INTELLECTUAL PROPERTY, INNOVATION, TRADE AND AGRICULTURE: STRATEGIES FOR THE ACTUALISATION OF AGENDA 2063 OF THE AFRICAN UNION

by

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DECLARATION

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DEDICATION

To the memory of my beloved sister, Elizabeth Beatrice Taaka, whose firm support for my education, boundless love, and relentless sacrifices inspire and motivate me every day.

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We did it—together.

ABSTRACT

This thesis investigates the role of intellectual property, innovation, and trade in achieving the agriculture-related goals of Agenda 2063, a strategic framework for Africa's development. The central research question is: How can intellectual property, innovation, and trade be leveraged to actualise the agriculture-related goals of Agenda 2063, and what legal and policy mixes are necessary to achieve these goals? Employing doctrinal analysis, the research establishes agriculture as a key stimulus for Agenda 2063, given its substantial contribution to the Gross Domestic Product of many African economies. Despite its importance, the sector faces persistent challenges including climate change, limited technological capacity, and low adoption of advanced agricultural technologies—factors that hinder productivity and necessitate urgent reform measures.

Recognising intellectual property, innovation, and trade as key enablers of development, the thesis links these elements to the realisation of the agriculture-related goals of Agenda 2063. It explores the legal and policy frameworks essential for transforming the sector, with emphasis on intellectual property laws related to agricultural technologies, particularly patents and plant breeders' rights. Innovation and trade are discussed in relation to their interdependency, acknowledging that intellectual property solutions alone are insufficient to achieve holistic results.

Findings show that while intellectual property rights have the potential to facilitate the materialisation of Agenda 2063 goals, many African countries face challenges that undermine their effectiveness in promoting agricultural development. Most intellectual property laws strictly comply with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and impose rigid standards, often neglecting the flexibilities that could enhance agricultural productivity. The thesis calls for a pro-development, TRIPS-compliant intellectual property framework that deliberately utilises TRIPS flexibilities, plant breeders' rights, and utility models, alongside supportive policy interventions and greater investment in research and development.

The thesis provides policymakers and stakeholders practical recommendations for developing a bespoke, pro-development, TRIPS-compliant intellectual property framework to serve as a principal guide for intellectual property strategies that can support advancements in agriculture and other sectors.[1]

[1] The cutoff date for the research is October 2024.

ABBREVIATIONS

ABS	Access and Benefit Sharing
ABioSA	Access and Benefit Sharing (ABS) Compliant Bio-trade in Southern Africa
ACET	African Centre for Economic Transformation
AfCFTA	African Continental Free Trade Agreement
AgGDP	Agricultural GDP
AMA	African Medicines Agency
ARIPO	African Regional Intellectual Property Organisation
AU	African Union
CBD	Convention on Biological Diversity
CAADP	Comprehensive Africa Agricultural Development Programme
CDC	Centre for Disease Control and Prevention
CIPR	Commission on Intellectual Property Rights
DSB	Dispute Settlement Body
DONATA	Dissemination of new agricultural technologies in Africa
ECOWAS	Economic Community of West African States
EPA	Economic Partnership Agreement
EU	European Union
FAO	Food and Agriculture Organisation
FARA	Forum for Agricultural Research in Africa
FAAP	Framework for African Agricultural Productivity
GATT	General Agreement on Tariffs and Trade
GATS	General Agreement on Trade in Services
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on Research and Development
GVC	Global Value Chains
ICESR	International Covenant on Economic, Social and Cultural Rights
ICT	Information and Communication Technology
ICTSD	International Centre for Trade and Sustainable Development
IMF	International Monetary Fund
IFPRI	International Food Policy Research Institute (IFPRI),

IP	Intellectual Property
IPR	Intellectual Property Right
ITC	International Trade Centre
ITPGRFA	International Treaty on Plant and Genetic Resources for Agriculture
LDC	Least Developed County
MFN	Most Favoured Nation
MNC	Multi-national Corporation
MIP	Minimum Integration Programme
NEPAD	New Partnership for Africa's Development
OAU	Organisation of African Unity
OAPI	*Organisation Africaine de la Propriété Intellectuelle* (African Intellectual Property Organisation)
OECD	Organisation for Economic Co-operation and Development
PAIPO	Pan - African Intellectual Property Organisation
PBR	Plant Breeders' Rights
PCT	Patent Cooperation Treaty
PIC	Prior Informed Consent
PIDA	Programme for Infrastructure Development in Africa
PVP	Plant Variety Protection
REC	Regional Economic Communities
R&D	Research and Development
RTA	Regional Trade Agreement
SDG	Sustainable Development Goal
S&D	Special and Differential Treatment
SME	Small and Medium-sized Enterprise
SPS	Sanitary and Phytosanitary Measures
STI	Science, Technology and Innovation
STISA	Science, Technology and Innovation Strategy for Africa
TBT	Technical Barriers to Trade
TCE	Traditional Cultural Expressions
TK	Traditional Knowledge
TRIPS	Agreement on Trade Related Aspects of Intellectual Property Rights

UDHR	Universal Declaration of Human Rights
UN	United Nations
UNCESCR	UN Committee on Economic, Social and Cultural Rights (CESCR)
UNCTD	UN Commission on Trade and Development
UNDP	United Nations Development Program
UNDROP	UN Declaration on the Rights of Peasants and Other People Working in Rural Areas
UNECA	UN Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UPOV	Union for the Protection of New Varieties of Plants
VCLT	Vienna Convention on the Law of Treaties
WIPO	World Intellectual Property Organisation
WCT	WIPO Copyright Treaty
WIPO SCP	WIPO Standing Committee on the Law of Patents
WTO	World Trade Organisation

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CHAPTER 1

INTRODUCTION AND RESEARCH OVERVIEW

1.1 Research Context

The thesis examines how intellectual property (IP), innovation and trade can be leveraged to actualise the agriculture-related goals and aspirations of Agenda 2063.[1] It seeks to answer the question: What is the role of IP, innovation, and trade in the actualisation of the agriculture related goals of Agenda 2063, and what legal and policy mixes are required to realise the Agenda goals and aspirations? This task is approached from the perspective that achieving Agenda 2063 is possible through sustained innovation, harnessing IP, and constructing a vibrant trade sector. In the contemporary global economy, IP innovation and trade are each widely recognised as critical drivers of economic growth, competitiveness, and prosperity.[2] This forms the basis for linking these three elements to the realisation of the agriculture-related goals of Agenda 2063.

To provide the background within which to answer the research question, the relationship between innovation, IP, trade, and agricultural development is drawn for a conceptualisation of what the optimal regulatory legal and policy response should comprise. The result is a recommendation for a multipronged strategy—one that incorporates appropriate legal and policy mixes.

The thesis places IP, innovation, and trade at the center of efforts to achieve the agriculture-related goals of Agenda 2063, with specific emphasis on IP. Agriculture is prioritised as a stimulus for Agenda 2063 due to its predominant role in many African economies, and contribution to the continental Gross Domestic Product (GDP). Agriculture also directly impacts nearly every other sector of the economy. Innovations within the sector

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[1] African Union Commission *Agenda 2063: The Africa We Want* (2013), available at *https://au.int/agenda2063* (accessed 10 May 2024).

[2] The role of IP in fostering economic growth through innovation is well-established (see R Zink 'The role of IP in promoting economic growth through innovation' (2009) *Intellectual Asset Management* 23-9; AR Atun, I Harvey & J Wild 'Innovation, patents and economic growth' (2007) 11(02) *International Journal of Innovation* 279–297). The relationship between international trade and economic growth has also been extensively explored (see T Singh 'Does international trade cause economic growth? A survey' (2010) 33(11) *The World Economy* 1517–1564; OA Yeboah, CB Naanwaab & S Saleem 'Effects of trade openness on economic growth: The case of African countries' (2012) *Southern Agricultural Economics Association.*

can therefore have far-reaching implications for the advancement of all sectors,[3] thus enabling the continent to realise the wider goals and aspirations of Agenda 2063.

Despite its importance, however, the sector remains largely subsistence-based, generates minimal income and cannot adequately feed a growing population. This poses a serious threat to food security, and undermines development. Under current conditions, its contribution to growth and development is limited, necessitating urgent transformational measures. Innovation in the sector is indispensable, coupled with efforts to scale trade, most importantly under the newly established African Continental Free Trade Area (AfCFTA).[4]

This chapter guides the thesis. It explains the research premise, the nature of enquiries undertaken to answer the research question, and very importantly, the assumptions that underpin this work.

1.2 Background

Africa's agricultural potential remains significantly untapped, with the continent lagging other regions of the world in terms of productivity. The labour force is stuck in subsistence agriculture with overwhelming dependence on rain,[5] leading to perpetual poor yields. The continent is a net food importer since the mid-1970s,[6] unable to supply enough food for its people.[7]

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[3] FM Wambugu, A Harvest & JO Okpaku *Science, Technology and Innovation for Agricultural Transformation* African Development Bank Group (2015) at 35. Available at *https://www.afdb.org/fileadmin/uploads/afdb/Documents/Events/DakAgri2015/Science__Technology_and_Innovation_for_Agricultural_Transformation.pdf* (accessed 15 May 2024).

[4] In January 2012, the 18th Ordinary Session of the AU Assembly in Addis Ababa adopted a decision to establish the AfCFTA with a tentative start date of 2017. The Summit also endorsed the Action Plan on Boosting Intra-Africa Trade (BIAT) which includes seven clusters: trade policy, trade facilitation, productive capacity, trade-related infrastructure, trade finance, trade information, and factor market integration. The AfCFTA, the world's largest free trade agreement, unites 55 African countries. Its primary objective is to create a single market for goods and services with free movement of persons, and to deepen economic integration in Africa. AFCFTA negotiations built upon existing REC frameworks. See: *https://au.int/en/ti/cfta/about* (accessed 10 May 2024) and UNECA '*The African Continental Free Trade Area (AfCFTA): Towards the Finalisation of Modalities on Goods'* (2018), available at *https://hdl.handle.net/10855/24379* (accessed 15 May 2023).

[5] See JM Moyo, EH Bah, A Verdier-Chouchane 'Transforming Africa's agriculture to improve competitiveness' *The Africa competitiveness Report* 2015 (2015) :37–52. For further exploration of these themes, see A Shimeles, A Verdier-Chouchane &A Boly 'Introduction: understanding the challenges of the agricultural sector in Sub-Saharan Africa' *Building a resilient and sustainable agriculture in sub-Saharan Africa* (2018) 1–12. Available at *https://doi.org/10.1007/978-3-319-76222-7_1* (accessed 15 May 2024).

[6] MA Rakotoarisoa, M Iafrate & M *Paschali Why has Africa become a net food importer? Explaining Africa agricultural and food trade deficits* (2012).

[7] United Nations. Economic Commission for Africa & African Development Bank 'Africa water vision for 2025: equitable and sustainable use of water for socioeconomic development' (2003).

In 2014, the year for which figures are available, cereal yield was estimated at around 1,430 kg per hectare of cultivated land, compared to 4,000 kg per hectare in Latin America and the Caribbean, and about 5,200 kg per hectare in East Asia and the Pacific.[8] It is also reported that in the last 40 years, Africa has steadily lost its share of the global agricultural market.[9] While previously at comparable development levels with countries such as Thailand, today, Thailand exports more food products than all of Sub-Saharan Africa combined.[10]

Evidence indicates that industrialised economies have historically pursued a development trajectory that is led by agricultural advancement.[11] East Asian giants like Japan and China traversed a path that relied on agricultural transformation as a basis for industrial growth. Agricultural growth has also been a prominent feature in the rest of developing Asia, particularly Indonesia, Malaysia, and Thailand.[12] (However, South Korea may stand out as an exception. Its post-war economic expansion deviated from this classical model, as industrialisation was not primarily agriculture-led and did not necessarily follow the agriculture-first model of development.[13] While South Korea's case suggests the possibility of alternative development routes, Africa's economic structure makes agricultural transformation a necessary basis for economic development given its dominant role in employment and livelihoods, as shall be seen later on).

In the case of Africa, agricultural performance lags other regions of the world,[14] with productivity growing at rates that are roughly half of the average rate of developing countries.[15]

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[8] AN Mukasa, DW Andinet, OA Salami & AM Simpasa 'Africa's Agricultural Transformation: Identifying Priority Areas and Overcoming Challenges' (2017) 8(3) *Africa Economic Brief* 1-16, available *https://www.afdb.org/sites/default/files/documents/publications/aeb_volume_8_issue_3.pdf* (accessed 21 August 2024).

[9] J Nash, N Halewood & S Melhem '*Unlocking Africa's Agricultural Potential: An Action Agenda for Transformation*' World Bank (2013) at 14.

[10] Ibid. See also World Bank 'Africa's food markets could create one trillion-dollar opportunity by 2030' (2013) available at *https://www.worldbank.org/en/news/press-release/2013/03/04/africas-food-markets-could-create-one-trillion-dollar-opportunity-2030* (accessed 15 May 2024).

[11] FAO Regional Office for Asia '*Rapid Growth of Selected Asian Economies: Lessons and Implications for Agriculture and Food Security, Synthesis Report'* (Policy Assistance Series) Food & Agriculture Org (2006), available at https://www.fao.org/4/ag087e/AG087E00.htm (accessed 15 May 2024). Also see AC Chu, PF Peretto & AC Chu, PF Peretto & X Wang 'Agricultural revolution and industrialisation' (2022)158 *Journal of Development Economics* 102887.

[12] Ibid.

[13] AH Amsden 'Asia's Next Giant: South Korea and Late Industrialisation'(1989) Oxford University Press.

[14] Nash, Halewood & Melhem (2013) Supra at 17.

[15] A Nin-Pratt. '*Inputs, productivity, and agricultural growth in Africa South of the Sahara'* IFPRI Discussion Paper 1432 International Food Policy Research Institute (2015) 11.

Studies by the Food and Agricultural Organisation (FAO),[16] the World Bank,[17] and the United Nations Commission for Africa (UNECA)[18] indicate that the current state of agriculture in Africa is characterised by low productivity, climate vulnerability, and a limited technological base. Low productivity has led to widespread rural poverty and food insecurity.[19] The potential for productivity increases presents an opportunity for growth. Innovation and IP can contribute to addressing the sector challenges and can enable countries to accelerate their integration in global trade and transition to modern economies, where greater fortunes can occur. Africa's future relies on the continent's ability to capitalise on its strengths, and to exploit its late-comer advantage in the development dynamic. The continent's population and youth power; and the latter's intersection with technologies have implications for agricultural transformation.[20]

The prevailing view in global trade is that IP-intensive goods substantially influence trade flows, international market participation,[21] and income levels. As a result, various countries and Regional Economic Communities (RECs) have introduced laws and policies to promote the production of such goods. [22]

Since gaining independence, however, which for most countries coincided with the founding of the Organisation for African Unity (OAU),[23] the African Union (AU) predecessor, most African countries still struggle to transition to modern economies. The stagnation can be linked to a failure to identify strategic development bottlenecks, with the result that countries

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[16] S Koroma, V Mosoti, & H Mutai et al *Towards an African Common Market for Agricultural Products* (2008).
[17] World Bank '*World Bank Assistance to Agriculture in Sub-Saharan Africa*: An IEG Review' (2007). Also see AH Akram-Lodhi, '(Re) imagining agrarian relations? The world development report 2008: Agriculture for development' (*2008 39(6) Development and Change* 1145-1161.
[18] UNECA & African Union *Assessing Regional Integration in Africa V: Towards an African Continental Free Trade Area* (2012).
[19] L Fox & L Sign '*Overcoming the barriers to technology adoption on African farms*' (2022), available at https://www.brookings.edu/articles/overcoming-the-barriers-to-technology-adoption-on-african-farms/ (accessed 15 May 2024).
[20] C Oguamanam '*Agriculture and the Future of Africa'* (2017). Available at https://www.oguamanam.com/publications/2017-10-31/agriculture-and-the-future-of-africa (accessed 27 September 2024).
[21] M Campi & M Duenas 'Intellectual property rights, trade agreements, and international trade' (2019) *Research Policy*, *48*(3), 531-545. Also see C Fink & CA Primo Braga '*How stronger protection of intellectual property rights affects international trade flows'* (1999) World Bank.
[22] See, for example, the COMESA Regional Policy on IP Rights and Cultural Industries (COMESA IP Policy), and the EAC Regional IP Policy on the Utilisation of Public Health-Related WTO-TRIPS Flexibilities and the Approximation of National IP Legislation.
[23] The OAU, founded on 25 May 1963 in Addis Ababa, Ethiopia, with 32-member governments and chaired initially by Haile Selassie I, was dissolved on 9 July 2002 by South African President Thabo Mbeki. It was succeeded by the AU. Refer to the Sirte Declaration which announced the decision to establish the African Union at the fourth Extraordinary Session of the OAU Assembly of African Heads of State and Government, Sirte, Libya, 1999.

cannot consequently resolve them. The majority of African countries have low per capita income and GDP.[24] Most economies are agrarian, characterised by low output, use of rudimentary technologies and substandard products that are unable to compete on the global market.[25] To change Africa's development path, African Heads of State and Government launched, in May 2013, at the eve of the 50th anniversary of the OAU, a 50-year development trajectory for Africa, called Agenda 2063.[26] Its rallying call is '*The Africa We Want.* '[27] Agenda 2063 is the strategic framework for transforming the continent into a global powerhouse of the future. It aims at a peaceful, integrated and prosperous continent by 2063. It is formulated to drive Africa's change, development and transformation. It sets targets to be achieved by 2063 in areas such as agriculture, health and overall poverty reduction.

There are a number of prerequisites essential to achieving Agenda 2063, which include fixing problems in the agricultural sector, considered critical for the continent's development; and the industrialisation and technological advancement of African economies. The fact that agriculture forms a major proportion of the economies of nearly all African countries, and the need for deliberate action cannot be overstated. [28] Scholars like Christiansen and Demery have stressed the sector's ability to alleviate poverty through the deployment of appropriate agricultural technologies.[29] Similarly, Bindraban, Van Keulen, and Leffelaar equally advocate

[24] S Rey & F Deisting 'GDP per capita among African countries over the period 1950-2008: Highlights of convergence clubs' (2012) 32(4) *Economics Bulletin* 2779. However, in 2017, Africa was reported to be the world's second-fastest-growing economy. See African Development Bank '*African Economic Outlook'* (2017).
[25] PS Bindraban, H Van Keulen & PA Leffelaar 'How to close the ever-widening gap of Africa's agriculture' (2008)4(3) International *Journal of Technology and Globalisation* 276-295. For related insights, refer to LJ Christiaensen *Down to earth: agriculture and poverty reduction in Africa* (2007) World Bank Publications.
[26] Agenda 2063 (2013) Supra.
[27] At the 50th OAU Anniversary, Heads of State and Government took stock of past achievements such as progress in ridding the continent of colonialism and acknowledged continuous pervasive challenges. The leaders rededicated themselves to the continent's development, pledging commitment to make progress in eight key areas, for the 'Africa We Want.' These are: (i) African identity and renaissance, (ii) the struggle against colonialism and the right to self-determination of people still under colonial rule, (iii) integration agenda, (iv) agenda for social and economic development, (v) agenda for peace and security, (vi) democratic governance, (vii) determining Africa's destiny, and (viii) Africa's place in the world.
[28] See C Schaffnit-Chatterjee, ML Lanzeni, DB AG & R Hoffmann 'Agricultural value chains in sub-Saharan Africa: From a development challenge to a business opportunity' (2014) *Deutsche Bank Research*, Frankfurt, 1-28. Also see BG Sims, M Hilmi & J Kienzle 'Agricultural Mechanisation: A Key Input for Sub-Saharan Africa Smallholders' (2016) *Integrated Crop Management* (FAO) eng v. 23; and TS Jayne & D Ameyaw 'Africa's emerging agricultural transformation: Evidence, opportunities and challenges' (2016) 1 *Africa Agriculture Status Report: Progress Towards Agriculture Transformation in Sub-Saharan Africa* 2-20, available at https://agra.org/aasr2016/public/pdf-viewer/web/report-sections/chapter-1.pdf (accessed 5 March 2024).
[29] See L Christiaensen & L Demery '*Revisiting the role of agriculture in poverty reduction in Sub-Saharan Africa'* World Bank Report Paper (2006); LJ Christiaensen *Down to earth: agriculture and poverty reduction in Africa'* World Bank Publications (2007); and L Christiaensen & L Demery '*Are African Countries Paying Too Much Attention to Agriculture'* (2010).

for closing Africa's agricultural gap by pointing out the catalytic role of technology, drawing parallels with the green revolution of the mid-20th century which dramatically increased agricultural productivity through the use of high-yield crop varieties, fertilisers, and irrigation.[30] Without a decisive move away from dependence on primary commodities toward manufacturing, innovation, and value addition, the continent's growth prospects will remain fragile.

Innovation, IP and trade are the tonic for (agricultural) growth[31] and are an important spark for Agenda 2063. IP protection is a key stimulus for innovation, as it influences the incentives to innovate.[32] The most vital component for innovations to flourish is the availability of funding for R&D, as indeed, most inventions world over have been possible through sustained investment in R&D.[33]

There are also important linkages between IP and trade, and the two are closely intertwined. IP regimes shape the trends and patterns of international trade, and trade policies influence the protection, enforcement, and exploitation of intellectual property rights (IPR). Goods often command a premium if their process and/or production integrates IP,[34] as IP improves the quality of products, maximises output and enables firms to move up value chains. Therefore, for agricultural products to attract value, they must integrate IP. Innovation, creativity and branding represent a large amount of the value that changes hands in international trade today.[35] There is no doubt that IP is central to global progress.

Nowadays, effective participation in international trade requires maximising innovation. Yet, innovation in Africa is too low, the lowest in the world. This is reflected in

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[30] Bindraban, Keulen & Leffelaar (2008) Supra.

[31] Zink (2009) Supra; MMA Mohamed, P Liu & G Nie 'Causality between technological innovation and economic growth: Evidence from the economies of developing countries' (2022)14(6) *Sustainability* 3586.

[32] H Torun &C Cicekci 'Innovation: Is the engine for the economic growth' Ege University (2007). Additional insights can be found in RA Atun, I Harvey & J Wild 'Innovation, patents and economic growth' (2007)11(2) International *Journal of Innovation Management* 279-297.

[33] HM Luong & N Hewitt-Dundas '*The interrelationship between R&D, innovation and productivity*'(2020), available at *https://www.enterpriseresearch.ac.uk/wp-content/uploads/2020/07/ERC-ResReport-DfE-Report-April-20.pdf* (accessed 15 May 2024).

[34] C Shapiro 'Premiums for high quality products as returns to reputations' (1983) 98(4) *The Quarterly Journal of Economics* 659-679.

[35]WTO *'Changing the face of IP trade and policy making'* (2015).

the Global Innovation Index,[36] Global IP Index[37] and Africa's share of global trade respectively.[38] Africa's gross expenditure on R&D as a proportion of GDP stands at only about 0.5 per cent compared to the world average of 2.2 per cent.[39] Statistics show that African countries spend an average of only 0.45 per cent of their GDP on R&D, falling well below the global average of 1.7 per cent.[40] These figures are too low to propel the continent towards its future, and fall below the 1 per cent target set by the AU.[41]

At continental level, the AU has identified IP and innovation as key economic drivers and affirmed trade as a tool for economic growth.[42] Harmonising national IP, innovation, and trade systems with the continent's development goals, especially in agricultural transformation, is a critical legal and policy imperative. Against this backdrop, the thesis explores appropriate legal and policy frameworks for advancing agricultural innovations, paying special attention to IP. It also provides a cursory discussion of innovation and trade, as integrated within the architecture of the sector's transformation. Innovation and trade are discussed in relation to their interdependency. Recognising that IP cannot function in isolation, the thesis emphasises the need for integrated legal and policy approaches that connects these three pillars to support agricultural progress.

The first step in the analysis involves identifying the pathways through which agricultural innovations can contribute to achieving Agenda 2063 goals and aspirations. These include the utilisation of the flexibilities found in the World Trade Organisation (WTO)

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[36] S Dutta, B Lanvin & S Wunsch-Vincent '*The global innovation index 2017'* Cornell University, INSEAD, & WIPO (Eds.), Global innovation index. (2019) 1-39. The report indicates that in sub-Saharan Africa, only South Africa (63), Kenya (77), and Mauritius (82) are in the top 100 of 129 ranked economies. The Global Innovation Index 2019, a global benchmark for stimulating and measuring innovation, evaluated economies based on 80 indicators, including R&D investments, patent and trademark applications, mobile app creation, and high-tech exports. South Africa and Rwanda (not in top 100) lead their income groups.

[37]U.S. Chamber of Commerce '*U.S. Chamber International IP Index'* (5th ed) (2017). Only Kenya, Egypt, and Algeria have impressive scores of 31, 41, and 42 respectively, out of 45 economies ranked. This performance is lower, according to the current assessment. See US Chamber of Commerce: '*International IP Index'* (2024).

[38] Africa plays only a marginal role in world trade. Its share of global exports is 2.4 per cent, with sub-Saharan Africa accounting for just 1.7 per cent. See ADB, OECD & UNDP *African Economic Outlook 2015: Overview* (2015).

[39] UNECA '*Towards Achieving the African Union's Recommendation of Expenditure of 1per cent of GDP on Research and Development: Expenditure Target of 1 Percent of Gross Domestic Product'* (2018), available at https://hdl.handle.net/10855/24306 (accessed 15 May 2024).

[40]WEF '*Innovative Approaches for Unlocking R&D Funding in Africa'* (2023), available at https://www.weforum.org/agenda/2023/11/innovative-approaches-for-unlocking-research-and-development-funding-in-africa/ (accessed 15 May 2024).

[41] Ibid.

[42] See: African Union '*Action Plan to Boosting Intra-African Trade (BIAT) and Framework for Fast Tracking the Establishment of the Continental Free Trade Area*' (2012); and Article 4 of the AfCFTA Agreement.

Agreement on Trade-related aspects of Intellectual Property Rights (TRIPS), tapping into utility models, and increasing R&D investments. Subsequently, supportive legal and policy frameworks must be designed to guide and sustain innovations. A substantial outlay of resources is required, most of which are out of reach for many countries.

In light of this, a continental (Pan – African) R&D strategy to support innovations ought to be conceived, the rationale for which shall become apparent in the course of the thesis. The New Partnership for Africa's Development (NEPAD),[43] the AU's economic programme that has long recognised agriculture's vital role in Africa's development is well-positioned to lead the development of this strategy and to identify key funding and cooperation opportunities. As a key institution within the AU, NEPAD plays a crucial role in advancing a number of pan-African development initiatives, particularly the critical components of Agenda 2063.[44]

1.2.1 Situating IP and Innovation in Agenda 2063

IP and technological innovation are interconnected, with technological advancement steering the evolution of IP systems, and IP stimulating technological innovation.[45] The development of vibrant innovation ecosystems supported by balanced and effective IP systems is an essential ingredient for Agenda 2063. This is a critical step to becoming producers of high-value knowledge-based goods and services supportive of Africa's transformation.[46] The World Intellectual Property Organisation (WIPO) has emphasised that the development and diffusion of innovative technologies is necessary for achieving a number of development goals.[47] In relation to agricultural growth, science and innovation are important in transforming Africa's

[43] NEPAD is an economic regeneration programme of the AU adopted in July 2001 at the 37th session of the Assembly of Heads of State and Government in Lusaka, Zambia and ratified by the AU in 2002.
[44] The 31st Ordinary Session of the African Union Heads of State and Government held in Nouakchott, Mauritania, in July 2018 approved the transformation of the NEPAD Planning and Coordination Agency (NPCA) into the African Union Development Agency (AUDA-NEPAD). On May 6, the Specialised Technical Committee (STC) on Justice and Legal Affairs adopted the AUDA-NEPAD statute and rules of procedure in Cairo, Egypt. For more information, see AU: *'NEPAD officially becomes African Union Development Agency – New Partnership for Africa's Development (AUDA-NEPAD)*', available at *https://www.nepad.org/nepad-officially-becomes-african-union-development-agency* (accessed 15 May 2024).
[45] M Guo et al 'Integration mechanism of intellectual property and scientific and technological innovation from a cross-domain perspective: International experience and enlightenment' (2023)12(1) *Frontiers in Business, Economics and Management* 26-32.
[46] United Nations Office of the Special Adviser on Africa (OSAA) *'The role of intellectual property rights in promoting Africa's development: Overview of IPR in Africa'* (2022), available at *https://etradeforall.org/boosting-business-competitiveness-in-africa-with-ip-and-innovation/* (accessed 15 May 2024).
[47] F Gurry *'The World Intellectual Property Organisation (WIPO) and Sustainable Development Goals'* (2017), available at *https://www.wipo.int/about-wipo/en/dgo/speeches/* (accessed 15 May 2024).

agriculture into a force of economic growth.[48] IP and innovation can for instance support the increase of crop yields, value addition via the application of scientific knowledge to entrepreneurial activities, the development of new varieties of plants, etc.

The AU has similarly underscored the significance of IP for innovation and creativity in the knowledge-based economy. For instance, while articulating the AU Common African Position in the post 2015 development agenda,[49] Pillar II of the Common Position underlined Science, Technology and Innovation (STI) as crucial contributory factors for the socio-economic scientific, technological, and cultural development of Africa and emphasised the role of IP in advancing innovation for sustainable agricultural technologies.[50] It also advocated for sound IP policy and institutional frameworks for the effective and balanced use of the IP system to promote innovation, creativity, entrepreneurship and development in Africa.

The decision by the AU to promote IP and innovation is also seen in attempts to strengthen STI through the adoption of Africa's first Science and Technology Consolidated Plan of Action (2005–2014), succeeded by the Science, Technology and Innovation Strategy for Africa (STISA) 2014–2024,[51]and soon STISA–2034,[52] all of which highlight the conjunction of IP and innovation in the development process.

In regard to Agenda 2063, STI lies at the center of the Agenda's development outlook. Agenda 2063 recognises STI as multi-functional tools for achieving continental development goals.[53] STISA is particularly adopted within the framework of Agenda 2063 as the continental framework for accelerating Africa's transition to an innovation-led, knowledge-based economy. While Agenda 2063 does not explicitly address IPR, its overarching objectives and

[48] C Juma The *New Harvest: Agricultural Innovation in Africa* (2015) Oxford University Press. Juma discusses key opportunities for transforming Africa's agriculture into a key driver of economic growth, including advancements in science and technology and the development of regional markets. He outlines essential policies and institutional reforms needed to support this transformation.

[49]See African Union 'Common African Position On the post-2015 development agenda' (2014) Doc Assembly/AU/9 (XXII) endorsed through Decision Assembly/AU/Dec, 503.

[50] Ibid.

[51]African Union Assembly/AU/Dec.520(XXIII) Decision on Science Technology and Innovation Strategy for Africa 2014-2024' (2014, June 27) adopted by the 23rd Ordinary Session of the African Union Heads of State and Government Summit.

[52]A draft strategy for STI in Africa, covering the years 2024 to 2034, is underway. It is expected to be validated and endorsed by the Ministers of STI in November 2024 and the AU Summit in February 2025.

[53] Also see Statute of the African Observatory in Science Technology and Innovation (AOSTI), 2016.

strategic priorities underscore the significance of IP and innovation in advancing Africa's development.[54]

Similarly, the AfCFTA, a key flagship project of the Agenda is developed with an IP Protocol, accentuating its projected role.[55] Further, the Agenda 2063 framework document calls for greater emphasis on STI in Africa's development by prioritising science and innovation-driven manufacturing, industrialisation, value addition, economic diversification and sustainable use of biodiversity.[56] Agenda 2063 has therefore made central the role of innovation as a major tonic for economic growth,[57] underlining the need to explore mechanisms for IP and innovation to facilitate agricultural transformation for increased productivity and overall value addition, among others. The strengthening of innovative capabilities is thus critical to enable Africa to move to a prosperous future.

The strategic channeling of resources to R&D and innovation for the development of agricultural technologies is expected to support the path to Agenda 2063. IP systems and implementation frameworks that support the actualisation of Agenda 2063 have to be designed early enough in the implementation process. At present, African countries have gained little from the existing international framework for IPR, which is modeled around the WTO - TRIPS. The current international framework has generally affected the conditions for access and use of technology and, therefore, the patterns of both industrial and technological development in Africa.[58] The AU, particularly through NEPAD and the office that shall oversee the AfCFTA IP Protocol's strategic visioning and planning need to craft new approaches to tap into the benefits of IP and innovation by designing policies and frameworks that enable Africa's progression in technology, to effectively power Agenda 2063.

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[54] IPR is a key element of STI, which is an important cross-cutting enabler for the implementation of Agenda 2063.

[55] See the African Continental Free Trade Area (AfCFTA) Protocol on Intellectual Property Rights (IP Protocol) (2023) adopted by the AU Assembly in Addis Ababa, Ethiopia on February 18–19, 2023.

[56] African Union Commission 'Linking Agenda 2063 and the SDGs' available at *https://au.int/ar/node/35001* (accessed 15 May 2024).

[57] N Rosenberg 'Innovation and economic growth' (2006); see also RE Evenson 'How far away is Africa? Technological spillovers to agriculture and productivity' (2000) 82(3) *American Journal of Agricultural Economics* 743-749; and preamble to the Statute of the Pan - African Intellectual Property Organisation (PAIPO) 2016.

[58] S Adams 'Intellectual property rights, innovation, and economic growth in sub-Saharan Africa' (2011) 28(1) *Journal of Third World Studies* 231-243.

To enable a focused discussion, the thesis limits its scope to IPRs that impact agricultural technologies, specifically patents and Plant Breeders' Rights (PBR).[59] Other forms of IP protection relevant to agriculture exist, such as trademarks, geographical indications, and trade secrets, but these will not be discussed in this study. It is however necessary to provide a general note of IP forms, and to highlight that each serves a differentiated purpose. IPR are typically divided into two main areas: copyright and related rights, and industrial property. Copyright covers the rights of authors of literary and artistic works such as books and other writings, musical compositions, paintings, sculptures, computer programs and films.[60] Related rights include rights of performing artists in their performances, producers of phonograms in their recordings, and broadcasters in their radio and television programs.[61] Industrial property on the other hand covers patents,[62] trademarks,[63] geographical indications[64] and designs.[65] Other IPR include PBR, trade secrets, and layout designs (topographies) of integrated circuits.[66] New IPRs however keep evolving.[67]

To leverage IP as a catalyst for Agenda 2063, there is need to strengthen the continent's STI capacities to enable the development and diffusion of new and appropriate agricultural technologies. The AfCFTA, which recently entered operational phase,[68] and the newly adopted AfCFTA IP Protocol are an opportunity to advance IP systems that support the actualisation of Agenda 2063 by increasing emphasis on R&D and positioning IP as an enabler for innovation and increased trade.

[59] See International Convention for the Protection of New Varieties of Plants, 1961, as revised at Geneva on November 10, 1972, on October 23, 1978, and on March 19, 1991 (UPOV Convention).
[60] Article 2(1) Berne Convention for the Protection of Literary and Artistic Works, 1886 (As revised).
[61] Article 3 Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organisations, 1961.
[62] Article 27 TRIPS Agreement.
[63] Article 15.
[64] Article 22.
[65] Article 25.
[66] Article 35.
[67] See for example, Traditional Knowledge/Traditional Cultural Expressions discussed under section 6.6.3.1.
[68] The Operational phase of the African Continental Free Trade Area was launched at the 12th Extraordinary Summit in Niamey, Niger, on July 7, 2019.

1.2.2 The AfCFTA and Agenda 2063 nexus

Trade is recognised as a critical engine for achieving the development goals outlined in Agenda 2063.[69] Its acclaimed role in the development process[70] seems to have informed the decision by the AU heads of State and Government to expedite the creation of the AfCFTA.[71] There is overwhelming evidence from various parts of the world to show that trade, like agriculture is a powerful agent of transformation, capable of alleviating poverty and enhancing economic growth.[72] The degree of these advantages however can differ based on the unique conditions of each country. The AfCFTA offers an unprecedented chance for Africa to revolutionise its economies through diversification, value addition, and technological upgrading,[73] which require investment in IP and innovation. Agenda 2063 does not detail how it may be achieved, but 10-year implementation plans[74] provide a roadmap for its operationalisation. Several flagship projects are already ongoing, including the AfCFTA, which was prioritised to support the acceleration of intra-Africa trade.

Rooted in Pan-Africanism and the African Renaissance,[75] Agenda 2063 aspires to define the 21st century as the African century by transforming Africa into a global powerhouse. Agenda 2063 is not an isolated plan; it builds on antecedents and historical frameworks like the Lagos Plan of Action[76] and the Abuja Treaty,[77]as well as initiatives such as the Minimum Integration Programme (MIP),[78] the Programme for Infrastructure Development in Africa

[69]African Union *'Agenda 2063: The Africa We Want'* (2015) Popular Version, paragraphs 24-25 and 72(h), available at https://au.int/sites/default/files/documents/36204-doc-agenda2063_popular_version_en.pdf (accessed 15 May 2024).
[70] I Frank 'The role of trade in economic development' (1968) 22(1) *International Organisation* 44-71.
[71] The AfCFTA was adopted by the African Union in January 2018 and signed in Kigali, Rwanda on March 21, 2018. The operational phase was launched on July 7, 2019, and trading began on January 1, 2021. On January 31, 2024, South Africa sent its first shipment to Kenya under the AfCFTA agreement.
[72] World Bank, International Monetary Fund, World Trade Organisation '*Making Trade an Engine of Growth for All: The Case for Trade and for Policies to Facilitate Adjustment'* International Monetary Fund (2017).
[73] Goal 8.2 of the United Nations Sustainable Development Goals (SDGs), 2015-2030.
[74] Agenda 2063 is operationalised through a series of five Ten-Year Implementation Plans. The first plan, covering the period from 2014 to 2023, focused on convergence by harmonising policies and strategies across the continent. The second plan, spanning from 2024 to 2033 emphasises accelerating the implementation of these initiatives, building on the foundational work of the first decade. See Agenda 2063: First Ten-Year Implementation Plan, 2014-2023; Agenda 2063: Second Ten-Year Implementation Plan, 2024-2033.
[75]African Union *'Agenda 2063: The Africa We Want'* (2015) Popular Version, para 1, available at https://au.int/sites/default/files/documents/36204-doc-agenda2063_popular_version_en.pdf (accessed 15 May 2024).
[76] Lagos Plan of Action for the Economic Development of Africa, 1980–2000.
[77] Treaty Establishing the African Economic Community (AEC Treaty), 1991, Abuja, Nigeria (also known as the Abuja Treaty).
[78] The MIP embodies activities of projects and programmes the RECs need to implement to speed up the conclusion of the regional and continental integration process.

(PIDA),[79] the Comprehensive Africa Agricultural Development Programme (CAADP),[80] and NEPAD, which collectively support its strategic vision of economic growth, sustainable development, and greater global influence.

Agenda 2063 seeks to deliver on seven aspirations, each loaded with its own set of goals.[81] These include: a prosperous Africa based on inclusive growth and sustainable development (Aspiration 1); an integrated continent politically united and based on the ideals of pan-Africanism and a vision for Africa's renaissance (Aspiration 2); an Africa of good governance, democracy, respect for human rights, justice and the rule of law (Aspiration 3); a peaceful and secure Africa (Aspiration 4); an Africa with a strong cultural identity, common heritage, shared values and ethics (Aspiration 5); an Africa whose development is people driven, relying on the potential of the African people, especially its women and youth (Aspiration 6); and Africa as a strong, united and influential global player (Aspiration 7).

Aspiration 1 is of particular interest, from the perspective that agricultural prosperity would have spillover effects for other development aspirations and outcomes. Aspiration 1 *interalia* envisages the following: a leap in the global quality of life measures for African countries attained through strategies of inclusive growth, job creation, investments in science, technology, research and innovation; gender equality, youth empowerment and the provision of basic services including health, nutrition, education, shelter, water and sanitation. It also seeks to modernise Africa's agriculture using STI and indigenous knowledge. To achieve this, Africa would have to scale up its innovation capacity to provide the enabling environment for achieving the Agenda objectives.

Ten Year Implementation Plans mentioned above guide the implementation of Agenda 2063 objectives. The first ten-year implementation plan had eight priorities translated into concrete targets designed to directly impact the welfare, lives and livelihoods of the African people. One of the priorities was to expand agricultural production, develop the agro-

[79] Programme for Infrastructure Development in Africa (PIDA) adopted at the 18th Ordinary Session of the African Union (AU) held in Addis Ababa, Ethiopia, on 29-30 January 2012, endorsed through adoption of the 'Declaration on the Programme for Infrastructure Development in Africa' (Doc. EX.CL/702(XX)).

[80] NEPAD 'Comprehensive Africa Agriculture Development Programme (CAADP)' (2003), available at *https://nepad.org/programme/comprehensive-africa-agriculture-development-programme-caadp* (accessed 15 May 2024).

[81] See the First Ten -Year Implementation Plan which included 7 Aspirations, 20 Goals, 13 Fast-Track Projects, 39 Priority Areas, and 255 targets. The Second Ten-Year Implementation Plan of Agenda 2063 builds on this foundation, aiming to further integrate African economies and drive socio-economic transformation with a focus on sustainability, inclusivity, and resilience.

processing and business sectors; increase market access and achieve food self-sufficiency and nutrition through smallholder agriculture. The second ten-year implementation plan builds on the foundational work of the first plan and seeks to achieve modernised agriculture.[82] As noted, the implementation of Agenda 2063 involves a series of flagship projects, including the establishment of the AfCFTA. The central theme of these initiatives is the pursuit of accelerated growth and socio-economic transformation.[83]

From the outset, significant capital is placed on trade, with emphasis on intra-African trade.[84] To this end, the AfCFTA is one of the first key flagship projects to be rolled out.[85] The AfCFTA was established on May 30th 2019,[86] following a series of negotiations that commenced in 2016.[87] The AU 18th Ordinary Session of the Assembly of Heads of State and Government approved the AfCFTA as an urgent initiative whose immediate implementation would provide quick gains and impact on the socio-economic development of the continent.[88] The AfCFTA is thus expected to help accelerate Africa's development vision and contribute to the achievement of Agenda 2063.

The AfCFTA is also part of the AU's regional integration strategy to overcome the constraint of small fragmented economies. Its establishment is consistent with the WTO multilateral trading system specifically Article XXIV of the General Agreement on Tariffs and Trade (GATT), the Enabling Clause, and Article V and VI *bis* of the General Agreement on Trade in Services. (GATS).[89]

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[82] Agenda 2063, Moonshot 1, Strategic Objective 1.3.
[83] Flagship Projects of Agenda 2063 include the AfCFTA, Grand INGA Dam Project, Pan - African e-Network, Integrated High-Speed Train Network.
[84] Action Plan to Boosting Intra-African Trade (BIAT) and Framework for Fast Tracking the Establishment of the Continental Free Trade Area (2012).
[85] Decision on the Launch of Continental Free Trade Area Negotiations Doc. (*Assembly/AU/11(XXV*).
[86] The Agreement establishing the African Continental Free Trade Area entered into force on 30 May 2019 for the 24 countries that had deposited their instruments of ratification, as stipulated under Article 23 of the Agreement.
[87]African leaders held an Extraordinary Summit on the AfCFTA from 17-21 March 2018 in Kigali, Rwanda, during which the Agreement establishing the AfCFTA was presented for signature, along with the Kigali Declaration and the Protocol to the Treaty Establishing the African Economic Community relating to the Free Movement of Persons, Right to Residence and Right to Establishment.
[88]Decision (*Assembly/AU/Dec.394 [XVIII])* of the 18th Ordinary Session of the AU Assembly, held in Addis Ababa, Ethiopia, 2012 to establish a Continental Free Trade Area by 2017. The Summit endorsed the Action Plan on Boosting Intra-Africa Trade (BIAT), identifying seven priority clusters: trade policy, trade facilitation, productive capacity, trade-related infrastructure, trade finance, trade information, and factor market integration.
[89] UNCTAD *'Building the African Continental Free Trade Area: Some Suggestions on the Way Forward'* (2015).

The AfCFTA relies, to a large extent, on IP as a crucial lever for its outcomes. It acknowledges IP as a trade-related aspect, integral to Africa's developmental trajectory. Article 4 of the AfCFTA Agreement mandates that State Parties collaborate on investment, IPR, and competition policy to fulfill the AfCFTA's objectives.[90]

To maximise IP benefits, initiatives should be synchronised with the AfCFTA, preferably through the IP office that is to be established under the AfCFTA IP Protocol, considering that coordinated and multi-pronged efforts are required to address the challenges of the sector.

Suffice to mention that references to the AfCFTA IP Office are forward-looking and acknowledge that while Article 31 of the Protocol provides for its establishment, its governance, administrative structure, functions, and rules of procedure are still to be determined. In the evolving institutional framework of the AfCFTA, this study envisages the AfCFTA IP Office as a potential entity that could play a vital role in harmonising IP systems, facilitate technology transfer and promote agricultural innovation. The office's future role will depend on the adoption of an Annex to the AfCFTA IP Protocol, which would formally establish and operationalise it.

The AfCFTA is expected to promote the agriculture and agribusiness sectors by creating new regional markets for farmers, enhancing agro-value chains, fostering innovation, and potentially substituting imports from non-AfCFTA countries. [91] With the successful reduction of tariffs under the AfCFTA, market access for Africa's agricultural products is projected to increase, thereby boosting intra-Africa trade.[92] There is great potential for IP to play a key role in transforming production processes and patterns in Africa. As the private sector faces pressure to add more value to their products to remain competitive, they will need to adopt new approaches and invest in innovation to enhance competitiveness. With modernised agriculture and a fully functional AfCFTA, the pathway to achieving Agenda 2063 will be paved.

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[90] Scholars viewed its Protocol on IP as an opportunity to set common rules on IPR and achieve harmonisation based on a common approach. See CB Ncube, T Schonwetter, J de Beer & C Oguamanam *'Intellectual Property Rights and Innovation: Assessing Regional Integration in Africa* (ARIA VIII)*'* (2017).

[91] M Lubinga '*What Does the African Continental Free Trade Area (AfCFTA) Agreement Mean for South Africa's Agricultural Sector?'* (2019), available at *https://www.namc.co.za/commentary-what-does-the-african-continental-free-trade-area-afcfta-agreement-mean-for-south-africas-agricultural-sector/* (accessed 15 May 2024).

[92] ON Onwuka & KC Udegbunam 'The African Continental Free Trade Area: Prospects and Challenges' (2019)3 *Conflict Trends* 3-10.

However, even though the AfCFTA is a key step forward towards Agenda 2063, there is still a long road ahead. The continent needs to innovate solutions to fix the pervasive challenges highlighted in section *1.2.3* below. Gains in agricultural productivity are expected to increase economic prosperity. Therefore, building innovation capacities to address old, new and recurring challenges cannot be overemphasised.

1.2.3 Agenda 2063 and Agriculture

1.2.3.1 The Prime Position of Agriculture

Agriculture is the backbone of many of African economies.[93] The agricultural economy employs 65–70 per cent of Africa's labor force (approximately two-thirds)[94] and accounts for about 75 per cent of domestic trade.[95] Its prominence is evident in its substantial contribution to GDP,[96] which on average stands at 15 per cent but varies widely — from below 3 per cent in Botswana and South Africa to over 50 per cent in Chad, (which may reflect varied economic structures).[97]

The sector's dominance in African economies lends merit to improving its fortunes as the springboard for enhanced growth, and consequently, the materialisation of Agenda 2063. Several national, regional, Pan-African, and international organisations have emphasised the need for Africa's economic transformation, with a growing consensus pointing to agriculture as the stimulus for this change.[98] STI in agriculture is acknowledged as critical to achieving progress. An often-quoted example is the agricultural revolution in Asia, which occurred roughly half a century ago. Asia's agricultural transformation was largely propelled by scientific research that led to the development of high-yielding varieties of rice and wheat.[99] It was further supported by deliberate favourable government policies that encouraged

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[93] L Goedde, A Ooko-Ombaka & G Pais 'Winning in Africa's agricultural market. *Private-Sector Companies Can Find Practical Solutions to Enter and Grow in Africa's Agricultural Market'* (2019).
[94] OECD-FAO *Agricultural Outlook 2016-2025* (2016) OECD Publishing, Paris. The study shows that agriculture is the most important sector in African economies. In a few countries however such as South Africa, Mauritius and Kenya, the services sector is more prominent and has overtaken the combined share of agriculture and manufacturing. See UNCTAD *Economic Development in Africa: Unlocking the Potential of Africa's Services Trade for Growth and Development* (2013).
[95] World Bank 'Agriculture for Development' World Development Report (2008), available at *http://hdl.handle.net/10986/5990* (accessed 12 July 2024).
[96] OECD-FAO (2016) Supra.
[97] Ibid at 60.
[98] FM Wambugu, A Harvest & JO Okpaku (2015) Supra at 1.
[99] Ibid at 1.

investment in key agricultural inputs such as fertilisers, irrigation, mechanisation, information dissemination, farmer training, transport infrastructure, and improved grain storage to prevent post-harvest losses.[100] As a result, Asia successfully transitioned from a food-deficit region to a net exporter of rice and wheat, including to Africa.[101]

In Africa, the sector is impacted by a complex web of problems. Increasing land degradation, declining soil productivity, climate change and unpredictable weather patterns combine to undermine productivity of the sector.[102] In addition to environmental challenges, there is low technology deployment, limited diversification and value addition. Relevant and often existing technologies are rarely deployed.[103] There is still widespread use of outdated practices such as planting according to phases of the moon and reliance on traditional tools like hand hoes and cutlasses, which further impede sectoral progress. Additionally, much of the farming is subsistence-oriented, with minimal commercial-scale agriculture.[104]

The decline in agricultural production capacity remains a serious concern, occasioned in part, by post-harvest losses. Farmers often incur substantial losses due to inadequate access to post-harvest handling, packaging, and marketing technologies.[105] Post-harvest losses in Africa range from 20 to 60 per cent in various countries and for various commodities.[106] In sub-Saharan Africa, particularly, agricultural productivity has lagged behind other regions of the world,[107] with crop yields reaching only about 20 per cent of their potential.[108]

Weak supply chains further impact both agricultural productivity and food security. The food and agriculture supply chain consist of four interlinked stages: farm preparation,

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[100] Ibid.
[101] Ibid.
[102] R Steinbach *'Growth in Low-Income Countries: Evolution, Prospects, and Policies'* (2019) World Bank Policy Research Working Paper (8949).
[103]The Africa Report '*New Technology and Agriculture, A sluggish uptake* (2013), available at *http://www.theafricareport.com/West-Africa/new-technology-and-agriculture-uptakestill-sluggish-among-smallholders.html 1.* (accessed 15 May 2024)
[104]On the need to commercialise the agricultural sector, see WR Mgomezulu, MMN Chitete & BB Maonga, 'Does shifting from subsistence to commercial farming improve household nutrition and poverty? evidence from Malawi, Tanzania and Nigeria' (2024)8 *Research in Globalisation* 100201.
[105] FAO *Global Food Losses and Food Waste: Extent, Causes and Prevention* (2011). For a thorough discussion on post-harvest losses, see J Kaminski & L Christiaensen 'Post-Harvest Loss in Sub-Saharan Africa-What Do Farmers Say?' (2014)3(3-4) Global *Food Security* 149-158.
[106] FM Wambugu, A Harvest & JO Okpaku (2015) Supra at 5.
[107] KE Giller, T Delaune & JV Silva et al 'Small farms and development in sub-Saharan Africa: Farming for food, for income or for lack of better options?' (2021) 13(6) *Food Security* 1431-1454.
[108] PA Sanchez 'Soil fertility and hunger in Africa' (2002) *295*(5562) *Science* 2019–2020. Also see MK Van Ittersum, KG Cassman & P Grassini et al '*Yield gap analysis with local to global relevance—a review'* Field Crops Research 143 (2013): 4-17.

farming/production, preservation, and transportation. In all four stages, IPR is indispensable for productivity and efficiency. For instance, in farm preparation, IPRs incentivise innovations such as improved seed varieties, fertilisers, and farming equipment, which enhance productivity and resilience. During farming/production, IPRs protect technologies like precision agricultural tools and pest-resistant crops that optimise yields. In the preservation stage, IPRs encourage the development of advanced storage solutions and processing technologies to reduce post-harvest losses. Finally, in transportation systems, IPRs support innovations in logistics, cold chain systems, and tracking technologies, which allows for efficient delivery of food products to markets. Fixing weak supply chains is essential for achieving agricultural growth and ensuring food security considering that it not only enhances the efficiency of food production and distribution but also mitigates risks related to food spoilage, loss, and access disparities.

Whereas there are advances in technology like Information Communication and Technology (ICT), mobile telephony, and biotechnology, poor governance and weak policies that fail to promote agricultural investment and productivity are major barriers to transformation,[109] which makes it clear that the role of innovation and IP in addressing these challenges is under appreciated,[110] and highlights the urgent need to promote innovative solutions and modern technologies along the agricultural value chain.

A major factor derailing Africa's growth prospects in agriculture therefore is the pace of technology advancement. African countries, which make up the majority of the world's least developed countries (LDCs) are at the lower end of the technology radar.[111] The Global Innovation Index[112] which monitors the state of technological advancement in several countries spotlighted a few innovation achievers in Africa including Mauritius, South Africa and Kenya, with the latter holding its position as a top performer for eleven consecutive years.[113] 21 out of the 32 countries in the bottom quartile of this index are LDCs, the majority of which are

[109] Ibid at 13–19.
[110] TJ Lybbert, G Diiro, D Kawooya & *Enhancing innovation in the Ugandan agri-food sector: Robusta coffee planting material & tropical fruit processing* (2017).
[111] The United Nations classifies LDCs as the world's poorest and weakest countries suffering from structural impediments to economic development. See *Timeline of LDC Criteria Changes, UNITED NATIONS*, available at *https://search.un.org/search?sort=relevance&collection=All&q=ldc+classification&row=10&currentPageNumber=1* (accessed 15 May 2024).
[112] S Dutta, B Lanvin, S Wunsch et al., eds. *Global innovation index 2022: what is the future of innovation-driven growth?* WIPO (2022) 2000.
[113] Ibid at 25.

located in Africa. Of the 22 LDCs ranked, only Tanzania appears in the second quartile. [114] This is further reflected in the pattern of LDC exports, with the share of high-tech manufacturing exports being below 1 per cent for all African LDCs, except Tanzania.[115] In contrast, countries such as Malaysia, the Philippines, and Vietnam, while not LDCs demonstrate much higher performance, with high-tech manufacturing exports accounting for 38.6 per cent, 36.2 per cent, and 36.1 per cent, respectively, over 30 times the share seen in most African LDCs.[116]

It has been shown that a country's product and export composition is decisive in determining its development course.[117] The production and export of technology-intensive, high-value, and sophisticated goods generates higher income and contributes more to productivity and transformation than the export of primary or semi-processed goods.[118] What a country produces and exports is therefore crucial. The key issue, therefore, is for African countries to raise their investments in the critical areas necessary to ensure the level of technological sophistication required to achieve the desired transformation.

Africa's agriculture needs to be revolutionalised around new advances in biology, agronomy, plant and animal science, digitisation, and robotics.[119] To this list can be added the development of modern farm machinery and innovative models of farm ownership. The Global Agricultural Productivity Report, which assesses agricultural productivity growth indicates that over the past decade, investment in agricultural innovation has been fueled by an unprecedented convergence of these fields.[120] These technologies, collectively referred to as 'digital agriculture, precision farming, or smart farming,'[121] are creating the basis for a new more productive and sustainable future for agriculture.[122] For Africa, harnessing the game

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[114] Ibid at 4.
[115] Ibid.
[116] Ibid.
[117] H Hesse '*Export diversification and economic growth'* Washington, DC: Commission on Growth and Development (2008)21 1-23.
[118] World Economic Forum *'Technology is the Key to Transforming Least Developed Countries. Here's How'* (2022), available at https://www.weforum.org/agenda/2022/01/technology-is-the-key-to-transforming-least-developed-countries/ (accessed 25 July 2024).
[119] For opportunities and challenges in scaling up the application of AI in agriculture, see A Gwagwa et al *'Road Map for Research on Responsible Artificial Intelligence for Development (AI4D) in African Countries: The Case Study of Agriculture'* (2021).
[120] Global Harvest Initiative *'Global Agricultural Productivity Report: Sustainability in an Uncertain Season'* (2016).
[121]EH Van & J Woodard 'Innovation in Agriculture and Food Systems in the Digital Age' in *The Global Innovation Index* (2017) 97-104.
[122] Ibid.

changing technologies presents a unique opportunity to bypass the limitations of the Green Revolution to a direct leapfrog into a new era.

Some countries in Africa have started campaigns promoting the integration of new technologies in farming. The Africa Report (2015)[123] for example details how the Cameroonian government launched a campaign called 'second-generation' (2G) agriculture, aimed at encouraging farmers to shift from rudimentary practices and adopt mechanisation, advanced irrigation techniques, fertiliser and pesticides use, among other farming practices. The Forum for Agricultural Research in Africa (FARA) has similarly implemented the Dissemination of New Agricultural Technologies in Africa (DONATA)[124] with the objective to promote the widespread adoption and use of proven agricultural technologies to boost productivity, promote agricultural growth, enhance food security, and reduce poverty in Africa. Whereas these efforts are commendable, they remain sparse. Moreover, for investments in agriculture to deliver economic and social returns, countries need to capitalise on the catalytic power of STI.[125]

The key options available to tackle the challenges in the sector therefore necessitate a comprehensive approach that includes substantial investments in agricultural R&D (AgR&D), enhancing innovation, and the effective utilisation of IP through necessary legal and policy reforms. It is also important to not only promote the development of homegrown technologies but also encourage the adoption of innovations from elsewhere that remain underutilised in Africa. This effort should be complemented with improving access to markets. Currently, due to the limited deployment of technology in the agricultural sector, many African countries mostly trade in commodities with minimal value addition. To be able to enhance agriculture's development prospects to deliver Agenda 2063, there needs to be a paradigm shift towards leveraging technology-driven advancements in agriculture.

While the research emphasises the necessity to increase spending on R&D and the need for a continent -wide (Pan-African) strategy on R&D, it's necessary to highlight that R&D is only useful to the extent that it effectively promotes technological learning and builds

[123] Alliance for a Green Revolution in Africa (AGRA) 'Africa Agriculture Status Report: Youth in Agriculture in Sub-Saharan Africa' (2015), available at https://agra.org/wp-content/uploads/2021/03/africa-agriculture-status-report-2015.pdf (accessed 8 June 2024).
[124] See AO Fatunbi, A Youdeowei, SI Ohiomoba & AA Adekunle et al *'Agricultural Innovation Platforms: Framework for Improving Sustainable Livelihoods' in* Africa' Forum for Agricultural Research in Africa (FARA) (2016).
[125] NEPAD 'Agriculture in Africa: transformation and outlook' (2013).

innovation capacities in individual countries. Therefore, it's important for the AU to pay keen attention to the nature of research activities it promotes to ensure they address the technology deficit of the continent. This means prioritising research that not only generates new knowledge but also translates it into practical solutions that can be readily applied to address the challenges faced by African countries, particularly in sectors like agriculture where technological advancements are crucial for its development. Investing in innovation and modernising agricultural practices will not only boost productivity but also boost growth throughout the continent.

1.2.3.2 Aligning Agricultural Reform with Agenda 2063 Aspirations

The importance of the sector in Africa is well-established, given its dominance in most countries, with the possible exception of countries like South Africa, Botswana, and Mauritius.[126]As the backbone of many African economies, it plays a vital role in sustaining livelihoods and enhancing economic growth in the continent. It follows that developing the sector through increased technological integration can improve its gains and enable materialisation of the Agenda.[127]

Agenda 2063 seeks to transform Africa's agriculture by enhancing productivity and production through technological advancement as part of the ambition of transforming Africa's economies.[128] It also seeks action to address climate change and environmental factors that pose a great risk to the sector. Africa's agricultural transformation is anchored in CAADP, which constitutes the agricultural component of the Agenda. It anticipates dramatic transformation of the agricultural sector from subsistence to commercial production, agro processing and manufacturing. The Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved livelihoods[129] provides additional impetus to the CAADP process and gives the direction for agriculture on the continent.

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[126] Kenya has a fairly well-developed services sector estimated to contribute approximately 54.4 per cent to GDP. Even in these countries however, the agriculture sector provides the highest formal and informal employment, and is the basis for livelihood security in Africa's rural areas. See Kenya 'National Trade Policy' (2016) available at *https://www.trade.go.ke/sites/default/files/Kenyaper cent20Nationalper cent20Tradeper cent20Policyper cent20per cent282016per cent29_0.pdf* (accessed 15 May 2024).

[127] See O Ajakaiye & A Jerome 'Sub-Saharan Africa's Development Experience and Policy Practice, 1960–2018' in O Ajakaiye & A Jerome (eds) *African Economic Development* (2019) 497-519.

[128] Goal 5.

[129] Adopted at the 23rd Ordinary Session of the AU Assembly, Malabo, Equatorial Guinea, 26-27 June 2014.

Goal 5 of Aspiration 1[130] of Agenda 2063 envisages modern agriculture for increased productivity and production. Goal 5 is expected to be achieved through a set of targets including: allocation of a minimum of 10 per cent annual public expenditure to agriculture and growing the sector by at least 6 per cent per annum;[131] Doubling agricultural total factor productivity;[132] Increasing youth and women participation in integrated agricultural value chains by at least 30 per cent;[133] Reducing post-harvest losses by 50 per cent;[134] Increasing the proportion of farm, pastoral and fisher households resilient to climate and weather related risks to 30 per cent;[135] At least 10 per cent of Agricultural GDP to be produced by commercial farmers;[136] At least 10 per cent of small-scale farmers to progress into small-scale commercial farming and of those progressing at least 30 per cent should be women;[137] and tripling intra-African trade of agricultural commodities and services, among other targets.[138]

Goal 5 aims to ensure implementation of resilient agricultural practices that increase productivity and production, maintain ecosystems, strengthen capacity for adaptation to climate change, extreme weather, drought, flooding, among others. CAADP,[139] the key document for realising agriculture related Agenda 2063 goals and aspirations seeks to raise Africa's economic growth through agriculture-led development by actualising the targets above. Through CAADP, African governments agreed to allocate at least 10 per cent of national budgets to agriculture and rural development, and to achieve agricultural growth rates of at least 6 per cent per annum, a feat yet to be achieved.[140]

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[130] Agenda 2063 seeks to deliver on a set of Seven Aspirations each with its own set of goals.
[131] Agenda 2063, Target 5.1.
[132] Ibid Target 5.2.
[133] Ibid Target 5.3.
[134] Ibid Target 5.4.
[135] Ibid Target 5.5.
[136] Ibid Target 5.6.
[137] Ibid Target 5.7.
[138] Ibid Target 5.8.
[139] CAADP is one of the several continental frameworks developed to address the development of key sectors such as Agriculture and trade, considered key in enabling AU Member States to achieve their development goals. Others include: The Programme for Infrastructural Development in Africa (PIDA), The African Mining Vision (AMV, Science Technology Innovation Strategy for Africa (STISA), and Accelerated Industrial Development for Africa (AIDA).
[140]AUDA - NEPAD '*African nations to set common plans addressing agriculture challenges*.' Available at *https://www.nepad.org/news/african-nations-set-common-plans-addressing-agriculture-challenges* (accessed 18 June 2024). To date, 43 African countries have formally joined the CAADP process. Out of these 39 have developed formal national agriculture and food security investment plans – and these have become their medium-term expenditure frameworks for agriculture, thus resulting in improved agricultural planning. See AUDA - NEPAD '*43 countries have joined CAADP.'* Available at *https://nepad-aws.assyst-uc.com/caadp/interactive-timeline/43-countries-have-joined-caadp* (accessed 25 September 2024). All countries are at different stages of implementation.

In a nutshell, the successful realisation of Agenda 2063 depends, in large part, on Africa's ability to transform its agriculture from a predominantly subsistence-based activity into a modern, technology-driven engine of inclusive growth. As the sector that sustains the majority of livelihoods and contributes considerably to national economies, it holds unmatched potential to stimulate the continent's socio-economic transformation. Agenda 2063, particularly through CAADP and the Malabo Declaration, outlines a bold vision for a productive, technology-driven, and climate-resilient agricultural sector. The vision is not merely to improve yields, but to modernise the sector.

Success shall require some basics to be in place, mentioned above— committed public investment, integration of innovation and research, supportive trade and IP policies as well as developing trained scientific talent, improving transportation and other kinds of infrastructure.[141] Investments must be directed toward some key general opportunities including embracing technological breakthroughs that could sustainably raise farmers from poverty.[142] If these building blocks are secured, agriculture can become a powerful lever for realising the continent's development agenda.

1.3 Theoretical Orientation

IPR is understood and justified through various philosophical and legal theories including the utilitarian, personhood and labour theories. The utilitarian theory supports IPR on the basis that it promotes innovation and creativity, thereby advancing overall societal welfare. The personhood theory justifies protection of intangible works by linking them to the creator's identity and self-expression. The labour theory, which draws from natural rights principles argues that individuals have a rightful claim to the products of their labour including intangible creations, because they have invested effort and skill in bringing them into existence. Each of the theories emphasises different aspects of creativity, effort, and public good.

The utilitarian theory, propounded by classical philosophers such as Jeremy Bentham and John Stuart Mill seeks the maximisation of societal welfare through policies and practices that promote the greatest good for the greatest number.[143] According to this theory, society

[141] Z Gaibi, A Maske &S Moraje 'Africa's Path to Growth: Sector by Sector' McKinsey Quarterly Economic Studies (2010).
[142] Ibid.
[143] PS Menell 'Intellectual Property: General Theories' (1999)2, *Encyclopedia of Law and Economics* 129-188.Also see R Crisp '*Routledge philosophy guidebook to Mill on utilitarianism'* (2002) Routledge; and. J

benefits when individuals innovate, as their progress leads to widespread societal benefits.[144] IP is characterised as a set of intangible assets resulting from human intellect, requiring protection through rights similar to those applied to tangible assets.[145] From a utilitarian perspective, Bentham argued that authors, inventors, and artists should enjoy exclusive rights to their creations for a limited time.[146] Exclusivity ensures proper remuneration for their work while incentivising continued innovation.[147] Thus, IP protection is justified because it encourages innovation, which ultimately promotes the greatest good for society. While, however, utilitarianism supports temporary monopolies to encourage innovation, it is clear that a balance of these rights with public access to inventions is required, through legislative measures.[148]

The labor theory of property, famously advanced by John Locke, posits that property rights originate from the labour an individual exerts upon natural resources. [149] Locke asserts in his *Second Treatise of Government* that all things in nature are provided by God and are held in common for the benefit of all. [150] No individual can claim prior ownership over substances available in nature, as these resources are meant for the enjoyment of all humanity. However, when an individual exerts labor upon these resources, they may claim ownership because their labor has added value. [151] In Locke's view, labour is the central factor contributing to the value of an item.

It is worth noting that while Locke, a labour theorist who also explored natural rights showed some interest in authorial rights—particularly concerning individuals' control over their own labour,[152] his work concentrated on justifying property rights in material goods.

Bentham '*An introduction to the principles of morals and legislation*' (1781) History of Economic Thought Books.

[144] Ibid.

[145] R Paul '*Intellectual Property Rights: A Utilitarian Perspective'* (2021). Available at SSRN: https://ssrn.com/abstract=3842429 (accessed 20 September 2024). Also J. Driver "The History of Utilitarianism" (2014). Stanford Encyclopedia of Philosophy.

[146] J Bentham '*An Introduction to the Principles of Morals and Legislation (1789), printed in the year 1780, and now first published in Literature and Philosophy in Nineteenth Century British Culture'* (1789) 261-268.

[147] JC Fromer 'Expressive Incentives in Intellectual Property *'Virginia Law Review* (2012) 98, 1745 Routledge.

[148] See PN Upreti *'Intellectual Property Responsibility: A Manifesto'* (2024). Available at https://link.springer.com/article/10.1007/s40319-024-01426-y#citeas (accessed 20 September 2024).

[149] J Locke & PH Nidditch (eds) *The Clarendon Edition of the Works of John Locke: An Essay Concerning Human Understanding* (1979).

[150] J Locke '*Two Treatises on Government: A Translation into Modern English' Industrial Systems Research* (2013).

[151] Ibid.

[152] See M Rose '*Authors and Owners: The Invention of Copyright'* (1993) Harvard University Press.

Locke did not directly address IPRs in the way they are understood today. However, later scholars built on his ideas to support the notion that individuals have a natural entitlement to the products of their intellectual effort. The interpretation influenced the evolution of modern IP law. [153] Therefore, a key strength of the Lockean theory is that IPRs are fundamentally akin to other forms of property rights whether concerning personal goods, land, inventions, or books. [154]

The natural rights theory, articulated by philosophers like Immanuel Kant and Hugo Grotius argues that individuals possess inherent rights to their property based on natural law. Kant, for instance, proposed that intellectual creations are an extension of a creator's personality and thus should be treated as their property.[155] According to this theory, IPRs are not merely the result of labour or utility but are ingrained in human dignity and autonomy.[156] Natural rights theorists assert that creators deserve control over their works as an intrinsic right.[157] Kant's approach particularly links IP to the creator's sense of self and personal expression, underscoring the importance of protecting such creations as part of one's identity and moral rights[158].

The personhood theory, often associated with Hegel, asserts that IPRs are an extension of an individual's identity and self-expression.[159] Hegel argued that property serves as the external manifestation of a person's will, which is essential to self-actualisation. When an individual expresses their will through an object, that object becomes a reflection of their personality. According to this theory, intellectual works such as books or inventions embody the creator's personality,[160] and grants them the moral right to control and profit from their

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[153] Ibid.
[154] A Mossoff '*Why Intellectual Property Rights? A Lockean Justification'* (2015) Library of Law and Liberty.
[155] CS Yoo '*Rethinking Copyright and Personhood'* (2019). University of Illinois Law Review 1039.
[156] PS Menell '*Intellectual Property: General Theories'* (1999). Encyclopedia of Law and Economics, 2, 129-188.
[157] H Breakey '*Intellectual Liberty: Natural Rights and Intellectual Property'* (2016).
[158] See CS Yoo '*Rethinking Copyright and Personhood'* (2019). University of Illinois Law Review 1039.
[159] GWF Hegel & AW Hegel '*Elements of the Philosophy of Right—Cambridge Texts in the History of Political Thought*' (1820).
[160] See AE Elsen & J H Merryman '*Law, Ethics, and the Visual Arts'* (2007); EJ Damich '*The Right of Personality: A Common-Law Basis for the Protection of the Moral Rights of Authors'* (1988)23 *Ga. L. Rev. 1*; and N. Netanel *'Copyright Alienability Restrictions and the Enhancement of Author Autonomy' A Normative Evaluation,'* (1993)24 Rutgers L.J. 347, 359.

creations.[161] Therefore, IP protection is not merely about protecting the creator's labour or maximising societal utility but also about safeguarding personal identity and creativity.[162]

The study is anchored in utilitarianism—the maximisation of overall societal welfare, as its central tenet. The theoretical orientation informs the analysis of the relationship between IP, innovation, trade, and agricultural development within Agenda 2063. While, therefore, other theories (labour theory, natural rights, and the personhood theory) contribute to the larger discourse on IPRs, the study engages with utilitarianism to assess how IP, trade, and innovation policies can collectively enhance agricultural productivity, food security, and economic growth in Africa.

In the sphere of IP, it is needless to emphasise that utilitarianism justifies IPR as a means to stimulate innovation and creativity. The promise of exclusive rights serves as an incentive for individuals and firms to invest in R&D, ultimately leading to societal benefits through technological progress and economic growth. Going by the utilitarianism approach, IP systems should provide incentives for innovation, but without erecting barriers to access, so that the greatest number of people can benefit from the innovations.

Utilitarianism, when applied to agricultural development promotes policies that ensure the widespread distribution of benefits from agricultural innovations to enable both technological progress and social equity. The utilitarian theory would thus seek to maximise the diffusion of agricultural innovations, while at the same time ensuring that IP systems play a catalytic role in advancing public welfare, in consonance with the goals of Agenda 2063.

The utilitarianism approach is particularly important for developing countries that often lack the resources to access expensive or protected technologies. In Africa, where agricultural productivity is often constrained by factors such as climate change, low technological adoption and poor infrastructure, IP and innovation laws and policies should enable the rapid spread of new agricultural technologies.

Since utilitarianism emphasises that IP protection should not be an end in itself but a means to achieve widespread societal benefits, this perspective informs the analysis of utility

[161] See W Fisher '*Theories of Intellectual Property'* Cambridge (2001); and R.P. Merges, P.S. Menell & M.A. Lemley Intellectual Property in the New Technological Age (2003).
[162] See J Hughes 'The Personality Interest of Artists and Inventors in Intellectual Property' (1998)16, *Cardozo Arts & Entertainment Law Journal* 81.

models in Chapter 4. Utility models are assessed based on their ability to enhance social welfare by promoting innovations that improve productivity and sustainability, particularly in resource-constrained settings. Likewise, the TRIPS flexibilities, including Articles 7, 8, and 30 (discussed in Chapter 3), illustrate how utilitarian principles can be applied within international trade frameworks. The above provisions allow countries to circumvent certain IP restrictions to address public interest concerns, such as access to medicines and affordable agricultural technologies, in line with the utilitarian goal of maximising societal welfare.

In trade, utilitarianism would back policies that reduce unnecessary barriers to trade, lower costs, and increase consumer welfare. Nevertheless, trade barriers can be justified under utilitarian principles if they serve a greater public good, such as protecting public health,[163] ensuring food security,[164] or promoting nascent industries in developing countries.[165]

Utilitarianism thus provides a solid theoretical basis for evaluating how IP, innovation, and trade policies can be aligned to advance the agricultural goals of Agenda 2063.

1.4 Relevance and Originality of Thesis

Since the adoption of Agenda 2063 in 2013, African policy makers are confronted with the need to identify strategic bottlenecks and devise actions that can be pursued in order to improve the development prospects of the continent. This thesis identifies and synthesises the key issues that should form the basis for the successful implementation of Agenda 2063 in relation to agriculture.

The major thrust of the study is on IP, while innovation and trade are discussed to the extent that a comprehensive suite of measures is necessary, specifically that IP, in isolation of other connected measures is not sufficient to achieve sector transformation. Therefore, innovation and trade are discussed as essential components of a comprehensive strategy. It proposes actions required for African countries to reach a new horizon of socio-economic prosperity anticipated by 2063. Agriculture is selected because it dominates most African economies and therefore scaling up its fortunes through IP, innovation and dynamic trade offers an accelerated route to achieving the Agenda's goals. Attention to the subject is also motivated

[163] Article XX(b) GATT.
[164] See for example, Article XX(g) GATT which allows measures relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.
[165] Article XIX GATT.

by the sector's central role in critical areas such as food security and environmental protection, as well as the role of IP in enabling change in these areas.

Studies over the past decades have explored various aspects of IP and development in Africa. As far back as 1989, Juma and Ojwang[166] urged African countries to reassess their IP policies and implement laws that prioritise national sovereignty. Since then, African-based researchers such as Pistorius have advanced the understanding of the link between IP and development.[167] In-depth studies have been conducted on specific issues, including the protection of traditional knowledge (TK) and the need for *sui generis* PBR (Ekpere, 2000);[168] textiles and TK (Boateng, 2011);[169] as well as access to learning materials (Armstrong et al., 2010;[170] De Beer, 2013).[171] Regional analyses have also been undertaken on Access to Knowledge (A2K) in North Africa (Shaver and Rizk, 2010); [172] while scholars like Blakeney and Megistie (2011)[173] have explored perspectives on IP and economic development in sub-Saharan Africa. Research on the neo-colonial dimensions of IP (Rahmatian, 2009)[174] and the historical evolution of African IP organisations (Kongolo, 2000)[175] have further enriched the discourse.

Most recently, Caroline Ncube[176] accentuated these insights by arguing for the calibration of IP law and policy to achieve national socioeconomic goals in African states. Despite these contributions, many gaps remain in understanding the conjunction of IP and development in Africa, more so, in linking IP frameworks to tangible economic and social transformation.

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[166] C Juma & JB Ojwang *'Innovation and Sovereignty: The Patent Debate in African Development'* (1989).
[167] T Pistorius *'Intellectual Property Perspectives on the Regulation of New Technologies: Research in South Africa'* (2007).
[168]JA Ekpere '*Sui Generis Plant Breeders' Rights for Africa'* (2000) OAU Model Law on Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources.
[169] B Boateng *The copyright thing doesn't work here: Adinkra and Kente cloth and intellectual property in Ghana* University of Minnesota Press (2011).
[170] C Armstrong et al *'Access to Knowledge in Africa: The Role of Copyright'* (2010).
[171] J De Beer *'Implementing the WIPO Development Agenda'* (2013).
[172] L Shaver & N Rizk '*Access to Knowledge in Egypt: New Research on Intellectual Property, Innovation and Development'* Bloomsbury Academic (2010).
[173] M Blakeney & G Mengistie 'Intellectual property and economic development in sub-Saharan Africa' (2011)14(3-4) *The Journal of World Intellectual Property* .238-264.
[174] A Rahmatian 'Neo-Colonial Aspects of Global Intellectual Property Protection' (2009)12(1) *The Journal of World Intellectual Property* 40-74.
[175] T Kongolo 'Historical Evolution of Copyright Legislation in Africa' (2000) 3(2) *The Journal of World Intellectual Property* 265-272.
[176] CB Ncube *Intellectual Property Policy, Law and Administration in Africa: Exploring Continental and Sub-Regional Co-operation'* Routledge (2016). See also CB Ncube *Intellectual Property Law in Africa: Harmonising Administration and Policy* 2 ed Taylor & Francis (2023).

Regarding agricultural development, this thesis highlights a combination of critical legal and policy mixes that should be considered as the continent moves toward Agenda 2063, bearing in mind the diverse capacities of African countries. The strategies proposed, particularly the pro-development IPR framework, a Pan-African strategy for R&D, and a comprehensive government-wide policy approach (Whole of Government approach) contribute to the thesis's unique academic focus.

1.5 Research Question, Aims and Objectives

The central question for the thesis is the following: What is the role of IP, innovation, and trade in the actualisation of the agriculture related goals and aspirations of Agenda 2063, and what legal and policy mixes are required to realise the Agenda aspirations? The overarching inquiry is explored through a web of five interrelated sub-questions:

(1) What is the relationship between innovation, IP, trade, agriculture, and Agenda 2063?
(2) What are the current obstacles to growth in the agricultural sector?
(3) How can the problematic agricultural sector possibly be repaired?
(4) What legal frameworks and policy measures are essential to achieve the agricultural objectives of Agenda 2063?
(5) In what way can the outcome of the research be utilised by relevant stakeholders?

1.6 Methodology

The research method employed by the thesis is qualitative, approached from a doctrinal perspective. A combination of primary and secondary sources were consulted. The primary sources comprised relevant international and regional legislation and policy documents such as the WTO-TRIPS Agreement, the Agreement establishing the AfCFTA, the AfCFTA IP Protocol, the Abuja Treaty, Agenda 2063 Framework document, CAADP, Malabo Declaration,[177] STISA-2024, among others. The secondary sources comprised academic literature such as text books, peer-reviewed journal articles and reports including reports on themes such as the utilisation of the TRIPS flexibilities. There are two aspects to the approach adopted to meet the research objectives as stated below:

[177] African Union *'Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods'* (2014) available at https://au.int/en/documents/20140627/malabo-declaration-accelerated-agricultural-growth (accessed 5 May 2024).

Firstly, a framework for understanding the intersection of the key aspects of the study i.e. IP, innovation, trade and agriculture is developed. The framework is developed in light of the presumed importance of IP, innovation, trade and agriculture to the development process and how to construe the same to achieve Agenda 2063.

Secondly, the global IP framework (TRIPS) is analysed against the backdrop of the minimum standard requirements for WTO members, upon which a framework for the adoption of flexible IP regimes is explored. The seminal works in this area include those of Drahos,[178] Maskus,[179] Ncube,[180] and ground-breaking policy works such as the Report of the Commission on Intellectual Property Rights (CIPR),[181] the Doha Declaration,[182]and the WIPO Development Agenda.[183]The WIPO Development Agenda, adopted by WIPO member states in 2007, is important because it serves as an important guide for promoting pro-development approaches within the IP system (as proposed in Chapter 6). The Agenda comprises 45 recommendations aimed at ensuring that IP systems support development, particularly in developing countries.

1.7 Assumptions

(1) ***R&D Funding is key to improving the fortunes of the agricultural sector.***

It is assumed that Africa's poor agricultural performance stems from a lack of or low investment in the sector. Government measures, coupled with increased public and private investment in R&D and agricultural technologies are deemed long term requirements for improving sector productivity.

(2) ***The Strategic Deployment of Agricultural Innovations Can Have Multiplier Effects***

The deployment of appropriate agricultural technologies is assumed to generate economy -wide benefits, and can help contribute to major continental priorities such as

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[178] P Drahos 'A *Philosophy of Intellectual Property'* Routledge (2016).
[179] KE Maskus '*Intellectual Property Rights in the Global Economy'* Peterson Institute (2000).
[180] CB Ncube '*The Development of Intellectual Property Policies in Africa-Some Key Considerations and a Research Agenda'* (2013); CB Ncube '*Decolonising Intellectual Property Law in Pursuit of Africa's Development'* (2016) 8(1) WIPO *Journal* 34-40.
[181] Commission on Intellectual Property Rights (CIPR) *'Integrating Intellectual Property Rights and Development Policy'* London (2002).
[182]Doha Ministerial Declaration WT/MIN (01)/DEC/1 20 November 2001 (01-5859) WTO Member States, Ministerial Conference, Fourth Session, Doha, 9-14 November 2001 (adopted on 14 November 2001).
[183]World Intellectual Property Organisation *WIPO Development Agenda* (2007) available at https://www.wipo.int/ip-development/en/agenda/ (Accessed 20 September 2024).

eradicating poverty and hunger and boosting intra -Africa trade and investments. The innovations are expected to help spread prosperity towards achieving Agenda 2063.[184]

(3) ***Innovation Drives Economic Development***

This assumption has two elements, detailed in Chapter Two. Firstly, the thesis adopts a restricted view of technological innovation, without engaging with general theories of innovation. Secondly, it is assumed that an increase in technological innovation positively impacts a country' economic development in general.

(4) ***The IP System is a Positive Driver of Technological Innovation***

While acknowledging that there are contrary opinions, the thesis assumes that IPRs positively influence individual decisions to engage in inventive activity.[185] The major thrust is not on disputing or disapproving the IP system, but on how it can be harnessed to achieve Agenda 2063, for instance, through flexibilities available to developing countries under the TRIPS Agreement.

It is further acknowledged that IP protection is not integrally a driver of innovation but rather a tool whose impact depends on contextual factors such as industrial capacity, R&D investment, and market size.[186] Indeed, strict IP regimes in developing countries have sometimes hindered, rather than facilitated, technological advancement.[187] Similarly, there are examples of African-led innovations that have surfaced despite weak formal IP protections.[188]

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[184] PB Hazell '*Africa agriculture status report: the business of smallholder agriculture in Sub-Saharan Africa'* Alliance Green Revolution (2017) 5:3-19. For additional insights, see BT Kebeda, TO Abdisa & AJ Berkessa '*Review on the Expected Role of Climate Smart Agriculture on Food System in Ethiopia'* (2019).

[185] See for example, S Ezell & N Cory '*The Way Forward for Intellectual Property Internationally'* Information Technology and Innovation Foundation (2019).

[186] H Khouilla & C. Bastidon 'Does Increased Intellectual Property Rights Protection Foster Innovation in Developing Countries? A Literature Review of Innovation and Catch-Up' (2024) 36(2) *Journal of International Development* 1170-1188.

[187] Maskus (2000) Supra; K.E. Maskus 'Intellectual Property Rights and Economic Development' (2000) 32 *Case W. Res. J. Int'l L.* 471; and R.E. Evenson 'Intellectual Property Rights and Economic Development, by Keith Maskus' (2001) 33 *Case W. Res. J. Int'l L.* 187.

[188] See the revolutionary M-Pesa mobile money payment platform. M-Pesa which was launched by Safaricom in Kenya in 2007 is an exemplar of how innovation can flourish even in environments with weak formal IP protection. Upon its launch, M-Pesa quickly revolutionised financial inclusion by providing a secure and accessible platform for mobile-based money transfers and financial services. It enabled millions of unbanked individuals to participate in the formal economy. M-Pesa's success was not a result of strong IP incentives but rather a response to local needs, entrepreneurial agility, and supportive regulatory frameworks. A key lesson from M-Pesa's success is that innovation ecosystems rely on a mix of factors beyond IP rights alone. "Also see OJ

(5) ***IP and Innovation Lead to Improved Productivity and Competitiveness***

It is assumed that IP and innovation lead to the production of quality goods, resulting in better market acceptability and improved trade outcomes. Therefore, investing in innovation is considered a key priority.

1.8 Synopsis

The research has seven chapters, six of which answer to the objectives above, while Chapter Seven is the culmination of the research endeavour. It provides the final conclusions drawn from the study and outlines the way forward.

Chapter One has explained in detail the research premise, including the underlying assumptions.

Chapter Two clarifies the concepts associated with IP, agriculture, trade and innovation. It lays the background for the discussion in subsequent chapters of the two most important facets of IP relevant to agricultural technologies, that is, patents and PVP. It analyses the causal relationships between innovation, IP and trade and describes IP as intrinsic to trade, owing to the fact that IP makes it possible to control the commercial exploitation of the results of scientific, technological and cultural creation and that the ability to develop and use such results is a key factor of development. It then develops a framework for analysing the interconnectedness of IP, innovation, trade and agriculture and demonstrates how these aspects must work together to bring about Agenda 2063. It therefore contributes to answering the main research question, and research sub-question 1.

Chapter Three addresses the second and third subsidiary questions of the research by exploring the barriers to agricultural advancement in Africa and the potential role of IPR in overcoming these challenges. It assesses how the flexibilities of the TRIPS Agreement, such as the exceptions outlined in Article 30, can mitigate the negative effects of patents on technology generation and access, while also supporting societal development in African countries. The chapter examines key interpretative sources that guide the application of TRIPS,

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Okesanya et al. 'Introducing African-led Innovation to Tackle the Challenges of Climate Change in Africa' (2024) 13 *PAMJ One Health* 10.11604.

including Articles 7 and 8, the Doha Declaration, Australia-TPP (No. 1[189] and No. 2[190]), and the Vienna Convention on the Law of Treaties (VCLT),[191] which provide a novel approach to employing the TRIPS Agreement's flexibilities to equilibrate the rights of patent holders within the public interest. It posits that flexibilities are a necessary instrument in IP policy, essential for realising the agricultural goals and aspirations set out in Agenda 2063, as they allow governments to override certain IP restrictions in favour of public interest objectives such as food security and access to agricultural technologies. It postulates that the failure to strategically address the challenges of the sector particularly by leveraging the IP regime among other measures can slow attainment of Agenda 2063. The examination in this chapter underpins the proposal for suitable policy, legal, and regulatory measures in Chapter Five, and the basis of the framework proposed in Chapter Six.

While Chapter Three underscores the importance of countries utilising TRIPS flexibilities to calibrate their IP laws according to their specific needs, Chapter Four reveals that despite the significance of these flexibilities, on their own, they do not suffice to steer the level of agricultural innovation and development necessary to achieve the ambitious objectives of Agenda 2063. It explores strategies for enhancing the endogenous technological base in African countries through the use of utility models and an R&D strategy.

The analysis is presented in two sections. Part I deals with the concept of utility models, while part II deals with R&D.

Part I elaborates on the necessity of integrating utility models into the suite of measures required to develop Africa's endogenous technological base, arguing that utility models can complement strategies such as the utilisation of TRIPS flexibilities, increased investment in R&D and policy reforms aimed at nurturing an environment conducive for innovation and development.

Part II proposes a Pan - African R&D Strategy to guide R&D on the continent. It provides the rationale for scaling up investments in R&D to address existing technology deficits and argues that African countries have neither sufficiently invested in R&D nor

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[189]Panel Report *'Australia -Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging: Reports of the Panels'* WT/DS435/R, WT/DS441/R, WT/DS458/R, WT/DS467/R.

[190]Appellate Body *'Australia -Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging'* WT/DS435/AB/R, WT/DS441/AB/R.

[191] Vienna Convention on the Law of Treaties,1969.

developed critical science and innovation capacity to address the pressing needs of the African people. The role played by low capacities and skills in exacerbating these challenges is discussed, and, in this regard, a number of conclusions and recommendations are made.

The rationale for an R&D strategy is premised on the enormous technical, institutional and financial resources required to build R&D and innovation capacities. Many countries lack these resources and the capacity to engage in the highly technical and granular aspects of R&D and innovation. The dominant narrative in the body of existing literature is on technology transfer for developing countries which has been slow to realise, to date.[192] The conspicuous lack of emphasis on an R&D Strategy to guide continental R&D efforts for homegrown technological solutions suggests a material gap in the current discourse on Africa's development. This means there is a lack of cohesive direction in leveraging R&D to address regional challenges and promote innovation. Without a strategic R&D framework, there is limited coordination in allocating resources, setting priorities, and promoting collaboration among stakeholders.

The Chapter proposes that discussions on developing a Pan-African R&D strategy tailored to the continent's unique needs and opportunities should commence. This would facilitate the pooling of resources, encourage knowledge sharing, and strengthen partnerships both within Africa and internationally. Academics are uniquely positioned to explore further how such a strategy can be designed and effectively implemented, going past the perspectives provided in this chapter. Further academic exploration would enrich the discourse and guide practical steps to improve Africa's R&D efforts.

Chapter Four therefore addresses the critical factors for the attainment of the agriculture related goals of Agenda 2063, and in so doing, answers research sub - questions 3, 4 and 5.

Chapter Five outlines the legal, policy, and regulatory tools necessary to shift agriculture from its current state of stagnation. It builds on the discussion in Chapter Three regarding the role of IP, particularly the TRIPS flexibilities in advancing sectoral growth, as well as the considerations for utility models and the R&D Strategy explored in Chapter Four. The chapter analyses the legal and policy frameworks governing innovation, IP, and trade to

[192] See F Dos Santos Dos '*Innovation in Africa: Levelling the Playing Field to Promote Technology Transfer*' Oxford University Press (2024). To overcome challenges currently posed by inefficiencies in the flow of technologies to LDCs, the author proposes maximal implementation of the TRIPS Agreement provisions related to technology transfer and recommends the adoption of a uniform international legal instrument under the framework of the WTO to be designated as the Agreement on Trade-Related Issues of Technology Transfer and Innovation (TRITTI).

determine how they can collectively support agricultural development. The chapter underscores the imperative of cohering policies in agriculture, IP, and trade, as well as the importance of coordinating these policies with complementary measures in areas such as industry, competition, investment, tax and environment. It resolves sub - questions 3 and 4.

Chapter Six is dedicated to designing a framework for the optimal blend of IP laws and policies necessary to advance agriculture. The framework provides guidance for countries to address the rigidities in their existing IP laws, many of which are based on colonial-era IP systems inherited from former colonial powers.[193] This issue is compounded by limited participation and strict adherence to the TRIPS Agreement. Having highlighted, in previous chapters, the trend of African countries adopting high international IPR standards without a clear national policy that considers the common good, this Chapter proposes an IPR pro-development approach to replace misaligned IP frameworks with those more suited to local needs and realities. In doing so, the chapter provides strategies for *interalia* leveraging the flexibilities in the TRIPS Agreement to support agricultural development, and answers research sub-questions 3 and 4.

Chapter Seven synthesises the research by weaving together the various themes explored in earlier chapters. It reinforces the initial research premise and demonstrates how the study's objectives have been met through its chapter-by-chapter findings. The chapter also presents the overall findings, offers recommendations, and provides a general conclusion. It answers the main research question, and research sub-question 5.

[193] PK Yu 'TRIPS and its Discontents' (2006) 10 *Marq, Intell. Prop. L.* Rev 369

CHAPTER 2

FRAMEWORK FOR UNDERSTANDING INTER-RELATION BETWEEN INTELLECTUAL PROPERTY, INNOVATION, TRADE AND AGRICULTURE

2.1 Introduction

The central question of the thesis is: What is the role of IP, innovation, and trade in the actualisation of the agriculture related goals and aspirations of Agenda 2063, and what legal and policy mixes are required to realise the Agenda aspirations? This chapter addresses the central question and the first research sub-question, which concerns the relationship between the study's key elements: IP, innovation, trade and agriculture. It provides a framework for conceptualising the research question, considering both the individual components and their interrelationship. It is structured into four parts: Part I clarifies the key concepts used in the study and their relevance to agriculture and Agenda 2063. Part II provides an overview of IPR relevant to agricultural technologies, particularly patents and PBRs. Part III examines the interrelationship between IP, innovation, trade, and agriculture to establish an understanding of their collective role in advancing the agricultural sector. Finally, Part IV provides a framework for analysing the interdependency of the concepts.

2.2 Part I: Clarification of Concepts

The first step in constructing the framework for understanding the relationship between the terms employed in the study is to define and clarify the terms.

2.2.1 Innovation

The term innovation has several definitions, each aligning to a particular discipline.[1] According to the Oslo Manual[2], an Organisation for Economic Cooperation and Development (OECD) international reference guide for collecting and using data on innovation, the term 'innovation' can signify both an activity and the outcome of the activity. The manual provides definitions for both. The general definition of innovation is as follows:

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[1] R Adams, J Bessant & R Phelps 'Innovation Management Measurement: A Review' (2006) 8(1) *International Journal of Management Reviews* 21-47.

[2] OECD/Eurostat *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation* (4th ed) (2018) OECD Publishing, Paris/Eurostat, Luxembourg.

> An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).[3]

Going by this definition, innovation relates to the introduction of new products, processes and practices that advance technology.

The manual further states:

> Innovation activities on the other hand include all developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm.[4]

According to the Manual, the minimum requirement for innovation is that the product/ process must be new (or significantly improved) to the firm'. The process of innovation involves applying ideas, knowledge or practices that are new to a particular setting with the purpose of creating positive change that will provide a way to meet needs, take on challenges or seize opportunities.[5] The changes could be substantial (a large change or improvement) or cumulative (small changes that together produce a remarkable improvement). The ideas that cause change may constitute the basis for protectable IP, including patentable inventions. The decision to apply for patent protection depends on the patent's usefulness to the particular firm's innovation strategy.

The Manual also categorised innovation into four main types: organistional, process, product (technological) and market innovation. The research is concerned with process and product/technological innovation. With this background in mind, the term is then used to refer to processes directed towards the conceptualisation, development, and application of new technology;[6] in tandem with literature that views technological innovation as a process traceable from R&D, to the production and implementation of new products or processes.[7] That is, the innovation process is a chain beginning with applied R&D, prototyping, development, and commercialisation.[8]

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[3] Ibid at 273.
[4] Ibid at 74.
[5] OECD/Eurostat '*Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data'* 3rd ed OECD Publishing (2005), available at *https://doi.org/10.1787/9789264013100-en* (accessed 7 June 2024).
[6] L-A Tong '*The Development of a South African Legal Framework Relating to Patentable Inventions Made by Employees'* (unpublished PhD thesis, University of Cape Town, 2016).
[7] J Pelkmans & A Renda 'How Can EU Legislation Enable and/or Disable Innovation?' (2014).
[8] Ibid at 9.

Schumpeter,[9] a leading theorist defined innovation as the creation of a new good that adequately satisfies existing or previous needs, so that, this way, it can create the new and destroy the obsolete, and firms can introduce new products, new production methods, conquer new markets, open new sources of supply and adopt new forms of organisation. Other scholars have defined innovation as 'technical design, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product or the first commercial use of a new (or improved) process or equipment.'[10]

FAO has defined agricultural innovation as the process whereby individuals or organisations bring new or existing products, processes or ways of the organisation into use for the first time in a specific context in order to increase effectiveness, competitiveness, resilience to shocks or environmental sustainability thus contributing to food security and nutrition, economic development or sustainable natural resource management.[11]

Whereas there are different classifications for innovations as seen above, the thesis is concerned with technological innovations.

2.2.2 Agricultural technologies

For purposes of the study, "agricultural technologies" are defined as the range of technological applications or tools that can be applied in the agricultural sector to increase agricultural production and productivity, ensure sustainable natural resources management, improve post-harvest handling and marketing and, safeguard food quality and human health. To clarify further on the above definition which also provides the scope for differentiating agricultural technological innovations from other technological innovations, some examples suffice.

Agricultural production and productivity technologies can cover several fields including machinery, soil and water management, variety improvement (seeds and livestock), pest and weed control, nutritional enhancement, post-harvest handling, food packaging and preservation, marketing information systems, and food safety and human health technologies. These can be grouped into three categories: seed technology, farm machinery, and ICT.

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[9] JA Schumpeter & R Opie *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle* Harvard University Press (1934).
[10] C Freeman & L Soete *The Economics of Industrial Innovation* MIT Press (1982).
[11] FAO *'FAO's Work on Agricultural Innovation'* (2018).

In addition to the aforementioned technologies, modern agriculture routinely employs a range of sophisticated technologies such as robots, temperature and moisture sensors, drone and aerial images, satellite imagery, and Global Positioning System (GPS) technology. Precision agriculture and robotic systems enhance productivity, profitability, and efficiency.

The case for increasing agricultural productivity to accelerate transformation is strongly supported by well-established evidence.[12] The African Center for Economic Transformation (ACET), in its first continental review of progress towards transformation produced in 2014 states and concludes that raising agricultural productivity has to be a key part of the economic transformation agenda in Africa.[13]

Despite, however, technology playing an essential role in enhancing agricultural productivity, efficiency, and resilience, African agriculture is characterised by limited innovation, low levels of technology and high labour intensity.[14] Smallholder farmers often lack access to affordable and appropriate technologies as well as quality inputs (seeds, fertilisers, pesticides). Access to technologies such as irrigation systems, precision farming tools, drones for crop monitoring, , weather forecasting tools, and improved seed varieties can substantially improve yields and reduce vulnerability to various risks. A McKinsey study shows that very little land on the continent is irrigated.[15] Of the 183 million hectares of cultivated land in sub – Saharan Africa, 95 per cent is rain-fed and less than 5 per cent benefits from some sort of agricultural water management practice, the lowest irrigation development rate of any region in the world.[16]

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[12]D Suttie & RS Benfica *'Fostering Inclusive Outcomes in African Agriculture: Improving Agricultural Productivity and Expanding Agribusiness Opportunities through Better Policies and Investments'* (2016).
[13]African Center for Economic Transformation *'African Transformation Report: Growth with Depth'* (2014). Also see AGRA *'Africa Agriculture Status Report 2016: Progress Towards Agricultural Transformation'* (2016) Nairobi, Kenya: Issue No. 4.
[14] Z Gaibi, A Maske & K Jayaram *'Africa's Path to Growth: Sector by Sector'* (2020) McKinsey Global Institute available at *https://www.mckinsey.com/featured-insights/middle-east-and-africa/africas-path-to-growth-sector-by-sector* (accessed 14 May 2024).
[15] Ibid at 2.
[16] J Nash, N Halewood & S Melhem '*Unlocking Africa's Agricultural Potential: An Action Agenda for Transformation*' World Bank (2013) at 14.

2.2.3 Intellectual Property

IP broadly refers to creations of the mind, encompassing various creative and innovative outputs, including inventions, literary and artistic works, designs, symbols, names, and images used in commerce.[17] Forms of IP protection, briefly discussed in section 1.2.1 include copyright,[18] patents,[19] trademarks,[20] geographical indications,[21] Lay out designs (topographies) of Integrated circuits,[22] among others.[23]

The legislative rationale for IPR is well recognised in the international IP discourse.[24] In addition to rewarding the IP holder, the grant of an IPR benefits the public. Thomas Jefferson, for instance, viewed patents as a societal benefit structured to achieve specific policy objectives.[25] Under patent law, society grants an inventor a temporary monopoly to commercially exploit an invention. In return, the inventor contributes new knowledge to society. The requirements and conditions for granting patents reflect the terms of the deal between the inventor and society.

The grant of an IPR provides the IP holder exclusive rights to prevent others from using, making and selling the subject of protection, for a limited period of time.[26] IP regulation is therefore said to promote creative and inventive progress.[27] In the absence of such exclusivity, the ease of copying an invention would discourage creators to expend the necessary effort to

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[17] K Idris *A Power Tool for Economic Growth* WIPO Publication (2003).

[18] Copyright is granted to authors and artists to protect expressive works against unauthorized reproduction or distribution by third parties (See Article 9 TRIPS Agreement).

[19] Patents are rights granted to an inventor of a product or process that is new (or novel), involves an inventive step (or is non – obvious) and is capable of industrial application (See Article 27 TRIPS Agreement).

[20] A trademark is defined as a sign or symbol that distinguishes the goods or devices of an enterprise from another in commerce (Article 15 TRIPS Agreement).

[21] Geographical indications are identifiers that associate a product with a place based on the quality or characteristics of the product or good will associated with a place (Article 22 TRIPS Agreement).

[22] [22] Integrated circuits (or semiconductors) are produced based on three-dimensional maps or mask works that direct sophisticated equipment to etch circuits on semiconductor materials (Article 35 TRIPS Agreement). For a comprehensive coverage of the IP forms, see FM Abbott et al *International Intellectual Property in an Integrated World Economy* Aspen Publishing (2024).

[23] Others include undisclosed information, such as trade secrets and test data, as well as evolving forms like traditional knowledge and expressions of folklore.

[24] See JE Stiglitz 'Economic Foundations of Intellectual Property Rights' (2007) 57(6) Duke *Law Journal* 1693-1724; See also AC Michaels 'Benefits of the Invention and Social Value in Patent Law' (2021) 28(2) George *Mason Law Review* 237-263.

[25] See RP Merges & JF Duffy *Patent Law and Policy: Cases and Materials* 4th ed, LexisNexis (2007), where Jefferson's perspective on patents is discussed. Also see Walterscheid EC 'To Promote the Progress of Useful Arts: American Patent Law and Administration, 1798-1836' (1998) 79 *Journal of the Patent and Trademark Office Society* 61, 77.

[26] IP rights are limited in time and scope.

[27] G Dutfield & U Suthersanen *Dutfield and Suthersanen on global intellectual property law* (2020).

invent further.[28] Absent the ability to appropriate the returns of innovative activities granted by the monopoly right, the market would undersupply research, innovation, and creative work. Proponents of this orthodoxy also argue that the most successful countries in the world are those that have advanced production capabilities, acquire, deploy and control valuable knowledge[29] to the extent that such knowledge if unavailable to rival firms is key to international competitiveness and the development of local economies.[30]

As discussed, proponents of IPR such as Jeremy Bentham, John Stuart Mill, Friedrich Hegel, and Thomas Jefferson offer varied philosophical justifications for IP protection, particularly that IPR encourages progress, respects personal expression, and is consistent with the rights to property.[31] Utilitarian philosophers Bentham and Mill argue that IPR promotes the greatest good by incentivising innovation and creativity, thus benefiting society through advancements and economic growth.[32] Hegel, from a personalist perspective contends that IP is an extension of an individual's personality and creativity, meriting protection to respect personal development and self-expression.[33] Jefferson, while cautious about monopolies, acknowledged that patent protection could serve as a useful tool to encourage innovation and the dissemination of knowledge.[34] John Locke, a proponent of the labour rights theory posits that individuals have a natural right to the fruits of their labour, and that property rights are fundamental to personal liberty and economic development.[35]

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[28] W Van Caenegem 'Pervasive Incentives, Disparate Innovation and Intellectual Property Law' in *Intellectual Property Policy Reform* Edward Elgar Publishing (2009).

[29] See J Aurik, & H. Leurent. '*Which countries are best placed for the future of production'*(2018). available at *https://www.weforum.org/agenda/2018/01/time-for-action-who-is-really-ready-for-the-future-of-production/* (accessed 11 August 2024).

[30] While the main rationalisation of IPRs is to offer incentives for innovation, they can also inhibit innovation by restricting the diffusion of knowledge. Authors have noted both positive and negative effects of IP protection. See AC Chu, G Cozzi & S Galli 'Does Intellectual Monopoly Stimulate or Stifle Innovation?' (2012) 56(4) European Economic Review 727-746. Also see KE Maskus, 'Intellectual Property Rights and Economic Development' (2000) *Case Western Reserve Journal of International Law* 32 471. For perspectives on tailoring IPR regimes to development needs, see Ncube, 'Decolonising Intellectual Property Law in Pursuit of Africa's Development' (2016) 8(1) *WIPO Journal* 34-40.

[31] See L Burlamaqui *Governing Knowledge: Intellectual Property Management for Development and the Public Interest* (2015); and SM Maurer 'Intellectual Property Incentives: Economics and Policy Implications' in *The Oxford Handbook of Intellectual Property Law* (2016).

[32] See O Granstrand 'Philosophy and History of Intellectual Property' (1999).

[33] MB Wilson 'Personhood and property in Hegel's conception of freedom' (2019), available at *https://philarchive.org/archive/WILPAP-29* (accessed 15 May 2024).

[34] W Fisher *Theories of Intellectual Property* (2001).

[35] P Kimani 'Towards a Copyright Law That Encourages Creativity' (2022) 63 *IDEA* 354.

However, the rationale for IPR is contested, with some arguing that the system may stifle innovation. Scholars such as Peter Drahos[36] have critiqued the proprietarian views and argued for a more nuanced understanding that incorporates social and ethical dimensions. Drahos argues that IP rights should not be viewed merely as extensions of traditional property rights. Instead, he suggests that IPR are 'duty-bearing privileges' and should be approached through an instrumentalist lens rather than a proprietarian one. The instrumentalist approach emphasises the utility and societal benefits of IPR rather than concentrating on the connection between labour and property rights, which is central to the proprietarian view.[37] He draws on historical and philosophical perspectives, including the works of Grotius, Locke, Hegel, Marx, and others to analyse the implications of IPR on power, justice, and society.[38]

Similarly, Drahos and Braithwaite,[39] criticise the global IP system arguing that it often serves the interests of powerful corporations and neglects wider social and ethical considerations. Drahos observed that more and more of the world's knowledge and information is under the control of IP owners,[40] and emphasised the importance of designing IP systems that are equitable and supportive of global development particularly in relation to enhancing innovation and ensuring access to essential technologies and knowledge.

Whereas the debate is not settled, the prevailing trend is towards IPR strengthening.[41] Consequently, it is unlikely that there will be a shift in the current levels of IP protection to adjust to weak protection to favour developing countries. African countries must instead maximise the use of exceptions provided by IPR regimes.[42]

IP norms have been universalised by the WTO TRIPS Agreement,[43] which establishes minimum standards for IP protection globally. The principal objective of TRIPS is to reduce trade barriers by promoting adequate and effective IPR while ensuring the rights do not impede trade. Most African countries have developed basic IP infrastructure, including laws, policies,

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[36] P Drahos *A Philosophy of Intellectual Property* Routledge (2016).
[37] Ibid.
[38] See generally, Drahos (2016) Supra. For Hegel and Max's views, see N Levine '*The Works of Hegel that Marx Knew. In: Marx's Discourse with Hegel*. Palgrave Macmillan (2012) Also see S Buckle 'John Locke' in *Natural Law and the Theory of Property: Grotius to Hume* Clarendon Paperbacks, Oxford (1993).
[39] Drahos P & Braithwaite J *Information Feudalism: Who Owns the Knowledge Economy* Routledge (2002).
[40] Drahos (2016) Supra.
[41] For a discourse on the global trend towards strengthening IPR and its implications for innovation, economic development, and international trade, see KE Maskus *Intellectual Property Rights in the Global Economy* Peterson Institute (2000).
[42] G Dutfield Intellectual *Property Rights and the Life Science Industries: A Twentieth Century History* Routledge (2017).
[43] Annex 1C of the Marrakesh Agreement Establishing the World Trade Organisation. 1994.

and institutions, in compliance with the TRIPS Agreement. IP is utilised in many countries as an industrial policy tool to achieve development goals, despite its criticisms. Therefore, building effective IP systems is essential for the infrastructure of countries.

All forms of IP protection are specific to particular subjects or industries and have developed in response to scientific, technological, and economic advancements. Among the various forms of IP protection, patents and PBRs are particularly relevant to agricultural technologies and warrant further elaboration.

2.3 Part II: Intellectual Property Relevant to Agricultural Technologies

2.3.1 Patents

A patent is a form of exclusive right granted for an invention, which may be a product or a process that offers a novel method of doing something or provides a new technical solution to a problem. The patent holder is given the legal authority to exclude others from making, using, selling, or importing the patented invention without consent. Patents can be assigned or licensed to 3rd parties,[44] or devolved under a will. Typically, a patent remains in force for a period of at least twenty years from the date of filing.[45]

A number of requirements have to be fulfilled for the grant of a patent. These include novelty (newness), [46] inventive step (non-obviousness)[47] and industrial application (utility).[48] Further to this is the disclosure or specification requirement, which ensures that the invention falls into the public domain upon lapse of the patent, i.e., becomes part of the common stock of knowledge usable by others. This represents the *quid pro quo* or trade-off for the monopoly. The disclosure has to be in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art'.[49] This enables others to access the new knowledge and develop the technology further. It may also be required that the applicant indicates the best mode for carrying out the invention at the filing or priority date of the application.

[44] TRIPS Agreement, Article 28(2).
[45] Ibid Article 33.
[46] The novelty requirement prohibits inventors from offering something that society already has within its domain.
[47] The utility requirement guarantees that society will receive a useful invention.
[48] The non-obviousness requirement bars inventors from giving exclusive rights against something that society would likely soon have in any case.
[49]Bainbridge (2007) Supra.

Patent information, obtained through the social contract between inventors and society offers valuable insights into the scientific principles, methodologies, and technologies underlying inventions. It enables researchers to learn from patented innovations and adapt them to local conditions, which enhances technological progress.[50] Particularly for Africa, where agricultural technologies are of special interest, leveraging patent information presents an opportunity for advancement. However, the discussion in Chapter Three reveals that this information has not been effectively exploited, indicating a potential area for improvement in utilising patent data for agricultural development.

2.3.1.1 Architecture of the International Patent System

At the outset, it is important to clarify that patents are territorial in nature; consequently, the present discussion does not refer to an international patent, as none currently exists. Patent laws generally vary from country to country, but are inspired by international instruments and obligations, for example TRIPS. The general scope of patent law is influenced by key international agreements such as the Paris Convention and the TRIPS Agreement. The agreements establish the necessity of patent protection for inventions, but national interests determine patent practices at local level and are responsible for the past and continued development of key international IP instruments.[51] A degree of harmonisation has been achieved in national patent systems as a consequence of a common commitment to international regulatory instruments, particularly the Paris Convention and the TRIPS Agreement. The substantive and procedural terms of these two instruments are considered the closest approximation to an 'international' patent system.[52]

Although patent protection is a contemporary issue of considerable discourse, it is not a new phenomenon. Patents have existed for many years. As early as the 15th century, various forms of protection for inventive activity were featured in national legal systems. The earliest known patent for an invention was awarded in Florence in 1421 to architect and engineer Fillipo Brunelleschi for a barge with hoisting gear used to transport marble. The patent granted

[50] AB Jaffe & M Trajtenberg *Patents, Citations, and Innovations: A Window on the Knowledge Economy* MIT Press (2002).
[51] See S Yu 'Political Privilege, Legal Right, or Public Policy Tool? A History of the Patent System' *ATRIP Essay Competition* (2009) 318.
[52] There are other international instruments which serve to facilitate more efficient ways to apply for patents in multiple jurisdictions – for example the PCT. However, these are arguably limited in informing the substantive content.

Brunelleschi a three-year monopoly on the manufacture of the barge. The Venetian Patent Statute of March 19, 1474, is considered the first written patent law. [53] Patent protection continued to develop, reaching a major milestone in 1623 when Britain enacted its Statute of Monopolies which declared that all monopolies were illegal except those granted for new manufactures to the true and first inventor.[54]

More countries adopted domestic forms of protection for inventions, but with this came less harmonisation of approach or underlying philosophy, until the rise of the industrial revolution.[55] Industrialisation resulted in an increase in the cross-border exchange of goods, with governments under pressure to find ways to secure protection for their nationals' inventions in foreign markets. As early as the 1880s, countries that had attained significant levels of technological advancement began to seek to expand patent protection beyond domestic jurisdictions. In 1883, the Paris Convention for the Protection of Industrial Property was adopted in Paris.[56] The Convention, currently administered by WIPO was signed by eleven contracting states at a Diplomatic Conference in 1883, and was ratified in 1884.[57] It has since been revised several times, with the most recent formulation being the Stockholm version of 1967 as amended in 1979.[58] To note however, whereas the Paris Convention is the first international IP instrument to deal with patents, the system of patents is not ascribed to a single historical account.

The Paris Convention imposes two far-reaching obligations on its Member States: national treatment[59] and the right of priority obligations;[60] and more specific ones relating to compulsory licensing,[61] importation,[62] and the independence of patents.[63] Although the

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[53] P Stephen *Patents, Trademarks, and Related Rights: National and International Protection* (1975). Also see CA Nard & AP Morriss 'Constitutionalising Patents: From Venice to Philadelphia' (2006) 2(2) *Review of Law & Economics* 223-321.
[54] English Statute of Monopolies, 1624.
[55] See J Nakagawa '*International harmonization of economic regulation*' Oxford University Press. (2011).
[56] Paris Convention for the Protection of Industrial Property,1883.
[57] See G Bodenhausen 'Paris convention for the protection of industrial property' (1968).
[58] The Treaty was revised in Brussels, Belgium, on 14 December 1900; in Washington, United States, on 2 June 1911; in The Hague, Netherlands, on 6 November 1925; in London, United Kingdom, on 2 June 1934; in Lisbon, Portugal, on 31 October 1958; and in Stockholm, Sweden, on 14 July 1967, and was amended on 28 September 1979. See further http://www.wipo.int/treaties/en/ip/paris/ (accessed 15 November 2023)
[59] Paris Convention, Article 2.
[60] Ibid. Article 4. The "Right of Priority" means that a person applying for a patent has twelve months from the date of the application in a member country to apply for protection in all of the other member countries.
[61] Ibid Article 5.
[62] Ibid Article 5A (2).
[63] Ibid Article 4*bis.*

Convention does not define what may be patented or prescribe the duration of patent protection, it represents an early step toward the development of global standards for patent rights. The Convention is not prescriptive as to the implementation of the patent system, and it does not also prescribe rules.[64] States are left with a considerable amount of policy space to determine issues such as the criteria for patentability, examination procedures, whether patents should cover both products and processes, and who is eligible to hold a patent.

Subsequent treaties were introduced following the ratification of the Paris Convention mostly to facilitate multi-jurisdiction patent filing and to incorporate more standards to be implemented universally by states that are signatories to these agreements. These include the Patent Cooperation Treaty (PCT),[65] the Patent Law Treaty,[66] the Budapest Treaty,[67] and the Strasbourg Treaty.[68] Decades after the ratification of the Paris Convention, IPRs became connected to the global economy through the TRIPS Agreement which emerged in the late 1980s during the Uruguay Round of multilateral trade negotiations of the GATT, and came into force in 1995. TRIPS arose specifically as a response to the perceived failure of the existing international instruments specifically the Paris and Berne Conventions to ensure enforceable IP protection.[69]

The TRIPS Agreement does not offer a completely novel understanding of IPR, but incorporates and adds to the substantive provisions of the earlier instruments.[70] Although Member States have a measure of flexibility on how they implement the provisions,[71] the effect of the Agreement is to impose a minimum threshold on the levels of protection that WTO members are obliged to implement. This, combined with its enforcement through the WTO Dispute Settlement Body (DSB) contributes to its dominance in IP law and policy today. It is

[64]For more information, see GHC Bodenhausen (1968) Supra. However, for a discussion on how the US patentability criteria developed into the general standard and the Secretariat of the Paris Convention's 'recruitment' strategy to incorporate developing countries, refer to W Kingston 'Why Patents Need Reform and Some Suggestions for It' (2009) *Intellectual Property Policy Reform* 12.
[65] For details on how the PCT operates, see *www.wipo.int/pct/en/* (accessed 15 November 2023).
[66]Patent Law Treaty, 2000. See further *www.wipo.int/treaties/en/ip/plt/* (accessed 15 November 2023).
[67] Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure,1977 amended 1980. See further details at *www.wipo.int/treaties/en/registration/budapest/* (accessed 15 November 2023).
[68] Strasbourg Agreement Concerning the International Patent Classification, 1971 amended 1979. See further details at *http://www.wipo.int/treaties/en/classification/strasbourg* (accessed 15 November 2023).
[69]On the historical development of TRIPS see International Centre for Trade & Sustainable Development *Resource Book on TRIPS and Development* Cambridge University Press (2005).
[70] TRIPS Agreement, Articles 2(1), 9(1).
[71] Ibid Article 1.

however vociferously criticised for several reasons including the circumstances surrounding its formulation, with arguments that the forum for its negotiation was designed to benefit advanced economies, encourage a protectionist environment[72] and that because developing countries lacked the capacity to adequately represent their positions on IP at the WTO, the result was a further entrenchment of the disparity in the North-South divide.[73]

With specific reference to patents, the TRIPS Agreement incorporates the substantive articles of the Paris Convention and provides additional direction to members, most of which expand on the nature and scope of protection for inventions.[74] Unlike the Paris Convention, the TRIPS Agreement specifically sets criteria for patentability. Inventions must be 'new, involve an inventive step and be capable of industrial application'.[75] The Agreement demands that 'patents shall be available for any inventions, whether products or processes, in all fields of technology,'[76] and does allow countries discretion to exclude certain subject matter from patentability.[77] The TRIPS Agreement defines the scope of the exclusivity which a patent affords the patentee.[78] A patented product may not be made, used, offered for sale, sold, or imported without authorisation.[79] The patentee of a patented process not only has the exclusive right to prevent unauthorised third-party use of the process, but may also prevent the acts of using, offering for sale, selling, or importing products obtained directly from the patented process.[80]

The TRIPS Agreement includes exceptions and limitations to patent rights such as experimental use and scientific research,[81] prior use,[82] exhaustion of patent rights,[83] and compulsory licensing or government use.[84]

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[72] R Rikowski 'Tripping Over TRIPS: An Assessment of the WTO's Agreement on TRIPS, Focusing on Trade, Moral and Information Issues' (2003) 20 *Business Information Review* 149-165. See generally R Rikowski 'A Marxist Analysis of the World Trade Organisation's Agreement on Trade-Related Aspects of Intellectual Property Rights' (2006) 4(4) *Policy Futures in Education* 396-409.
[73] E Su 'The Winners and the Losers: The Agreement on Trade-Related Aspects of Intellectual Property Rights and Its Effects on Developing Countries' (2000) 23 *Houston Journal of International Law* 169.
[74]TRIPS Agreement, Article 2(1): 'Members shall comply with Articles 1- 12, and Article 19, of the Paris Convention (1967)'.
[75]TRIPS Agreement, Article 27(1).
[76] Ibid Article 27(1).
[77] Ibid Article 27(2) and 27(3)(a), (b).
[78] TRIPS Agreement Article 30, and Paris Convention Article 5.
[79] TRIPS, Article 28(2)(a).
[80] Ibid Article 28(1)(b).
[81] Ibid Article 30.
[82] Ibid Article 29(2).
[83] Ibid Article 6.
[84] Ibid Article 31 (b)(c) and (h).

A brief exposition on compulsory licensing is necessary. Compulsory licensing, a practice where governments authorise the use of a patent without the patent holder's consent finds its legal basis under Article 31 of the TRIPS Agreement. Though often associated with ensuring access to medicines, its potential conceivably reaches far beyond the pharmaceutical industry. For example, imagine a scenario where small-scale farmers are faced with rising costs and limited access to modern technologies, which impacts on both their productivity and food security. Compulsory licensing could become a lifeline, extending its reach to agricultural innovations that are essential for food security and enhanced productivity.

The promise of compulsory licensing in agriculture is therefore not just theoretical— it becomes essential when critical technologies are monopolised, pushing up costs and restricting access. When invoked, governments can ensure that key innovations like drought-resistant seeds or advanced irrigation systems are made available to those who need them most. In this way, compulsory licensing acts as a bridge connecting the needs of farmers with the breakthroughs of modern science which ensures both affordability and availability.

It is noteworthy that compulsory licensing and government use of a patent without the owner's authorisation is only possible under specific conditions aimed at protecting the legitimate interests of the patent holder. For example, the applicant for a license must have first attempted, unsuccessfully, to obtain a voluntary license from the right holder on reasonable commercial terms.[85] If a compulsory license is issued, adequate remuneration must still be paid to the patent holder.[86] However, in cases of national emergencies, other circumstances of extreme urgency, public non-commercial use (or government use), or anti-competitive practices, there is no need to first try for a voluntary license. [87]

At the national level, a judicial application for a compulsory license may be initiated for various reasons. In Uganda, for instance, such an application can be based on the non-working of the patent.[88] If the patent holder fails to commercially exploit the patented invention within a specified period, or fails to meet the demands of the local market adequately, a compulsory license may be sought through legal channels to ensure access to the technology

[85] Ibid Article 31(b).
[86] Ibid Article 31(h).
[87] Ibid Article 31(b).
[88] Section 58 of the Industrial Property Act, 2014.

for public benefit. [89] Similarly, in Egypt, Article 24[90] of the patent law states that a patent may be revoked if it is not worked (exploited) in Egypt within three years from the grant of the patent, or if the working of the patent is discontinued for a period of more than three years without legitimate reasons.

Such provisions in national law aim to ensure that IPRs are balanced with societal interests like promoting innovation, competition, and access to essential technologies, particularly in situations where public health or agricultural emergencies necessitate urgent action.

Finally, while the thesis does not advocate for either pro-patent or anti-patent positions, it emphasises that patents have the potential to either stifle or accelerate Africa's development goals as outlined in Agenda 2063. Therefore, they must be carefully managed to strike a balance between promoting innovation and addressing societal goals.[91] The thesis emphasises the need for a well-calibrated mix of laws and policies. Given the interconnectedness of IP, innovation, agriculture, and trade with poverty reduction, agricultural productivity, and food security, effective legal and policy frameworks are essential.

2.3.2 Plant Variety Protection

Plant Variety Protection (PVP) or PBR (used interchangeably) is the other form of IPR directly relevant to agriculture. It is protected by non-hierarchical instruments that make up the international IPR architecture for plant varieties. The main instruments include the TRIPS Agreement; Convention on Biological Diversity (CBD);[92] Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation (Nagoya Protocol);[93] International Treaty on Plant Genetic Resources for Food and Agriculture

[89] Industrial Property Act, 2014, s 58. Under Section 58(1), the period is typically four years from the filing date of an application or three years from the grant of a patent, whichever last expires.
[90] Patent Law No. 82, 2002.
[91] See DW Barnes 'The incentives/access tradeoff' (2010) 9 *NW J Tech & Intell Prop* 96.
[92] Convention on Biological Diversity,1992.
[93] Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation, 2014.

(ITPGRFA);[94] and the International Union for the Protection of New Varieties of Plants (UPOV Convention).[95] Of these instruments, UPOV shall be covered in breadth.

Louwaars et al[96] observe that historically, plant varieties received limited protection due to ethical, political, and legal objections to patenting life forms. [97] The signing of the Marrakesh Agreement which established the WTO in 1994, provided new direction. The Agreement mandates that WTO members provide protection for plant varieties, in effect offering flexibility through *sui generis* systems that are unique and adapted to national circumstances. WTO members have wide policy space to define how this protection is conferred and may opt for *sui generis* protection that is not UPOV-compliant.

The 1978 and 1991 Acts of UPOV are commonly referenced when establishing *sui generis* rights under Article 27(3)(b) of the TRIPS Agreement. However, the 1978 Act is no longer available for new members, which typically leads countries to adopt provisions from the 1991 Act that offers updated and stricter standards. UPOV has had three revisions; 1972, 1978 and 1991 which strengthened breeders' rights and widened its scope of application to include a greater expanse of species.

Comparatively, the 1978 and 1991 Acts are varied. Whereas the 1978 Act restricts PBR protection to commercial marketing activities, the 1991 Act expands the scope to include exporting, importing, and stocking of protected material. The protection period under the 1991 Act was extended to at least 20 years, compared to the 15 years stipulated by the 1978 Act. Additionally, the 1978 Act required members to provide PBRs for five species or genera initially, with an expansion to twenty-four within eight years.[98] Under the 1991 Act, this phased requirement is more wide-ranging, mandating PBRs for fifteen species or genera at the outset and extending it to all species or genera within ten years.[99]

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[94] International Treaty on Plant Genetic Resources for Food and Agriculture, 2004.
[95] International Union for the Protection of New Varieties of Plants (UPOV Convention) of 1968, revised 10 November 1972, 23 October 1978, and 19 March 1991.
[96] Louwaars NP et al *Impacts of Strengthened Intellectual Property Rights Regimes on the Plant Breeding Industry in Developing Countries* Washington, DC: The World Bank (2005).
[97] Ibid.
[98] TRIPS Agreement, Article 34.
[99] Ibid Article 3(2).

There are also differences regarding exemptions to the exclusive rights granted to breeders. The 1978 Act includes a breeders' (research) exemption, which allows other breeders to use the protected variety as parental material for developing new varieties without prior authorisation.[100] The 1991 Act narrows this exemption by excluding varieties that are considered 'essentially derived' from the original protected variety.[101] The second exemption pertains to farmers' use of seeds. Under the 1978 Act, PBRs have been broadly interpreted to permit farmers to use seeds and propagating material of a protected variety in a non-commercial manner without prior authorisation. The 1991 Act clarifies this provision as a limited exemption. Member countries can only permit farmers to use seeds or propagating material saved from their harvests on their own holdings, provided this use is within reasonable limits and safeguards the breeder's legitimate interests.[102]

While UPOV provides a framework for PBRs, the 1991 Act may not fully accommodate the nuanced needs and circumstances of African countries, particularly concerning farmers rights. Experts have cautioned against developing countries' participation in the UPOV system or implementing UPOV-based PVP systems, citing their rigidity and unsuitability with prevalent farmer-managed seed systems and seed-saving practices.[103] Opting, thus, for flexibility enables African countries to adapt their PVP systems to better meet their agricultural needs, promote food security, conserve biodiversity, and protect the rights of smallholder farmers while ensuring that agricultural policies are more responsive to the diverse realities and priorities of African agriculture.

At continental level, the African Model Law on the protection of the rights of local communities, farmers and breeders, and for the regulation of access to biological

[100] Ibid Article 5(3).
[101] Ibid Article 14(5).
[102] Ibid Article 15(2).
[103] G Conway, J Waage & S Delaney *Science and Innovation for Development* (2010). Also see D Lederman & L Saenz Innovation *and Development around the World, 1960-2000* World Bank Publications (2005); African Center for Biodiversity 'UPOV-aligned PVP laws impinge on farmer seed systems' (2023), available at *https://acbio.org.za/seed-sovereignty/upov-aligned-pvp-laws-impinge-on-farmer-seed-systems/* (accessed 8 June 2024); GAIA/GRAIN Ten reasons not to join UPOV Global Trade and Biodiversity in Conflict' Issue no. 2 (1998), available at *https://grain.org/en/article/1-ten-reasons-not-to-join-upov* (accessed 8 June 2024); and Third World Network (TWN) 'Stringent plant variety protection may impinge on right to food' (2014), available at *https://www.twn.my/title2/biotk/2014/btk141008.htm* (accessed 8 June 2024).

resources,[104](the African Model Law)[105] can be seen as a *sui generis* regime configured for Africa that would enable countries to fulfil their obligations under Article 27(3)(b) of the TRIPS Agreement. It has provisions on PBRs that strongly favour smallholder-farming conditions in Africa. Article 31 for example specifically enables farmers to fully exercise farmers' rights that are otherwise curtailed in the 1991 UPOV Act.[106] Additionally, examples from countries like India[107] and Malaysia[108] demonstrate the feasibility and success of departing from the UPOV model and adopting innovative national PVP legislation that addresses specific national interests.

The AU Model Law sought to strike a balance between IP protection and the rights of local communities, farmers, and breeders. However, its adoption has been hindered by conflicts with international agreements like the UPOV Convention (1978, 1991) which prioritise stronger IP protection that often overshadows farmers' rights. Similarly, free trade agreements could have capitulated and upturned the AU Model Law's position on PBRs.[109] The Model Law's non-binding nature has also not provided sufficient motivation for AU member states to adopt it. Moreover, for obvious reasons, multinational seed companies and donor agencies tend to favour frameworks that strengthen breeders' rights, while political and institutional challenges in many countries often sideline necessary legal reforms, particularly amidst competing priorities like food security and economic development. The AfCFTA IP Protocol provides a new platform for reconsidering a more regionally harmonised approach to PVP.

2.4 Part III: Inter-Relationship Between Innovation, Intellectual Property, Trade and Agriculture

The relationship between innovation, IP, and trade is essential for agricultural advancement. Innovation powers progress in agriculture, and fuels advancements in farming practices, crop breeding, machinery, and biotechnology. IPR protects these innovations, incentivising R&D efforts. On the other hand, trade plays a key role in facilitating access to markets for agricultural products and technologies. Trade agreements and policies influence agricultural trade, as

[104] African Union *African Model Legislation for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources*, 2000.
[105] Ibid.
[106] See P Munyi et al *A Gap Analysis Report on the African Model Law on the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources* (2012) 51-57.
[107] See Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act 2001.
[108] See Protection of New Plant Varieties Act (PNPV Act), 2004.
[109] See C Oguamanam 'Breeding apples for oranges: Africa's misplaced priority over plant breeders' rights' (2015) 18(5) *The Journal of World Intellectual Property* 165-195.

factors such as tariffs, quotas, and subsidies determine market access for agricultural products. IP regimes further impact agricultural trade by regulating the transfer and commercialisation of innovative technologies. Within initiatives like the AfCFTA, trade liberalisation can promote the cross-border dissemination of agricultural innovations which enhances technology transfer and knowledge sharing. Each component, therefore, individually influences and collectively impacts agricultural development.

2.4.1 Innovation and Agriculture

There is wide consensus about the role of innovation in meeting the challenges that confront the agricultural sector.[110] Development literature emphasises the importance of innovation in economic growth, drawing a clear link between technological progress and growth rates.[111] Agricultural innovations, which include biotechnological breakthroughs in crop breeding, to precision farming techniques and digital solutions that optimise resource management are instrumental in modernising traditional farming practices into more efficient and sustainable systems. The key relationship lies in the role innovation plays in agriculture by igniting advancements in areas such as crop breeding, machinery, and biotechnology. IPR protects these innovations and provides incentives for R&D investment.

Innovation is also at the center of key continental policy objectives, catalysing efforts to harness new and existing technologies. The deployment of these technologies is essential in enhancing crop and livestock productivity, improving soil fertility, ensuring water availability, and addressing biotic and abiotic stresses, etc., factors that collectively enhance food production and accessibility.[112] The ongoing development of STISA-2034, the successor to STISA-2024, aims to refresh momentum for positioning STI as a key ingredient for Africa's socio-economic development and growth.

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[110] C Juma *The New Harvest: Agricultural Innovation in Africa* Oxford University Press (2015). Also see OO Waheed, OO Ayodele & UJ Issah Innovation and Creativity in Agriculture for sustainable Development (2020)12(4) *World Rural Observation* 41-6; and AO Fatui, et al 'Agricultural Innovation Platform: Framework for Improving Sustainable Livelihood in Africa' Forum for Agricultural Research in Africa (FARA) (2016).

[111] K Asenso-Okyere & K Davis 'Knowledge and Innovation for Agricultural Development' (2009).

[112] UNCTAD '*The role of science, technology and innovation in ensuring food security by 2030'* Available at https://unctad.org/system/files/official-document/dtlstict2017d5_en.pdf (Accessed 20 September 2024).

2.4.2 Intellectual Property and Agriculture

IP plays a key role in agricultural innovation and productivity enhancement, often through protection like patents and PBR. The protection incentivises researchers, scientists, and companies to invest in developing new agricultural technologies. IP is also an inherently trade issue, since it makes it possible to control the commercial exploitation of the results of scientific, technological and cultural creation. Hence, a discussion on IP and agriculture must incorporate trade concerns, which therefore necessitates the integration of these interdependent issues in policy making. In Africa, a vibrant agricultural sector must address several constraints through innovation and the attraction of proprietary technology in three broad categories: the seed sector, agricultural machinery, and ICT.

Improving the seed sector with advanced varieties can boost yields and resilience, while modern agricultural machinery enhances efficiency and productivity. ICT provides farmers with vital information and services such as weather updates and market prices, which facilitates better decision-making and market access. Access to modern ICTs, and their effective utilisation is expected to improve and sustain agricultural production.[113] Together, these innovations are critical for overcoming challenges in the sector, stimulating growth, and ensuring the sustainability of agriculture.

There are a number of areas in which proprietary technologies in the sector can be surveyed. In the seed sector for instance, inputs are important for enhancing productivity. However, Africa's seed sector is underdeveloped, and Africa is a minor player in the global seed trade, accounting for less than 2 per cent.[114] Approximately 80 per cent of the total seed used by farmers is obtained through informal seed or farmer-managed seed systems.[115] Literature on agriculture indicates that the bottlenecks include lack of adequate R&D, weak capacity and investment in public sector innovation systems to develop new genotypes relevant

[113] TW Dagne & C Oguamanam 'ICTs in agricultural production and potential deployment in operationalising geographical indications in Uganda' (2018) *Ottawa Faculty of Law Working Paper* 24.
[114]JA Francis & M Waithaka 'CTA/ASARECA Policy Brief: Seed systems, science and policy." *Seed systems, science and policy in East and Central Africa. Technical Centre for Agricultural and Rural Cooperation. Wageningen* (2014); citing M Waithaka et al Impacts of an improved seed policy environment in Eastern and Central Africa. *ASARECA-The Association for Strengthening Agricultural Research in Eastern and Central Africa* (2011).
[115] B De Jonge & P Munyi 'A Differentiated Approach to Plant Variety Protection in Africa' (2016)19(1-2) *The Journal of World Intellectual Property* 28-52.

for different climatic requirements, minimal or little technology transfer, and, lack of seed marketing channels which in turn constrain access to seeds.[116]

In terms of farm machinery, Africa is the least mechanised region in the world. Sub-Saharan Africa is specifically the region with the least mechanised agricultural systems worldwide.[117] Enhancing mechanisation can be an important part of Africa's agricultural transformation. According to FAO, the lack of farm machinery, including tractors and irrigation systems contributes to inefficiencies throughout the agricultural value chain, from production to post-harvest handling and marketing.[118] Addressing the deficit through technological innovation and investment in mechanisation could improve the prospects of the sector.[119] Science and innovation in agriculture must therefore be brought to the forefront of Africa's development agenda as a public good, [120] to be able to combat the challenges the sector faces.

Several case studies illustrate how innovative solutions have been applied within Africa's agricultural ecosystems, which spotlights the role of IP in facilitating agricultural advancements. An example is the Water Efficient Maize for Africa (WEMA) project, which was spearheaded by the African Agricultural Technology Foundation (AATF) in partnership with national research institutions and seed companies. The project was implemented in Kenya, Uganda, Tanzania, Mozambique, and South Africa, and utilised patented drought-tolerant and insect-resistant maize varieties to enhance agricultural resilience.[121] The patented genetic technologies it relied on was mainly acquired through voluntary licensing agreements. The project successfully enabled the adoption of drought resistant maize in participating countries, with WEMA hybrids outperforming some of the best local hybrids on the market.,[122] underlining the role of IP and innovation in strengthening food security.

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[116] KR Srinivas 'Cooperation in Agriculture in AAGC: Innovations and Agro-Processing' RIS/AAGC Discussion Papers (2018).
[117] BG, Hilmi M, Kienzle J. Agricultural mechanization: a key input for sub-Saharan Africa smallholders. *Integrated Crop Management (FAO) eng v. 23* (2016).
[118] Ibid.
[119] See R Devkota et al 'Responsible Agricultural Mechanisation Innovation for the Sustainable Development of Nepal's Hillside Farming System' (2020) 12(1) *Sustainability* 374.
[120] S Ehui , L Ronchi, KK Freeman & AN Loboguerrero 'Scaling agriculture science and innovation for a climate-resilient future in Africa' (2023), available at *https://blogs.worldbank.org/en/agfood/scaling-agriculture-science-and-innovation-climate-resilient-future-africa* (accessed 8 June 2024).
[121] African Centre for Biodiversity (ACB)'*The Water Efficient Maize for Africa (WEMA) Project—Profiteering Not Philanthropy*' (2017). Available at https://acbio.org.za/gm-biosafety/water-efficient-maize-africa-project-profiteering-not-philanthropy/ (accessed 28 September 2024).
[122] M Edge, et al 'Water Efficient Maize for Africa: A Public-Private Partnership in Technology Transfer to Smallholder Farmers in Sub-Saharan Africa' (2018) in From Agriscience to Agribusiness: Theories, Policies and Practices in Technology Transfer and Commercialisation 391-412.

The governance of WEMA seeds involved three key IP-related aspects: PVP that was granted in several countries, licensing agreements among stakeholders, and farmers' rights to reuse saved seeds.[123] The International Maize and Wheat Improvement Center (CIMMYT) and Monsanto provided AATF with a non-transferable, non-exclusive, royalty-free license for drought-tolerant maize lines, which AATF could sublicense to seed companies operating in Sub-Saharan Africa.[124] The arrangement covered national agricultural research systems (NARs) in the five participating countries, and required seed producers to maintain rigorous quality control and stewardship. The collaborative contributions aimed at trait introgression and reflected the nuanced nature of IP arrangements in public-private partnerships (PPPs).[125]

Recent scholarship on the interconnection between IPR and agriculture has provided a comprehensive analysis of this subject that warrants keen appreciation of the indispensability of IPR in agriculture. Brad Sherman and Susannah Chapman in their seminal work, *Intellectual Property and Agriculture: Critical Concepts in Intellectual Property Law Series – Vol. 1*[126] articulate the role of IPR over the entire agricultural ecosystem and the manner in which IPR connects with various stages of the agricultural process, including the production, processing, marketing, and circulation of agricultural inputs, products, and practices. They argue that IPR is not limited to protecting plant varieties or agricultural inventions, but extends to a plethora of activities that influence how agricultural innovations are developed, disseminated, and utilised within the industry.[127] For instance, in the production phase, IPR mechanisms such as patents and PBR play a crucial role in incentivising the development of new, resilient crop varieties and innovative farming technologies. During the processing and marketing stages, trademarks and geographical indications help ensure the authenticity and quality of agricultural products which enhances their marketability and provides economic benefits to producers. On the other hand, copyright protection for agricultural manuals, software and digital tools support the dissemination of knowledge and best practices within the sector.

[123]ACB (2017) Supra.
[124] African Agricultural Technology Foundation (AATF) *Project Collaboration, Intellectual Property & Licensing Background* (2017).
[125] ACB (2017) Supra at 10-12.
[126] B Sherman & S Chapman '*Intellectual Property and Agriculture: Critical Concepts in Intellectual Property Law Series'* (2020)1 Edward Elgar Publishing.
[127] Ibid.

Sherman and Chapman also emphasise the importance of considering how IPR influences the circulation of agricultural inputs and products.[128] IP frameworks can either facilitate or hinder access to essential agricultural resources, depending on how they are implemented and enforced, an aspect that is particularly relevant in global supply chains and international trade, where disparities in IPR enforcement can lead to inequities in resource distribution and access.

An important development in the IP-agriculture nexus that must be emphasised given its potential to promote growth of the agricultural sector is the Memorandum of Understanding (MoU) between WIPO and FAO,[129] which recognises important intersections between IP and agriculture including farmer's rights, TK, agricultural biotechnology, and genetic resources. The MoU aims to *interalia* enhance access and the transfer of agricultural technologies, and promote innovation in the food and agriculture sectors. The WIPO-FAO collaboration recently gained further momentum with the launch of the joint initiative, *The Role of IP in Providing Sustainable Agriculture and Food Systems in the Context of Climate Change*,[130] which seeks to synchronise IP systems with global agricultural policies. Through these efforts, WIPO and FAO position IP as an important tool for agricultural growth.

2.4.3 Trade and agriculture

The relationship between trade and agriculture is mutually reinforcing, as trade creates market incentives that drive agricultural growth, while agriculture provides the essential products that fuel and sustain trade expansion. Trade spurs agricultural growth by providing farmers with access to larger markets, which enhances their ability to sell surplus produce outside local boundaries. Market access encourages farmers to increase production, invest in better technologies, and adopt improved farming practices to meet the demands of a wider consumer base.

As the agricultural sector grows, related industries such as processing, transportation, and retail are stimulated, which generates jobs and further enhances trade activities. Moreover,

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[128] Ibid.
[129] FAO/WIPO '*Memorandum of Understanding between FAO and WIPO'* (2010). Available at: https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=137234 (Accessed 20 September 2024).
[130] WIPO '*The Role of IP in Providing Sustainable Agriculture and Food Systems in the Context of Climate Change'* (2023).

policies that promote trade such as reducing tariffs, improving infrastructure, and implementing supportive trade agreements directly impact agricultural growth as they can lower costs and barriers for farmers, which makes it easier for them to access markets, acquire necessary inputs, and sell their products competitively.[131] Opportunities for Africa's agriculture have particularly arisen from the continent's greater integration into agricultural value chains (AVCs), through which African products can now reach larger markets, reinforced by increased trade integration under the AfCFTA.[132]

The relationship of the concepts discussed above informs the understanding of what an ideal legal, policy, and regulatory framework should comprise, examined in Chapters Five and Six.

2.5 Part IV: Diagnostic Framework

The convergence of innovation, IP, trade, and agricultural development does not occur seamlessly or by default. It requires a confluence of factors, including support for innovation to generate proprietary IP such as patents, adapting the IP to agricultural applications, and leveraging the innovations to enhance international trade participation, which in turn promotes trade and overall development. Fiscal policies and public incentives are vital for supporting R&D, advancing skills development, building essential infrastructure, and integrating new technologies.

To address existing technological deficiencies in the agricultural sector, laws, policies, and regulations can be leveraged, while establishing a strong R&D sector can expedite progress toward achieving Agenda 2063 goals and aspirations.

Some basic building blocks are required to jumpstart and promote the attainment of the agriculture-related Agenda 2063 goals and aspirations, and more may be needed to sustain it. Of these processes, the research underlines the promotion of innovation, along with attracting technology embedded in proprietary IP.

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[131]D Rodrik '*Trade policy and economic performance in Sub-Saharan Afric*a' (1998).
[132]FAO, AUC 'Framework for boosting intra-African trade in agricultural commodities and services." *Addis Ababa* (2021). Also see L Sommer & D Luke *'Priority trade policy actions to support the 2030 agenda and transform African livelihoods'* (2016); and A ElGanainy et al *Trade integration in Africa: unleashing the continent's potential in a changing world*. International Monetary Fund (2023).

Innovation and IPRs are interrelated phenomena. A coupling relationship exists between the two.[133] Innovation and technological advancement promote the continuous evolution of IP and IP systems, while, conversely, IP stimulates technological innovation.[134] Both are, to varying degrees, addressed by a series of laws and policies that impact their eventual shape and scope. The legal rules that arise are meant to incentivise the development of new products and processes. The results of innovation are often realised in IP, and applicable to areas such as the agriculture and trade sphere. To achieve the agriculture-related goals of Agenda 2063, legal and policy reforms in innovation, IP, agriculture, and trade are essential for transformation.

A simple "innovation demand" – "innovation supply" analytical framework is adopted for the analysis of the inter-relationship between innovation, IP, trade and agricultural development. This framework considers both the demand-side factors that activate the need for innovation and the supply-side factors that facilitate the creation and dissemination of innovative solutions.

In this framework, innovation is motivated by demand and supply forces such as addressing long-standing needs and maximising profits. These forces determine the body of rules, norms and rights regarding the exploitation of the resulting IP such as patents. On the one hand, developed countries hold the biggest pool of technological tools and resources because of extensive public and private investments in R&D. Innovation is motivated by the desire to enter and control new markets and maximise profits, and not to address the technology deficit in the recipient countries. On the other hand, developing countries rely on these technologies but must establish well-structured IPR regimes to facilitate technology transfer and licensing. They require a huge outlay of resources to be able to acquire and apply the proprietary technology, in the absence of which, limited technological progression is made. Although patents do not always feature in every innovative process, where they do, a consequence of their use to protect new ideas leads to monopoly rights. For poor countries, this

[133] M Guo et al 'Integration Mechanism of Intellectual Property and Scientific and Technological Innovation from a Cross-Domain Perspective: International Experience and Enlightenment' (2023) 12(1) *Frontiers in Business, Economics and Management* 26-32.
[134] Ibid.

may mean curtailing possible technological use and adaptation. Consequently, developing countries must create an environment that promotes domestic innovation while also attracting proprietary technologies relevant to their development priorities.

This analytical framework is shaped by two key narratives: agricultural transformation as a driver of economic growth— which suggests that technology powered advancements in agricultural practices and systems can lead to growth; and trade (policy) as a springboard for agricultural progress.

Inherent in the "agricultural transformation" narrative is the presupposition that agricultural prosperity contributes considerably to enabling economic advancement, and increased participation in international trade (agricultural trade) can spur growth, which is a necessary precondition for realising Agenda 2063 development outcomes. To realise this transformation, a wide array of contemporary agricultural technologies must replace traditional practices like the hand hoe and cutlasses. These include precision farming, biotechnological innovations in seed breeding (protected by plant patents or PVP), advancements in agricultural machinery (covered by patents), digital farming solutions (protected by copyrights for software and patents for algorithms), and innovative formulations of agrochemicals and biological inputs. "Agricultural transformation" is the central theme in the discourse on agricultural development in Africa. It explains some of the instruments adopted to advance Africa's agriculture such as the Malabo Declaration[135] and CAADP.[136]

Modernising the agricultural sector is essential to help generate economic conditions that are favourable for achieving Africa's development goals. It is possible in several ways. First, a modernised sector would create a multiplier effect on sectors linked to agriculture, such as services and manufacturing.[137] This is so because growth in the agricultural sector increases demand for goods and services from other sectors. Second, it would boost consumption from households engaged in agriculture as their incomes rise, which in turn generates demand in

[135]African Union *'Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods'* (2014) available at *https://au.int/en/documents/20140627/malabo-declaration-accelerated-agricultural-growth* (accessed 20 May 2024).
[136] NEPAD (2003) Supra.
[137] D Snodgrass 'Agricultural Transformation in Sub-Saharan Africa and the Role of the Multiplier: A Literature Review' (2014). Also see L Praburaj 'Role of Agriculture in the Economic Development of a Country.' (2018)3 *Shanlax International Journal of Commerce* 1–5.

non-agricultural sectors, further fueling overall domestic growth.[138] Agricultural transformation is thus a key enabler for achieving diverse development goals within the purview of Agenda 2063. When properly harnessed, the opportunities brought by modernised agriculture can be a powerful force for creating jobs, enabling efficient use of resources, improving the standards of living and ultimately spurring economic development for a large number of people, regardless of whether they directly depend on agriculture for their livelihood.

Lessons drawn from the economic history of advanced countries in Europe and Asia show that agricultural prosperity substantially contributed to their economic advancement, as evidenced by studies from Bairoch (1993);[139] Clark (2007);[140] Johnston & Mellor (1961);[141] Timmer (1988);[142] and Rostow (1960).[143] It is trite that the leading industrialised countries of today were once predominantly agricultural.[144] In the implementation process of Agenda 2063, it is important to pay attention to the type of laws and policies that would harness the enabling power of agriculture given its impact on development, and, in this regard, design a framework which will enhance coherence among such laws and policies.

Inherent in the "trade policy" narrative is the presumption that international trade creates markets for agricultural products, and pays a vital role in the socio-economic development of Africa. Competitive agricultural trade is closely linked to employment growth, the expansion of small and medium enterprises (SMEs), and food security.

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[138]AN Mukasa, DW Andinet, OA Salami & AM Simpasa 'Africa's Agricultural Transformation: Identifying Priority Areas and Overcoming Challenges' (2017)8(3) *Africa Economic Brief* 1-16, available at https://www.afdb.org/sites/default/files/documents/publications/aeb_volume_8_issue_3.pdf (accessed 21 August 2024).

[139] P Bairoch P *Economics and World History: Myths and Paradoxes* University of Chicago Press (1995).

[140] G Clark *A Farewell to Alms: A Brief Economic History of the World* Princeton University Press (2007).

[141] 3. BF Johnston BF & JW Mellor 'The Role of Agriculture in Economic Development' (1961)51(4) *The American Economic Review* 566-59As far back as the 1960's, the author noted then, as is today, that in virtually all underdeveloped economies, agriculture is an existing industry of major proportions. Typically, some 40 to 60 per cent of the national income is produced in agriculture and 50 to 80 per cent of the labor force is engaged in agricultural production.

[142] CP Timmer 'The Agricultural Transformation' in H Chenery & TN Srinivasan (eds) *Handbook of Development Economics* (1988) 1 Elsevier 275-331.

[143]WW Rostow *The Stages of Economic Growth: A Non-Communist Manifesto* Cambridge University Press (1960).

[144] See F Bresciani, T Chalmers & D Terzano *'An outlook on Asia's agricultural and rural transformation: Prospects and options for making it an inclusive and sustainable one'* International Fund for Agricultural Development (2019).

Trade connects developing country producers and consumers to global markets while facilitating the flow of finance, technology, and services necessary to enhance agricultural productivity. Historically, agriculture has been a cornerstone of economic development in East and Southeast Asia, [145] as well as in European economies, and holds similar potential for Africa. However, success in these regions was not solely driven by sector-specific reforms but also by policies that complemented and maximised the benefits of trade.[146]

Consequently, in this framework, "trade policy" is viewed as a foundation for "agricultural development." These processes are interconnected: when innovation is advanced through investment in R&D and is supported by well-structured IP laws and policies, agricultural productivity and competitiveness increase, leading to greater agricultural trade and economic progress.

The "agricultural transformation" narrative is particularly relevant for African countries aiming to achieve growth through the sector. When applied, it is the countries seeking change that will influence and shape the rules that govern the transformation process. Ultimately, it is up to each country to implement legal and policy measures that support this process. This narrative is evident in the commitments made thus far, including Agenda 2063, the Malabo Declaration, CAADP, and the AfCFTA IP Protocol. In addition, this research shows that countries can also utilise the flexibilities within the TRIPS Agreement that allow for policy and legislative maneuver, comprehensively discussed in Chapter Three and Six, to develop their agricultural sector.

The "trade policy" narrative makes sense where markets are accessible. It is incumbent on the State and relevant regional organs to design trade regimes that adequately promote both regional (such as AfCFTA) and multilateral trade (WTO) so as to guarantee the deepening and widening of markets.

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[145] RM Briones & J Felipe '*Agriculture and Structural Transformation in Developing Asia: Review and Outlook'* Asian Development Bank Economics Working Paper Series No. 363 (2013).

[146]P Dorosh '*Trade and related economic reforms in Asian countries - what were the impacts of actual policy changes on agricultural development, trade and food security?*' Paper presented at the FAO Expert Consultation on Trade and Food Security: Conceptualising the Linkages, Rome (2002), available at *https://www.fao.org/4/y4671e/y4671e0j.htm* (accessed 11 August 2024).

The implementation of the AfCFTA heralds major trade liberalisation in Africa, promising greater integration into regional and global economies. The intensified connectivity between markets is anticipated to serve as a key conduit for trade in goods and services, vital for enhancing productive capacity not only in agriculture but also in other industries. As noted however, despite agriculture's dominance in many African economies, its productivity remains suboptimal. Therefore, prioritising measures that enhance productivity and competitiveness in the agricultural sector is imperative to effectively leverage trade for sectoral growth. The thrust of this effort lies in innovation, which is essential for unlocking the sector's full potential.

Several factors influence the success or failure of innovation, including access to funds for commercialisation and the presence of innovation hubs, among other variables. Unlike developed countries which offer incentives for R&D that help mitigate innovation risks and increase the likelihood of success, many African economies lack such opportunities. In this regard, laws, policies, and regulations related to STI become key to overcoming development barriers. The specific mix of laws, regulations, and policies will be influenced by various factors, with the dynamic nature of the innovation process and the resulting IP playing a crucial role in determining the approach.

In this framework, therefore, innovation, IP, and trade must converge to realise the Agenda 2063 agricultural objectives. Given the interconnectedness of these aspects, their governance and policy frameworks would need to align cohesively for a combined effect. The strategic harmonisation is essential for maximising the collective impact of innovation, IP, and trade on agricultural development and advancing the overarching goals of Agenda 2063.

2.6 Conclusion

The discussion has shown the interconnected roles of IP, innovation and trade, each contributing both independently and collectively to agricultural development. It has been shown that IP protection promotes innovation, which, in turn, enhances the competitiveness of agricultural products in regional and global trade. Therefore, it is vital to implement supportive laws and policies that strengthen the complementarity of the elements to fully realise agriculture’s potential in advancing Africa's development.

CHAPTER 3

STATE OF PLAY OF THE AGRICULTURAL SECTOR AND THE POTENTIAL ROLE OF A CALIBRATED INTELLECTUAL PROPERTY RIGHTS REGIME

3.1 Introduction

This chapter addresses the second, third and fourth research sub-questions, which explore the current obstacles hindering the growth of the agricultural sector, strategies for overcoming the challenges, and the legal and policy prescriptions necessary to support the realisation of the agriculture-related goals and aspirations of Agenda 2063. It does so by examining the barriers to agricultural development in Africa, to set the stage for how IP can be utilised to overcome the obstacles. The chapter calls on countries to formulate IPR laws based on a clear national policy benchmark that prioritises public interest. It also identifies legal provisions that can facilitate the use of IP to advance the sector. Ultimately, it guides countries to interpret their IP substantive obligations in line with Article 7 and 8 of the TRIPS Agreement as a means to take advantage of the TRIPS flexibilities and calibrate a comfortable IPR regime suited to their needs.

The chapter follows a structured analysis, beginning with an overview of the agricultural sector (Section 3.2) and the current market dynamics (Section 3.3). It then examines the sector's challenges and opportunities (Section 3.4), before exploring how IPR can be leveraged to address the challenges (Section 3.5). The core of the chapter, Section 3.6, discusses TRIPS flexibilities and argues that their strategic application can enhance innovation, safeguard domestic priorities, and support the development of a regulatory environment conducive for the transformation of agriculture, in line with Agenda 2063.

3.2 The Current Landscape of African Agriculture

3.2.1 Sector Relevance

The agricultural sector represents a substantial portion of employment and GDP in developing countries, accounting for 15–50 per cent of national GDP[1] and about a quarter of the continent's GDP.[2] In lower-income landlocked countries such as Chad and Burundi, it accounts for over 50 per cent of GDP.[3] In most countries, it is the largest contributor to GDP and the biggest source of foreign exchange, savings, and tax revenue.[4]

Approximately 70 per cent of the continent's poor live in rural areas, and agriculture is their most important economic activity.[5] In countries like Burundi, Burkina Faso and Madagascar, more than 80 per cent of the labour force works in agriculture,[6] although this figure is lower in countries like Angola, South Africa, and Mauritius, where the sector employs only 5.1 per cent, 4.6 per cent, and 7.8 per cent of the population respectively.[7] Smallholder farmers constitute approximately 80 per cent of all farms in sub – Saharan Africa,[8] with limited commercial scale farming. Reducing poverty remains a development challenge for the continent, but growing the agricultural sector is key to achieving transformational impact.[9]

Africa is relying on agriculture to fuel broad-based economic development.[10] Although industries like energy, petroleum, minerals, and tourism are important, they lack the same potential to uplift Africans on a mass scale like agriculture would.[11] An empirical study has shown that on average, agricultural growth reduces poverty roughly 3.2 times as much as

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[1] OECD/FAO *OECD-FAO Agricultural Outlook 2016-2025* OECD Publishing (2016).
[2] Ibid at 60.
[3] Ibid at 60–61.
[4] See World Bank 'Agriculture for Development' World Development Report (2008).
[5] OECD/FAO (2006) Supra at 61.
[6] See FAO '*Statistical Pocketbook 2018'* (2018). These statistics show that the percentage of the population employed mainly in agriculture varies significantly across countries, with Kenya at 38.1 per cent and Ethiopia at 69 per cent.
[7] A Shimeles, AVerdier-Chouchane & A Boly 'Introduction: Understanding the Challenges of the Agricultural Sector in Sub-Saharan Africa' in *Building a Resilient and Sustainable Agriculture in Sub-Saharan Africa* (2018) 1-12 available at https://doi.org/10.1007/978-3-319-76222-7_1 (accessed 15 May 2024).
[8] Alliance for a Green Revolution in Africa '*Africa Agriculture Status Report 2018: Catalysing Government Capacity to Drive Agricultural Transformation'* AGRA (2018).
[9] TS Jayne, J Chamberlin & R Benfica 'Africa's Unfolding Economic Transformation' (2018) 54(5) *Journal of Development Studies* 777-787.
[10] Goal 5.
[11] African Center for Economic Transformation '*Agriculture Powering Africa's Economic Transformation'* ACET (2017).

growth in other sectors.[12] Enhancing agricultural performance is therefore vital, as it generates multiple spill-over effects including improved food security, poverty reduction, and increased incomes,[13] which, in turn, stimulates growth in related sectors such as manufacturing, transport, and services.[14] In this sense, agricultural transformation serves as the spur for progress across the wider economy.

Historically, improvements in agricultural output have been achieved either by intensifying cultivation on existing plots,[15] or by expanding the area under cultivation.[16] However, climate change and population growth have impacted land availability and output, making AgR&D a key factor in enhancing agricultural productivity and performance.[17] This is evidenced by extant literature which highlights the potential galvanising impact of AgR&D on productivity improvements. It has been posited that advancements in agriculture can be achieved through investing in knowledge creation and innovation, (technological improvements) and implementing mechanisms to assimilate knowledge created elsewhere.[18] Therefore, measures to support R&D and innovation, as well as IP supportive regimes, are essential.

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[12]L Christiaensen, L Demery& J Kuhl 'The (evolving) role of agriculture in poverty reduction—An empirical perspective' (2011) 96(2), *Journal of development economics* 239-254. Also see, L Christiaensen & W Martin '*Five new insights on how agriculture can help reduce poverty'*(2018 available at *https://www.ifpri.org/blog/five-new-insights-how-agriculture-can-help-reduce-poverty/* (accessed 8 June 2024).

[13] O Badiane & J Collins *Agricultural Growth and Economic Development: A View Through the Globalisation Lens* Oxford University Press (2016). Also see AGRA *Africa Agriculture Status Report. Accelerating African Food Systems Transformation* (2022); and *G Meijerink & P Roza 'The Role of Agriculture in Development. Markets, Chains and Sustainable Development'* Strategy and Policy Paper no.5 DLO (2007), available at *http://www.boci.wur.nl/UK/Publications/* (accessed 25 July 2024).

[14] See L Praburaj 'Role of Agriculture in the Economic Development of a Country.' (2018)3 *Shanlax International Journal of Commerce* 1–5.

[15] VW Ruttan 'Productivity Growth in World Agriculture: Sources and Constraints' (2002) 16(4) *The Journal of Economic Perspectives* 161-84.

[16] JM Alston & PG Pardey 'Agriculture in the Global Economy' (2014) 28(1) *Journal of Economic Perspectives* 121-146.

[17] See KO Fuglie & NE Rada '*Growth in Global Agricultural Productivity: An Update'* Economic Research Report Number 189 (2016); Alston & Pardey (2014) Supra; and NM Beintema & GJ Stads *'A Comprehensive Overview of Investments and Human Resource Capacity in African Agricultural R&D'* ASTI Synthesis Report (2017).

[18] See A Krishnan, K Banga, M Mendez-Parra Krishnan, Aarti, Karishma Banga, and Maximiliano Mendez-Parra 'Disruptive technologies in agricultural value chains' *Insights from East Africa. Working paper* 576 (2020); FM Wambugu, A Harvest, JO Okpaku 'Science, technology and innovation for agricultural transformation.' *African Development Bank Group* (2015); and L Bjerke & S Johansson 'Innovation in agriculture: An analysis of Swedish agricultural and non-agricultural firms' (2022)109 *Food policy* 102269.

3.2.2 Prioritisation in Continental Policy Development

The agricultural sector is at the center of Africa's growth, as reflected in its prioritisation in the continent's development agenda, particularly through Agenda 2063.[19] To give substance to the agricultural promise, Agenda 2063 co-opted CAADP as its core policy on agriculture. Developed under the auspices of NEPAD, CAADP addresses Africa's development challenges within changing paradigms.

As a blueprint for continental agricultural transformation, it aims to sensitise policymakers to the necessity of acting on specific fronts to improve Africa's agricultural conditions, with emphasis on key pillars such as agricultural research and technology dissemination.[20]

Countries are required to spend at least 10 per cent of their budget on agricultural investment[21] a figure similar to that of the Asian economies during their Green Revolution,[22] and which is believed to have led to key advances in agriculture in Asia.[23] Furthermore, NEPAD set a target for countries to spend 1 per cent of their agricultural GDP on R&D.[24] The underlying investment commitments target reducing poverty, increasing productivity and farm incomes, and enhancing the sustainability of agricultural production.

In 2014, AU Member States adopted the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods[25] (Malabo Declaration), which outlines a set of seven commitments aimed at transforming agriculture in Africa from 2015–2025. The commitments provide a holistic approach for governments to achieve improved livelihoods through agriculture, with a particular emphasis on the role of smallholder farmers.[26] Governments are expected to integrate the goals set out

[19] Agenda 2063, Goal 5.
[20] E Harsch 'Agriculture: Africa's Engine for Growth' (2004) 17(4) *Africa Recovery* 13-15.
[21] Ibid.
[22] FARA *Science Agenda for Agriculture in Africa (S3A): "Connecting Science" to Transform Agriculture in Africa'* (2014). Also see RE Evenson, D Gollin 'Assessing the impact of the Green Revolution, 1960 to 2000' *science* 300, no. 5620 (2003) 758-762.
[23] J Roseboom, NM Beintema, JK Lynam & O Badiane Unlocking *Africa's Agricultural Potential* (2016).
[24] Beintema & Stads (2017) Supra.
[25] Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihood,2014 (*Doc Assembly/AU/2 (XXIII*).
[26] Ibid at 3–4.

in the Malabo Declaration into their National Agriculture Investment Plans (NAIPs) and implement multi-stakeholder platforms for accountability and peer review purposes.[27]

At the national level, countries have made progress in developing R&D and innovation policies to enhance agricultural growth.[28] Numerous policy instruments are in place to promote and govern scientific R&D activities, mainly articulated in legislation, policies, plans, strategies, and white papers.[29] Additionally, countries rely on various implicit policies to promote R&D and science and technology in general. However, despite the formulation and adoption of these instruments by governments, many suffer from poor institutional arrangements for execution.[30] Consequently, the potential impact of the policies is often undermined, leaving gaps in translating scientific research into practical, scalable solutions.

3.3 Current Market Context

To achieve the agriculture-related Agenda 2063 goals, countries must prioritise achieving productivity growth and enhancing market connections with the help of pro-trade policies. There is a common understanding that trade is an enabler of economic growth and poverty alleviation.[31] This is one of the main reasons why African leaders committed at Malabo in 2014 to tripling intra-Africa trade in agricultural commodities and services by 2025.[32] The trade commitment package includes the establishment of a continental free trade area, recently established by the Agreement Establishing the AfCFTA.[33] Its objective is also to increase and

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[27] See NEPAD '*Country CAADP Implementation Guidelines under the Malabo Declaration'*(2016) available at https://au.int/sites/default/files/documents/31251-doc-the_country_caadp_implementation_guide_-_version_d_05_apr.pdf (accessed 8 June 2024).

[28] MJ Kahn 'The Status of Science, Technology and Innovation in Africa' (2022) 27(3) *Science, Technology and Society* 327-350.

[29] See for instance, South Africa's Science and Technology White Paper, 2019, which sets the long-term policy direction for STI for the country.

[30] N Clark, J Mugabe & J Smith *'Governing agricultural biotechnology in Africa building public confidence and capacity for policy-making'* (2014).

[31] J Riedel 'Trade as an engine of growth: Theory and evidence." *Economic development and international trade'* (1988) 25-54. Also see African Union Commission. *Framework for boosting intra-African trade in agricultural commodities and services* Food and Agriculture Org. (2021). Also see L Sommer & D Luke *'Priority trade policy actions to support the 2030 agenda and transform African livelihoods'* (2016); and A ElGanainy et al *Trade integration in Africa: unleashing the continent's potential in a changing world*. International Monetary Fund (2023).

[32] A Bouet, L Cosnard & CS Fall 'Africa in global agricultural trade' in Bouët A and Odjo SP (eds) *Africa Agriculture Trade Monitor 2019* (International Food Policy Research Institute, Washington, DC (2019) 17–41 available at https://hdl.handle.net/10568/147087 (accessed 05 October 2024).

[33] Agreement Establishing the African Continental Free Trade Agreement (AfCFTA), Mar. 21, 2018 (entered into force May 30, 2019), available at *https://au.int/sites/default/files/treaties/36437-treaty-consolidated_text_on_cfta_-_en.pdf* (accessed 15 May 2014).

facilitate investment in markets and trade infrastructure.[34] However, both global and intra-African trade remain dismal.[35]

Africa has the lowest participation in global trade, contributing only 2.4 per cent to global exports,[36] despite a population representing 17 per cent of the world's total.[37] The continent marginally affects both the international export market, and regional trade. For example, between 2015 and 2017, intra-African trade made up only 16.6 per cent of total exports in 2017, compared to 68.1 per cent in Europe, 59.4 per cent in Asia, and 55 per cent in the Americas. Current estimates place intra-African trade at approximately 15 per cent, while the continent's share of global trade stands at around 3 per cent. With the AfCFTA's operational phase underway since January 1, 2021, intra-African trade is expected to increase significantly,[38] with agricultural trade among the key beneficiaries. A 2020 International Monetary Fund (IMF) analysis projected that agriculture would account for 16 per cent of the welfare gains anticipated under the agreement.[39]

On the global market, Africa maintains an agricultural competitive advantage in only a handful of niche products, typically raw or minimally processed goods. The International Trade Centre (ITC)[40] reports that less than 2 per cent of tea, sesame seeds and cashew nuts were exported as processed goods in 2019.[41] According to the African Center for Economic Transformation (ACET), the vast majority (75 per cent) of sub-Saharan agro-processing

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[34] Ibid Article 4(c).

[35] TRALAC ' Intra-Africa trade: Facts and figures' (2022), available at *https://www.tralac.org/resources/infographic/16253-intra-africa-trade-facts-and-figures-2022.html* (accessed 15 May 2024). The statistics show that whereas intra-Africa trade has grown over the past 10 years from US$ 98 billion in 2013 to US$ 102 billion in 2022, intra-Africa trade as a share of Africa's global trade has remained stagnant and somewhat declined.

[36] L Signe Landry 'How can the new African free trade agreement unlock Africa's potential?' OECD Development Matters (2018), available *at* *https://oecd-development-matters.org/2018/10/22/how-can-the-new-african-free-trade-agreement-unlock-africas-potential/* (accessed 15 May 2014).

[37] D Luke How *Africa Trades*. LSE Press, 2023.

[38] Recent analysis however shows that the AfCFTA is yet to have an impact, although optism is still high, since countries are still learning to trade under the regime. According to UNECA, Intra-African trade as a share of global trade declined from 14.5 per cent in 2021 to 13.7 per cent in 2022. Over the same period, intra-African exports declined as a percentage of total exports from 18.22 per cent to 17.89 per cent, and intra-African imports declined from 12.81 per cent to 12.09 per cent. See UNECA 'African countries trading more outside the continent than amongst themselves' (2024), available *at* *https://www.uneca.org/stories/african-countries-trading-more-outside-the-continent-than-amongst-themselvesper cent2C-eca-report* (accessed 11 August 2024).

[39] ML Abrego ML et al '*The African Continental Free Trade Agreement: Welfare Gains Estimate from a General Equilibrium Model*' International Monetary Fund (2019).

[40] T Marwala *'Preparing Africa for the Fourth Industrial Revolution'* World Intellectual Property Organisation (2019), available at: *https://www.wipo.int/edocs/pubdocs/en/wipo_pub_121_2019_si.pdf* (accessed 20 March 2024).

[41] Ibid.

enterprises operate on an artisanal and semi-artisanal scale characterised by low productivity and limited market access.[42] The processing of agricultural products is considered an important route to improve gains from agriculture. Agricultural products can be used to develop manufacturing in Africa, and enable countries to join Global Value Chains (GVCs), where more benefits are expected.

3.4. Challenges and Opportunities

3.4.1 Challenges

Literature on agricultural performance indicates a constellation of factors that affect the sector's growth and expansion, including climate variability, dependence on rain-fed agriculture, high post-harvest losses—averaging around 30 per cent of total production in sub-Saharan Africa,[43] a low technological base, and limited adoption of modern agricultural technologies such as improved seeds, mechanisation, and digital tools. Additionally, inadequate investment in agricultural research, coupled with multiple trade barriers further impede progress. The level of value addition and processing of agricultural commodities also remains low.[44] Despite the continent's vast natural resources and high agricultural potential, many countries continue to be net importers of food.[45] The African Competitiveness Report[46] revealed that the continent imports approximately $25 billion worth of food crops annually.

A combination of the factors above account for the poor performance of the sector, and collectively culminate in low productivity—together, they not only constrain its development potential, but also pose risks to food security. Nin-Pratt has noted that the growth of agricultural productivity in Africa continues to lag every other region of the world, growing at rates that are roughly half of the average rate of developing countries.[47] Low productivity in all farming systems is therefore, arguably the single most important bottleneck for agriculture in Africa.[48]

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[42] African Center for Economic Transformation *African Transformation Report: Growth with Depth* (2014).
[43] JM Moyo, E-HM Bah & VA Chouchane 'Transforming Africa's agriculture to improve competitiveness' *The Africa competitiveness report* (2015) 37–52.
[44] C Ayim, A Kassahun, C Addison & B Tekinerdogan 'Adoption of ICT innovations in the agriculture sector in Africa: a review of the literature' (2022) 11(1) *Agriculture & Food Security* 22.
[45] Ibid at 1
[46] [46] Moyo, Bah & Chouchane (2015) Supra at 37.
[47] A Nin-Pratt. '*Inputs, productivity, and agricultural growth in Africa South of the Sahara'* IFPRI Discussion Paper 1432 International Food Policy Research Institute (2015) 11.
[48] FM Wambugu, A Harvest &JO Okpaku (2015) Supra at 4.

3.4.2 Opportunities

Africa is endowed with abundant arable land, estimated at 200 million hectares of uncultivated arable land.[49] Of the world's surface area suitable for production, Africa has the largest share by far, accounting for roughly 45 per cent of the global total.[50] Whereas a wide variety of crops and commodities can be produced in many parts of Africa, the continent requires a range of solutions in order to overcome the varying bottlenecks that continue to limit the agricultural potential of the different countries and regions on the continent.[51]

Several emerging technologies, including advancements in biotechnology, genetic engineering, drones, farm robotics, and nanotechnology have potential for scaling up in Africa. While the innovations may not be considered novel in more developed economies, they are still unfamiliar to many African farmers, who often lack access to such technologies. Additionally, some technologies may remain confined to laboratories or are implemented with varying degrees of success. Against this backdrop, Africa requires legal and policy frameworks that not only promote innovation but also ensure access to these technologies, accompanied by the necessary awareness of their existence and application.

The Framework for African Agricultural Productivity (FAAP), the reference document for implementing the CAADP tenet on agricultural science and technology (otherwise known as CAADP (Pillar IV) challenges African governments to invest prudently in agricultural research and farm technology so as to increase productivity towards high-value products.[52]Agriculture is at the top of the continent's development agenda with a push to increase the proportion of national budgets in the sector.[53]

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[49] OECD/FAO, *OECD-FAO Agricultural Outlook 2020-2029* FAO, Rome/OECD Publishing, Paris (2020), available at *https://www.oecd-ilibrary.org* (accessed 20 March 2024). Africa holds 21per cent of pastoral land and 14per cent of cropland, with the FAO estimating that it contains 60per cent of the world's uncultivated arable land.

[50]J Nash, N Halewood & S Melhem '*Unlocking Africa's Agricultural Potential: An Action Agenda for Transformation*' World Bank (2013) 1-70.

[51]Oxford Business Group '*Agriculture in Africa'* (2021) available at *https://oxfordbusinessgroup.com/sites/default/files/blog/specialreports/960469/OCP_Agriculture_Africa_Report_2021.pdf* (accessed 20 March 2024).

[52] FARA (2006) Supra.

[53] S Benin & B Yu 'Complying with the Maputo Declaration Target: Trends in public agricultural expenditures and implications for pursuit of optimal allocation of public agricultural spending' *ReSAKSS Annual Trends and Outlook Report (2012).* This report draws attention to the growing interest in agricultural R&D investments and the need to enhance Africa's scientific capabilities. For additional related documents, see the African Union Sirte Declaration on Investing in Agriculture for Economic Growth and Food Security (2009) *Doc Assembly/AU/12 (VIII);* Africa's Science and Technology Consolidated Plan of Action,2006; and K Flaherty 'The agricultural

To achieve transformation, countries could consider the following measures:

(a) Developing sufficient science capacity to participate in the transformation of the sector (Science, technology, engineering and mathematics (STEM) education);
(b) Developing capability to generate new knowledge as well as the capacity for intelligent borrowing of scientific discoveries made elsewhere for adaptation to local situations;
(c) Matching scientific research to the changing needs of farmers, producers, consumers and agribusiness entrepreneurs;[54]
(d) Developing laws (IP) and policies supportive of sector growth.

3.5 The Potential Role of IPR

The preceding discussion has shown that the current state of agriculture in Africa is characterised by low productivity which stems from a limited technological base and climate variability, among other causative factors. There is increasing pressure to find ways of improving the performance of the sector, amidst an environment that is altered by climate change. IPR, particularly patents and PBR can contribute to addressing these challenges. The succeeding discussion moves IPR as a potential driver of agricultural growth to center stage, given its ability to address the said challenges through inventions that can enable farmers to adopt new streams of farm practices and technologies to improve yields, manage inputs efficiently, adopt new crop and production systems, and improve the quality of products.

3.5.1 Agricultural Technologies and IPR

Agricultural technologies, discussed in section *2.2.2* include a wide range of innovations designed to improve farming practices, enhance crop yields, and increase the sustainability of agricultural systems. It includes advancements such as precision farming tools, improved seed varieties, automated equipment, and innovative pest control techniques, among others. Different IPRs such as patents and PBR play a critical role in the development, protection, and commercialistion of these technologies by incentivising innovation and ensuring that creators secure and benefit from their innovations.

R&D challenges of small countries in sub-Saharan Africa' *Gates Open Res* 3 (2019): 949. Flaherty observes that many analysts utilise the 1 per cent agricultural GDP target for agricultural research as a standard benchmark.

[54] FARA *Science Agenda for Agriculture in Africa (S3A): "Connecting Science" to Transform Agriculture in Africa* Forum for Agricultural Research in Africa (2014).

At the global level, the international IP architecture has witnessed the universalisation of IP norms which have coalesced around the expansion of protectable subject matter, the creation of new rights, and the standardisation of certain dimensions of IP, including limitations and duration of protection.[55] This trend is exemplified by the TRIPS Agreement, which sets minimum standards for IP protection.

Article 27 of the TRIPS Agreement is particularly important. It mandates that patents be available for any inventions, whether products or processes, in all fields of technology, provided they meet the criteria of being new, involve an inventive step, and are industrially applicable. It also requires that patents be granted without discrimination based on the place of invention or whether the products are locally produced or imported.[56]

Patentees are granted exclusive rights[57] to commercialise their inventions for a specific period.[58] They are however required to disclose the best mode for carrying out the invention,[59] which is the *quid pro quo* for the patent grant. Article 30 allows for permissible exceptions to the exclusive rights, often defined by national laws. The exclusive rights, particularly concerning imports, are subject to the principle of exhaustion.[60]

In addition to patents, the TRIPS Agreement also addresses PBR, a form of IP protection for breeders of new plant varieties, under Article 27(3)(b). The provision allows Member States to provide protection for plant varieties either through patents, an effective *sui generis* system, or a combination of both.

UPOV, discussed previously under section 2.3.2 established the first international PBR Act in 1961, with several revisions culminating in the 1991 Act. UPOV mandates member countries to enact national laws consistent with its provisions, setting the standard for PBR protection that many countries have benchmarked.

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[55] For example, Article 33 of the TRIPS Agreement sets the standard minimum period of protection for patents at 20 years.
[56] TRIPS Agreement, Article 27(1).
[57] TRIPS Agreement, Article 28.
[58] According to Article 33 of the TRIPS Agreement, patent protection lasts 20 years from the filing date.
[59] Article 29 of the TRIPS Agreement mandates that members require patent applicants to disclose their invention in a manner that is sufficiently clear for a person skilled in the art to execute and may require the applicant to indicate the best mode for carrying out the invention known to the inventor at the filing date.
[60] Article 6 of the TRIPS Agreement permits WTO members to adopt national, regional, or international exhaustion regimes for IPR. Paragraph 5(d) of the Declaration on the TRIPS Agreement and Public Health (14 November 2001) provides guidance on this. Members may establish their own regimes, provided they comply with the Most-Favoured-Nation (MFN) and national treatment requirements of Articles 3 and 4.

For a variety to qualify for protection under UPOV, it must be new,[61] distinct,[62] uniform,[63] stable,[64] and have an appropriate denomination. The duration of PBR is at least 25 years for trees and vines, and 20 years for other crops, commencing from the date of issuance.[65] Like other forms of IPR, PBR is only effective within the granting territory. However, for intergovernmental organisations such as OAPI, PBRs granted by the organisation are effective in all its member states. The right requires the breeder's prior consent for certain activities involving the exploitation of the protected variety. [66]

The PBR regime permits two exceptions: The breeders' exemption[67] and farmer's privilege.[68] The breeders' exemption allows other breeders (including farmers) to use a protected variety in their own breeding activities. The farmers' privilege on the other hand allows farmers to use the product of the harvest from a protected variety for reproduction purposes on their own farm holdings.[69]

It is important to note that because IPRs grant owners exclusionary rights,[70] they can potentially limit access to agricultural technologies, seeds, plants, and genetic resources, necessitating thus the development of mechanisms to facilitate both the generation and access to technologies.

3.5.2 Legislative Rationale for Patents and PBR

Both patents and PBR have the potential to spur agricultural innovation by increasing efficiency, productivity, and resource conservation. Without IPR, inventors and plant breeders might lack the motivation to innovate, which may lead to stagnation in agricultural progress. Effective incentive structures are essential, particularly given that the development of agricultural technologies requires substantial financial investment, technical expertise, and

[61] Article 6 of the 1991 Act of the UPOV Convention.
[62] Ibid Article 7.
[63] Ibid Article 8.
[64] Ibid Article 9.
[65] Ibid Article 19 (1) – (3).
[66] Ibid Article 14(1): Also see exceptions to the breeders right (Article 15), and exhaustion of the breeders right (Article 16).
[67] Ibid Article 15(1)(iii).
[68] Ibid Article 15(2).
[69] Article 12 of the UPOV Convention requires that a new plant variety must be examined to ensure it meets the conditions set out in Articles 5 - 9 and 20. The variety must be distinct from existing varieties, and it must be sufficiently uniform and stable.
[70] P Drahos *A Philosophy of Intellectual Property* (2016) at 1-11.

carries a high risk of failure, even in advanced stages of research. Like many other technologies, agricultural innovations often involve high upfront development costs but can be replicated inexpensively or at a relatively low marginal cost. As a result, firms may be discouraged from investing in innovation if competitors are able to reproduce and commercialise identical products without incurring the original development costs.[71]

Regarding plant varieties for instance, once a new plant variety is developed, it can easily be reproduced, which may deny the breeder the reward for their investment. Few breeders would be willing to invest years and substantial resources in developing new plant varieties without the means to protect and reward their efforts. An effective PVP system is thus essential to incentivise breeders to invest in breeding programs and research which can help to advance agriculture.

3.5.3 Societal concerns

In the societal debate around technological innovations, IPR is often perceived as an obstacle to accessibility. Whereas many WTO members are convinced of the utility of IPR in encouraging new inventions, others are less confident of its benefits and impact on economic development and social welfare.[72]

While some argue that IPRs are essential for encouraging investment in R&D, others contend that they can create barriers to access and limit the dissemination of new technologies, particularly in developing countries.[73] The lack of consensus reinforces the need for countries to find the right balance in IPR regulation so as to arrive at the best IPR regime suited to individual country development needs.

The TRIPS Agreement which epitomises the global IPR regime has frequently drawn criticism for imposing the IP regime of developed countries onto developing ones.[74] Critics

[71] KE Maskus 'Intellectual Property Rights and Economic Development' (2000) 32 *Case Western Reserve Journal of International Law* 471.
[72] C Garrison 'Exceptions *to patent rights in developing countries*' No. 17 International Centre for Trade and Sustainable Development (2006).
[73] See the discussion under section **2.2.3** on philosophical justifications.
[74] SK Sell Private *Power, Public Law: The Globalisation of Intellectual Property Rights* Cambridge University Press (2003)88. see E Helpman '*Innovation, Imitation, and Intellectual Property Rights'* (1992); and NP Louwaars et al *'Impacts of Strengthened Intellectual Property Rights Regimes on the Plant Breeding Industry in Developing Countries: A Synthesis of Five Case Studies'* Wageningen University (2005).

argue that the agreements covered by the WTO multilateral trading system[75] predominantly reflect the interests of developed countries, with the TRIPS Agreement being the materialisation of these interests in the field of IPR.[76]

It is believed that TRIPS was developed under the influence of powerful multinational corporations seeking to shape international IP standards to safeguard their markets and extend their competitive advantage globally,[77]with Articles 7 and 8, examined in detail below, incorporated as concessions by developed countries to reconcile IPR with public interest.[78] An analysis of the historical backdrop of the Agreement's negotiations highlights the importance of the above provisions in achieving a diplomatic compromise among diverse negotiating parties. [79]

Following the entry into force of the TRIPS Agreement, African countries engaged in wide ranging reforms of their IP legislation,[80] in pursuit of international compliance. However, the reforms were not matched with consistent development policies to fully utilise potential IP benefits. Consequently, there lacks a coherent approach or program to harness the benefits of IP and technological innovations at the national, regional, or continental level. This also means that countries have not optimally used the flexibilities within the TRIPS Agreement to advance their development objectives.

This section of the study explores how TRIPS flexibilities can be applied in the agricultural sector to mitigate the restrictive effects of patents on access to essential agricultural technologies and social development. Countries need to navigate the flexibilities effectively to

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[75] The WTO covered agreements encompass a wide array of international trade rules. Key agreements include the General Agreement on Tariffs and Trade 1994 (GATT 1994) WT/L/352; the General Agreement on Trade in Services (GATS) WT/GC/W/122; the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), LT/UR/A-1C/IP/1; the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), LT/UR/A-1A/12; the Agreement on Technical Barriers to Trade (TBT Agreement), LT/UR/A-1A/10; the Agreement on Trade-Related Investment Measures (TRIMs Agreement), LT/UR/A-1A/15; and the Dispute Settlement Understanding (DSU), LT/UR/A-2. Each of these agreements forms a critical component of the WTO's legal framework, and deal with various aspects of international trade.

[76] E Su 'The Winners and the Losers: The Agreement on Trade-Related Aspects of Intellectual Property Rights and Its Effects on Developing Countries' (2000) 23 *Houston Journal of International Law* 169.

[77] See SK Sell 'Private Power, Public Law: The Globalisation of Intellectual Property Rights' (2003)88 Cambridge University Press. Also see S Walker *'The TRIPS agreement, sustainable development and the public interest'* discussion paper. No. 41. IUCN (2001).

[78] PK Yu 'The Objectives and Principles of the TRIPS Agreement' (2009) 46 *Houston Law Review* 979-1046 available at *https://scholarship.law.tamu.edu/facscholar/457* (accessed 15 May 2024).

[79] DJ Gervais The *TRIPS Agreement: Drafting History and Analysis* (1998).

[80] Godber W Tumushabe *Intellectual Property Rights Protection and Agricultural Technology Transfer in East Africa: A Case Study of Uganda* (unpublished LLM thesis, Stanford University, 2008).

address concerns surrounding IP protection and access to agricultural technologies to promote a more equitable distribution of technological innovations so as to ultimately advance the continent's development agenda.

From the onset, it is emphasised that IPRs are most advantageous where innovative capabilities exist or can be established.[81] In countries with low investment in R&D, the patent system generally promotes the protection of foreign-made inventions, since few applications originate domestically.[82] Similarly, whereas PBRs are relevant to the commercial development of seeds, in many countries, the production and distribution of commercial seeds play a marginal role, while the informal seed system (based on the production and exchange of farmers' varieties) is the main channel for the diffusion of improved varieties.[83] More than 80 per cent of crops cultivated in developing countries are said to be planted with seeds from the informal seed system.[84]

Appreciating this background is essential to the understanding of why IP systems must be designed to meet the specific needs of individual countries, especially since most African countries are recipients of foreign technologies with minimal domestic technological inventions. It is beneficial to tackle the challenges facing the agricultural sector by adjusting domestic IPR laws to the flexibilities provided by the TRIPS Agreement, bearing in mind the current economic, technological, and social conditions of countries.

It is also important to acknowledge that IPRs as such are not a problem, but how they are used.[85] IP in itself neither aids nor hinders development. Instead, the effectiveness of IP for

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[81] CM Correa, M Mashayekhi & E Tuerk '*Training Module on the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights'* (2010). For an in-depth analysis of the intersection between IP, technology, and agriculture, see N Rosenberg *Inside the Black Box: Technology and Economics* Cambridge University Press (1982). Rosenberg highlights that patent protection for biotechnology may not benefit many developing countries with limited technological capabilities. For further discussion, see HP Kunz-Hallstein 'The United States Proposal for a GATT Agreement on Intellectual Property and the Paris Convention for the Protection of Industrial Property' (1989) 22 *Vand J Transnat'l L* 265.

[82] K Peschard, C Golay & L Araya The *Right to Seeds in Africa* (2023). Also see AR Davies, M Rut & JK Feeney 'Seeds of Change? Social Practices of Urban Community Seed Sharing Initiatives for Just Transitions to Sustainability' (2022) 27(6) *Local Environment* 784-799.

[83] Ibid. at 7. Also see Food and Agriculture Organisation (FAO) '*FAOSTAT Statistical Database'* (2018)

[84] M Coulibaly & RAB de la Perrière '*A dysfunctional plant variety protection system: Ten years of UPOV implementation in francophone Africa*' APBREBES (2019), 5. See, also, ETC Group, '*Who will feed us?'* (2017), available *at https://www.etcgroup.org/whowillfeedus* (accessed 8 June 2024) ; and AFSA and GRAIN, '*The real seed producers'* (2018), available at *https://grain.org/en/article/6035-the-real-seeds-producers-small-scale-farmers-save-use-share-and-enhance-the-seed-diversity-of-the-crops-that-feed-*africa (accessed 8 June 2024).

[85] United Nations Office of the Special Adviser on Africa '*The Role of Intellectual Property Rights in Promoting Africa's Development'* (2022), available at *https://www.un.org/osaa/role-intellectual-property-rights-promoting-africa-development* (accessed June, 8 2024).

development purposes is determined by the design and application of laws, policies, and practices.[86]

Indeed, A study by Kim et al.[87] concluded that strong IPRs do not necessarily lead to development, but that countries have to customise their regime to pick the appropriate cocktail of IPRs that will suit their national innovative and economic environment. As shall be seen, the TRIPS Agreement gives countries leeway to explore numerous policy spaces in the design of their national IP frameworks to enable them benefit from the IP system, better known as TRIPS flexibilities. The flexibilities, discussed in detail below have potential to neutralise the impact of the exclusive rights and thus ameliorate, to an extent, the said societal concerns. It is anticipated that the strategic application of the flexibilities can enhance innovation and safeguard domestic priorities.

It must also be noted that the TRIPS Agreement is not a model IP law in itself, as it lacks the detailed provisions typical of domestic legislation.[88] It sets minimum standards, conceived as general principles to be adapted according to the local needs and conditions of Members. In effect, it allows for differential application of IP laws in relation to developed countries, LDCs, public health, sectors of vital economic importance (such as agriculture), and in the implementation of the agreement generally;[89] which enables countries to customise their IPR laws to meet their development needs.[90] Each country is thus responsible for tailoring its domestic systems to conform with its legal, economic, and developmental realities. Therefore, to achieve the agricultural objectives of Agenda 2063, countries need to use the TRIPS Agreement as a guide to formulate laws and policies that harmonise various legitimate interests to achieve specific development objectives.

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[86] Ibid at 4, citing *World Intellectual Property Organization (WIPO) "DL-101 general course on intellectual property, Module 12: IP and development – the WIPO development agenda'* (2019), available at *https://welc.wipo.int/aipt/aiptCourses* (accessed on 8 June 2024).

[87] Kim et al. 'Appropriate Intellectual Property Protection and Economic Growth in Countries at Different Levels of Development' (2012) 41(2) *Research Policy* 358-375.

[88] AD Mitchell & A Taubman 'Practical Means of Applying the TRIPS Agreement's Flexibilities to Spur Vaccine Production' (2023) No. 225 *ARTNeT Working Paper Series*.

[89] TRIPS Agreement, Articles 27, 30, 66.

[90] W Zhuang *Intellectual Property Rights and Climate Change: Interpreting the TRIPS Agreement for Environmentally Sound Technologies* Cambridge University Press (2017).

3.5.4 The Contextual Meaning of Flexibilities

The exclusive rights granted by IPRs and more specifically to patents are not absolute. They are subject to certain flexibilities such as general exceptions and compulsory licensing rules, which counties can exploit to the maximum extent to be able to realise their development objectives.[91] There is however limited understanding of the flexibilities, including Article 30 and its scope (discussed in detail below), hence, countries have not been able to fully employ them for development purposes.

TRIPS flexibilities are legal tools that comprise varied rights, safeguards and options that WTO Members can exploit in the implementation of the Agreement.[92] They constitute the different ways to transpose TRIPS obligations into national law, while at the same time accommodating national interests and complying with TRIPS principles and provisions.

The term flexibility appears in paragraph 6 of the Preamble of the TRIPS Agreement, and Article 66(1). Paragraph 6 of the Preamble states:

> (...) recognising also the special needs of the least-developed country Members in respect of maximum flexibility in the domestic implementation of laws and regulations in order to enable them to create a sound and viable technological base.

The preamble acknowledges that taking advantage of the flexibilities by LDCs during implementation of the Agreement is important for establishing a national technological base necessary for development.

The meaning of the word flexibility as used in the Preamble is further explained by Article 66(1), which states:

> In view of the special needs and requirements of least-developed country Members, their economic, financial and administrative constraints, and their need for flexibility to create a viable technological base, such Members shall not be required to apply the provisions of this Agreement, other than Articles 3, 4 and 5, for a period of 10 years from the date of application as defined under paragraph 1 of Article 65. The Council for TRIPS shall, upon a duly motivated request by a least-developed country Member, accord extensions of this period.

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[91]UF Ugwu, '*Harnessing the Multilateral Patent and Plant Variety Protection Regimes to Advance Food Security: Implications of the EU-ECOWAS Economic Partnership Agreement*' South Centre, Geneva (2022).
[92] C Deere *The Implementation Game: The TRIPS Agreement and the Global Politics of Intellectual Property Reform in Developing Countries* Oxford University Press (2009).

The TRIPS preamble and Article 66(1) are augmented by Article 1(1) which permits variations in the implementation of the Agreement's provisions. It provides:

> Members shall be free to determine the appropriate method of implementing the provisions of this Agreement within their own legal system and practice.

As gleaned from the above provisions (Paragraph 6 of the Preamble, Article 1(1), 65 and 66(1)), the TRIPS Agreement gives member countries room to maneuver to customise their IP laws in accordance with their unique legal systems and development needs. In particular, Members have the ability to adopt certain measures that neutralise the impact of the exclusive rights.

For present purposes, TRIPS flexibilities are taken to mean safe harbour areas (provisions) within the IP system which can be exploited to support growth (of the agricultural sector).

African countries however have not fully utilised the full room of maneuver availed by TRIPS.[93] The landmark report by the Commission on Intellectual Property Rights (CIPR) advocated for increased use of the flexibilities, and recommended that developing countries adopt the widest possible exceptions to patent rights.[94] Furthermore, the Expert Report of the WIPO Standing Committee on the Law of Patents (WIPO-SCP) recognised that the use of the exceptions warrants careful consideration, as they are an important avenue for calibrating national patent policy.[95]

Considering, however, the limited use of the flexibilities, it is essential to revisit the Agreement's purpose to ensure its progressive interpretation. In this regard, the Agreement contains two key provisions—Articles 7 and 8, often referred to as the balancing provisions—which directly address the objectives and principles foundational to the Agreement itself. While these articles do not outline specific limitations that States may impose on IPRs, they identify

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[93] For an exposition on how the amendment of Article 31 of TRIPS enhanced legal certainty regarding flexibilities for developing countries, see T Avafia, J Berger & T Hartzenberg *'The Ability of Select Sub-Saharan African Countries to Utilise TRIPS Flexibilities and Competition Law to Ensure a Sustainable Supply of Essential Medicines: A Study of Producing and Importing Countries'* UNCTAD/ICTSD Project on IPRs and Sustainable Development (2006) 1-48. In contrast, Gnangnon SK examines whether the TRIPS waiver for Least Developed Countries has effectively created a viable technological base in 'Has the Least Developed Countries' TRIPS Waiver Delivered on Its Promise?' (2023).

[94] Commission on Intellectual Property Rights (CIPR) *'Integrating Intellectual Property Rights and Development Policy'* London (2002).

[95] WIPO Standing Committee on the Law of Patents '*Experts' Study on Exclusions from Patentability and Exceptions and Limitations to Patentees' Rights'* (2011),15th session, WIPO SCP/15/3 Annex, available at *https://www.wipo.int/export/sites/www/scp/en/meetings/session_15/pdf/scp_15_6_prov.pdf* (accessed 30 May 2024).

the general objectives and purposes that States can pursue when fulfilling their obligations under the Agreement.

Article7 on objectives states:

> The protection and enforcement of IPR should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.

Article 7 confirms that the purpose of TRIPS is not merely to safeguard IPR but to promote welfare gains.[96] It emphasises a balance between incentivising technological innovation and the transfer and dissemination of technology, considering the interests of both users and producers of technical knowledge, as well as the rights and obligations of WTO Members.[97] Article 7 advocates for an interpretation of TRIPS that supports both social and economic welfare, so as to ultimately benefit society. Some scholars argue that Article 7 is crucial for creating future exceptions to rebalance the international IP system.[98] Indeed, different scenarios have been proposed in which Articles 7 and 8 can be used to facilitate a flexible interpretation and implementation of the TRIPS Agreement.[99]

Article 8, concerning principles, consists of two paragraphs below:

(1) Members may, in formulating or amending their laws and regulations, adopt measures necessary to protect public health and nutrition, and to promote the public interest in *sectors of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement.*

(2) Appropriate measures, provided that they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of IPRs by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology.

Article 8(1) grants States room to implement public policy measures that safeguard societal interests, and acknowledges their right to legitimately customise their IP systems according to their developmental stage and needs. Since States can decide what defines public

[96]A Tesoriero 'Using the Flexibilities of Article 30 TRIPS to Implement Patent Exceptions in Pursuit of Sustainable Development Goal 3' (2022) 25(2) *The Journal of World Intellectual Property* 516-535.
[97] Ibid at 521.
[98]KY Peter 'The Objectives and Principles of the TRIPS Agreement' (2009) 46 *Hous. L. Rev*. 979. Available at: https://scholarship.law.tamu.edu/facscholar/457 (accessed on 8 June 2024).
[99] Ibid at 1018.

interest in sectors of vital importance, they have the leeway to determine the content and extent of the measures they enact.[100]

For ease of understanding, the above flexibilities can be grouped into two categories: those related to transition periods (procedural flexibilities), and substantive flexibilities.[101] Alternatively, they can also be categorised based on their *ex-ante* and *ex-post* applications. For each type of flexibility, the basic concept is examined, along with the elements that permit various implementation approaches. Specific interest is on flexibilities that are of particular importance to developing countries and LDCs.

3.6 Leveraging TRIPS Flexibilities to Address IPR Imbalances

3.6.1 Procedural Flexibilities - Transition Period

Article 66 which constitutes special and differential (S&D) treatment provides for the special needs of LDC's, who constitute the bulk of African countries. The Article permits LDCs to delay the implementation of certain TRIPS obligations.

According to Article 66(1), LDC Members, in their bid to create a viable technological base can defer the application of certain provisions of the TRIPS Agreement for a period of 10 years from the date of their membership to the WTO. During this period, LDC members are not required to comply with most TRIPS provisions other than Articles 3, 4 and 5. The TRIPS council, upon a motivated request by an LDC Member can enlarge this period.

In this period, LDCs can utilise Article 66(2) which enjoins developed country Members to provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to LDC Members in order to enable them to create a sound and viable technological base. The rationale for Article 66 is to provide LDCs with the time and space necessary to develop their technological and institutional capacities before fully implementing TRIPS obligations.

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[100] H Grosse Ruse-Khan 'The (Non) Use of Treaty Object and Purpose in Intellectual Property Disputes in the WTO' in *Sustainable Development Principles in the Decisions of International Courts and Tribunals* (1992) 11-15.

[101] SF Musungu, C Oh & World Health Organisation *The Use of Flexibilities in TRIPS by Developing Countries: Can They Promote Access to Medicines?* World Health Organisation (2006).

The initial transition period was for a duration of 11 years, until 2006. It has since been extended three times in response to specific requests from the LDC Group. In its decision of 29 November 2005, the TRIPS Council extended the period until 1 July 2013,[102] and on 11 June 2013, to a further period until 1 July 2021.[103] Most recently, on 29 June 2021, the Council extended it further until 1 July 2033, or when a particular country ceases to be in the least developed category, whichever comes before 2033.[104] The 2021 decision allows LDCs' more room in the implementation of the TRIPS Agreement, which enables them to tailor their respective IPR laws towards the advancement of agricultural development priorities (including other sectors). Moreover, LDCs can still seek further extensions.

The enjoyment of Article 66 by LDCs was amplified by the Panel in the India – Patents (US)[105] case, where it was held with respect to Article 70(9) as follows:

> "…. as is the case with Article 70.8(a), the granting of exclusive marketing rights is a special obligation linked with the enjoyment by Members of the transitional arrangements under Articles 65 and 66 of the Agreement."[106]

The Article 66 flexibility is no doubt regarded as essential for LDCs to develop their domestic technological base. Failure to fully utilise the TRIPS flexibilities may prolong the attainment of their development objectives. In the past, in the area of public health, LDCs such as Bangladesh, Uganda, and Tanzania invested in local manufacturing capacity to produce generic medicines. [107] Similar strategies can be employed to strengthen technological capacity in the agricultural sector by taking advantage of the extended transition period and utilising the built-in flexibilities.

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[102] World Trade Organisation (WTO) '*Decision of the TRIPS Council of 29 November 2005 (IP/C/40)* (2005), available at *https://www.wto.org/english/tratop_e/trips_e/t_ipc40_e.htm* (accessed 30 May 2024).

[103] World Trade Organisation (WTO) *Decision of the TRIPS Council of 11 June 2013* (IP/C/64) (2013), available at *https://www.wto.org/english/tratop_e/trips_e/t_ipc64_e.htm* (accessed 30 May 2024).

[104] World Trade Organisation (WTO) *WTO Members Agree to Extend TRIPS Transition Period for LDCs until 1 July 2034* (2021), available at *https://www.wto.org/english/news_e/news21_e/trip_30jun21_e.htm* (accessed 30 May 2024).

[105] World Trade Organisation (WTO) *India -Patent Protection for Pharmaceutical and Agricultural Chemical Products* (WT/DS50) (1997) available at *https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds50_e.htm* (accessed 30 May 2024).

[106] Ibid.

[107] See Article 31 of the TRIPS Agreement and Paragraph 6 of the Doha Declaration. Also see UNCTAD *Investment in Pharmaceutical Production in the Least Developed Countries - A Guide for Policymakers and Investment Promotion Agencies* (2011).

3.6.2 Substantive Flexibilities – Patent Related

3.6.2.1 Scope of Patentability

The Agreement allows countries to set their own standards for patentability, which encompass criteria for novelty, inventive step, and industrial applicability. Article 27 requires members to grant patents for any inventions, whether products or processes that are new, involve an inventive step, and are industrially applicable. TRIPS does not define these terms, which means Members have liberty in determining their application in domestic patent laws through several means including judicial decisions and in examination guidelines by patent grant authorities. Such latitude may aid countries to establish criteria that enables them to meet their development objectives such as those related to agricultural development.

3.6.2.2 Exclusions from patentability

Article 27 of the TRIPS Agreement expressly sets out permissible exclusions from the scope of patentable subject matter. The exclusions are discretionary for Members, thus allowing for domestic policy discretion since they serve as pre-grant limitations on patentability, thereby precluding all potential applicants from obtaining a patent on an invention that falls within the scope of the exclusion.

Article 27 exclusions are supported by Article 1(1), which allows Members to interpret concepts mentioned but not defined in the TRIPS Agreement, according to their national law and practice. As stated in *3.6.2.1* above, such concepts include 'novelty' and 'inventiveness.'[108] Article 27(3)(b) offers a specific exception related to agricultural biological processes which allows Members to exclude 'essentially biological processes' for plant production from patentability. With no explicit definition in TRIPS, this exclusion can be generally interpreted to include plants, including plant varieties and species. As a result, countries may opt to exempt plants derived from traditional breeding or genetic engineering from IP protection. [109]

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[108]World Intellectual Property Organisation (WIPO) '*Advice on Flexibilities Under the TRIPS Agreement* available at *https://www.wipo.int/ip-development/en/policy_legislative_assistance/advice_trips.html#:~:text=Flexibilitiesper cent20asper cent20toper cent20substantiveper cent20standards,establishedper cent20byper cent20theper cent20TRIPSper cent20Agreement* (accessed 15 June 2024).

[109]C Correa 'TRIPS Flexibility for Patents and Food Security: Options for Developing Countries' (2013) 2(3) *Bridges Africa*.

The CIPR Report[110] advises developing countries to make use of the flexibilities within the TRIPS Agreement to exclude certain subject matter from patentability. The exclusions include diagnostic, therapeutic, and surgical methods for treating humans and animals; plants and animals (with a narrow definition of microorganisms); new uses of known products; plant varieties; and, where possible, genetic material. The report further recommends that developing countries adopt rigorous standards for novelty, inventive step, and industrial application, as well as enforce stringent patentability and disclosure requirements to prevent overly broad patents.

For developed countries, the report suggests implementing an absolute novelty standard, whereby any prior disclosure globally constitutes prior art.[111] It also advises accounting for TK during the patent examination process and requiring the disclosure of the geographical source of biological materials used in inventions within patent applications. [112]

3.6.2.3 Patent Disclosure

An enduring principle of patent law is that an invention must be disclosed in enough detail to enable a person skilled in the art to implement the technology.[113] The publication of patent applications is a standard feature of patent systems and represents an important trade-off: in exchange for a limited period of market exclusivity, the patent holder must make the invention publicly accessible. The disclosure is intended to support local innovators and researchers by providing them with a clear understanding of the patented technology. Its essence is to ensure the protected technology enters the public domain.[114] Scientists and researchers rely on such access to not only expand their knowledge but to also develop new products, leading to scientific and technological progress.

Flexibility in the application of the mandatory requirement of disclosure allows countries to adopt more stringent requirements than the minimum established by Article 29(1).[115] A granting country may insist on a detailed description of the process used to

[110] CIPR (2002) Supra.
[111] Note however that absolute novelty can be a barrier to local innovation, if applied in Africa as local inventors might find it harder to secure patents if their inventions, though new locally, are already known elsewhere.
[112] CIPR (2002) Supra.
[113] Article 29(1).
[114] Garrison Supra (2006).
[115] Ibid.

create the claimed product or its components,[116] or it could demand that the disclosure be adapted to the technological level of the receiving country, in order to promote effective technological dissemination.

One of the barriers to technological development in Africa however is the inability to effectively extract technical information from patent applications.[117] Many African countries have not fully utilised the wide array of science and technology tools that have been applied elsewhere to enhance the agricultural sector, partly due to their underuse of patent information. Countries at an early stage of technological development, such as those in Africa, often rely on informal methods of technology transfer, including acquiring technologies through imitation, reverse engineering, and, at more advanced stages, adapting them to local conditions.[118] Therefore, it is essential to emphasise the role of the public domain as a key source of knowledge and a vital tool for technology absorption and development.

According to the European Patent Office, over 130 million published patent documents are reported to be available in the world.[119] Patent documents are often the sole source of disclosure for critical scientific or engineering information.[120] It has been shown that approximately 70 per cent or more of the information disclosed in patent documents is not available in other publicly accessible sources.[121] Therefore, emphasis needs to be laid on the importance of the public domain as a source of knowledge building and technology

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[116] Ibid.
[117] AB Jaffe & M Trajtenberg *Patents, Citations, and Innovations: A Window on the Knowledge Economy* MIT Press (2002).
[118] United Nations Conference on Trade and Development *Dimensions of Intellectual Property in Uganda* (2009) available at https://unctad.org/system/files/official-document/diaepcb200913overview_en.pdf (accessed 30 May 2024).
[119] The European Patent Office provides worldwide patent data through its online services, including Global Index, PATSTAT, and Espacenet. Espacenet. currently holds over 130 million published patent documents and tracks technical developments since 1782. The WIPO IP Facts and Figures 2023 indicates that worldwide patent filings reached a total of 3.5 million in 2023. Also see World Intellectual Property Organisation Guide on Using Inventions in the Public Domain (2021) (WIPO/TISC/YAO/21). For more information, see European Patent Office 'Patent information services' available at *https://epo.org* (accessed 30 May 2024).
[120] For an overview of the value of patent information, see S M Tertell, 'Patents are an Overlooked Information Source'(1986) *Bulletin of the American Society for Information Science* October/November 24; S Kumar, 'Patents as Source of Technological Information' (1986) Herald of Library Science July-October 180; and Chester, D 'Getting Benefits From Patents' (1984) 15(2) LASIE September/October 2, 8-9 at 4.
[121] Ibid (Chester) at 5.

absorption.[122] There is no doubt the information is readily available, as most patent applications are published 18 months after the first filing.[123]

The value of patent information is manifold. First, it can enable researchers and competitors to reorient or fine-tune innovative R&D activities.[124] The bibliographic data, along with references to the relevant prior art and the description of the invention in patent documents informs researchers and competitors of current technological developments and findings in their field, which allows them to redirect their activities. [125]

Second,[126] patent information permits recipients of patented technology to know precisely what they will be receiving, along with an evaluation of comparable technology and alternative solutions.[127] Third, the use of patent information can assist in alleviating the problems African countries may face in the identification, selection, negotiation, acquisition, and transfer of foreign technology, as it makes them aware of alternative sources of technology. This is particularly valuable since patent documents present concrete solutions to technological problems in a standard, concise, and easily accessible form,[128] which helps to reduce duplication of effort and wastage of investment resources. Fourth, patent information permits innovators to identify technologies and partners for further collaborative research including through avenues such as open innovation platforms. [129]

It is recommended that Patent office's get involved in the provision of technological information services to make contribution to the scientific and technological progress of their respective countries. However, in most African countries, the potential of patents as a valuable

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[122] RE Myrick, WP Skladony & R Nath 'Technological Innovation Process: Patent Documentation as a Source of Technological Information' (1993) 9 *Santa Clara High Tech LJ* 355

[123] European Commission (DG Research) & European Patent Office *Why Researchers Should Care About Patents* EPO Desktop Publishing (2007).

[124] United Nations Economic and Social Council *Innovation as Enabler for the Achievement of the Millennium Development Goals (MDG) and Sustainable Development: Annual Ministerial Review Regional Preparatory Meeting for Africa* (2013).

[125]G Mengistie & United Nations Economic Commission for Africa '*The Patent System in Africa: Its Contribution and Potential in Stimulating Innovation, Technology Transfer, and Fostering Science and Technology'* Economic Commission for Africa (2010).

[126] Ibid.

[127] Ibid. Also see United Nations Conference on Trade and Development '*Dimensions of Intellectual Property in Uganda: Transfer of Technology, Access to Medicines and Textbooks'* (2009) UNCTAD-ICTSD Project on Intellectual Property Rights and Sustainable Development, UNCTAD/PCB/2009/13.

[128]M Blakeney *Legal Aspects of Technology Transfer to Developing Countries* ESC (1989).

[129]K Laursen & A Salter 'Open for Innovation: The Role of Openness in Explaining Innovation Performance Among UK Manufacturing Firms' (2006) 27(2) *Strategic Management Journal* 131-150.

source of technological information and the role of patent offices remain underutilised.[130] It must be understood that to build technological competence, the productive sector in African countries has to be able to master imported technologies, adapt them to local conditions, improve them and finally use them as a base for creating innovations locally, in which case, information in patent documents can be a useful starting point.

A few countries have emphasised disclosure as a valuable source of technological information, such as Ethiopia. The Ethiopian IP office for instance identifies as one of the objectives of the office the collection, organisation and dissemination of technological information contained in patent documents and encourages its utilisation.[131]

3.6.2.4 Exceptions to Patent Rights

Article 28 of the TRIPS Agreement grants patent holders exclusive rights to prevent others from manufacturing, using, offering for sale, selling, or importing a patented product or a product obtained directly from a patented process. However, the exclusive rights granted by patents are not without limitations. They can be curtailed in consideration of public interest or the legitimate interests of third parties.

3.6.2.4.1 General exceptions - Article 30

Article 30 of the TRIPS Agreement, often referred to as the research and experimental use exception permits specific uses of patented inventions without the patent holder's consent. While it does not specify the types of exceptions that can be made, it provides the boundaries within which Member countries can introduce such exceptions. The common types of exceptions that have been recognised under this provision include experimental use, regulatory review (Bolar exemption), and private and non-commercial use. There are certain limitations attached to the exception; for example, it may not apply to commercial activities or acts that adversely affect the patent owner's legitimate interests.

Countries retain the flexibility to adapt the exception to their own legal systems and policies. Interpretations of Article 30 by the WTO Dispute Settlement Body (WTO – DSB)

[130]ARIPO *Importance of Patent Information* (2021) available at *https://newaripo.online/success-stories/importance-of-patent-information* (accessed 30 May 2024).
[131] See objectives of the Ethiopian Intellectual Property Authority available *at https://eipa.gov.et/about-us/* (accessed 30 May 2024).

provide guidance on its application and help define the boundaries of what constitutes a "limited exception" and how the conditions of Article 30 should be met.

To fully harness the potential benefits of the article and implement ambitious patent exceptions, particularly in the agricultural sector, it is critical to comprehend its interpretation and scope. Understanding how the three-step test of the Berne Convention lends support to the analysis of its application and exploring possible interpretive sources for its use are essential steps in maximising its impact.

Article 30, which establishes the general basis for exceptions to the exclusive rights envisaged under the Agreement states:

> Members may provide limited exceptions to the exclusive rights conferred by a patent, provided that such exceptions do not unreasonably conflict with a normal exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent owner, taking account of the legitimate interests of third parties.

This provision sets out a three-pronged test for evaluating exceptions to the rights granted:

(1) The exception should be limited.
(2) The exception must not unreasonably conflict with the normal exploitation of the patent.
(3) The exception must not unreasonably prejudice the legitimate interests of the patent owner.[132]

Article 30 draws upon Article 9(2) of the Berne Convention, which governs copyright exceptions. The Three-Step Test established under the Berne Convention serves as a guiding principle for evaluating exceptions and limitations not only in copyright but also in patent law. While it was originally designed to govern exceptions and limitations in copyright law, it establishes principles attuned to the objectives set out in TRIPS. Its application is critical to the discussion that follows below as it is not only a historical precursor but also a conceptual basis that informs the balancing mechanisms embedded in TRIPS.

Its relevance extends to Articles 7 and 8 of TRIPS, which seek to balance innovation incentives with social and economic welfare. For instance, Article 7 of TRIPS emphasises the need to promote social and economic welfare and ensure a balance between innovation and public interest, a theme that is reflective of the purpose of the Three-Step Test in copyright law

[132] TRIPS Agreement, Article 30.

that allows limited uses of protected works for public benefit, such as education and research. Article 8 of TRIPS on the other hand permits member states to adopt measures necessary to protect public health, the environment, and societal needs, provided these measures are consistent with TRIPS obligations; analogous to the Three-Step Test's emphasis on exceptions that do not conflict with the normal exploitation of works.

Article 30 reflects these principles to the extent that it allows exceptions for research and experimentation to ensure that IP laws do not stifle scientific progress or the dissemination of agricultural innovations. Like the Three-Step Test in copyright law, Article 30 permits limited uses of patented inventions without unreasonably prejudicing the patent holder's rights.

Combined, the Berne Three-Step Test, Article 7, 8 and 30 of TRIPS recognise that rigid IP protection can hinder access to essential knowledge and technologies, which makes carefully tailored exceptions vital for achieving public interest goals. Once the Three-Step Test is well understood, therefore, one gains insight into the evolution of the balancing principles and their relevance to the interpretation and application of Articles 7, 8, and 30 of TRIPS. As a matter of fact, through its incorporation into the TRIPS Agreement, what was previously a norm of international copyright law morphed into a norm of international trade law.

The Three-Step Test stipulates that exceptions or limitations to copyright must:

(1) Be limited or confined to certain special cases;
(2) Not unreasonably conflict with the normal exploitation of the protected subject matter; and
(3) Not unreasonably prejudice the legitimate interests of the rights holder.

The Three - Step Test constitutes an indivisible entirety, considered together as a whole in a comprehensive overall assessment, [133] that is, it functions as a unified analytical framework that provides a mechanism for evaluating the scope and application of exceptions to IPR. The conditions ensure a balance between protecting the rights of IP holders and promoting public interests. As pertains to agricultural technologies, the principles become particularly important as they can impact issues such as access to essential agricultural technologies, and the ability of farmers to benefit from new technologies while also respecting the rights of innovators,

[133] C Geiger, D Gervais & M Senftleben 'The Three-Step Test Revisited: How to Use the Test's Flexibility in National Copyright Law'(2013) *Am. U. Int'l L. Rev.*, *29*, 581.

provided the limitations and exceptions are not interpreted narrowly but according to their objective(s) and purpose(s).

The WTO has analysed the scope of Article 30 of TRIPS in the Canada —Term of Patent Protection;[134] and Canada – Patent Protection of Pharmaceutical Products.[135]

In Canada—Term of Patent Protection, the dispute concerned the duration of patent protection for pharmaceuticals. The Appellate Body (AB) examined whether Canada's patent regime, including provisions for patent term extensions, complied with international trade rules. In Canada—Patent Protection of Pharmaceutical Products, the Panel assessed whether Canada's regulatory review exception (Bolar exemption) met Article 30's conditions.

In both cases, the Panel and AB analysed the challenged measures against the basic structure of Article 30 of the TRIPS Agreement. It was found that the conditions apply cumulatively, meaning that each of the conditions outlined in Article 30 is a separate and independent requirement that must be satisfied. Failure to comply with any one of the three conditions results in the Article 30 exception being disallowed. That is to say, each of the three conditions— (1) the exception must be 'limited'; (2) the exception must not 'unreasonably conflict with normal exploitation of the patent'; and (3) the exception must not 'unreasonably prejudice the legitimate interests of the patent owner factoring in the legitimate interests of third parties' — is a separate and independent requirement.

3.6.2.4.1.1 The Polarising effect of Canada Patents

The case of Canada—Patent Protection of Pharmaceutical Products brought about a split in perspectives in relation to the interpretation of Article 7 and 8, and led to scholarly debates[136] about their impact, implementation and implications for patent policy

While the WTO-DSB attempted to interpret the scope of the Article 30, it did not do so in the context of Articles 7 and 8 of TRIPS,[137] as ought to have been done, per the Vienna Convention on the Law of Treaties (VCLT). WTO Panels and the AB have typically interpreted

[134] WTO *Canada – Term of Patent Protection* (2000) WT/DS170/AB/R at para 54.
[135] WTO *Canada – Patent Protection of Pharmaceutical Products* (2000) WT/DS114/R.
[136] See, PK Yu 'The Objectives and Principles of the TRIPS Agreement' (2009) 46 *Houston Law Review* 979-1046 available at *https://scholarship.law.tamu.edu/facscholar/457* (accessed 15 May 2014). Also see Correa CM *Research Handbook on the Interpretation and Enforcement of Intellectual Property under WTO Rules* Edward Elgar Publishing (2010).
[137] Garrison Supra (2006).

the TRIPS Agreement by referring to the customary rules of treaty interpretation, particularly those outlined in Articles 31 and 32 of the VCLT. The DSB's narrow interpretation and failure to apply the VCLT may have constrained the full potential of Article 30, and possibly deterred developing countries from conceiving and/ implementing new patent exceptions.

The Canada—Patent Protection of Pharmaceutical Products case[138] involved planned exceptions in Canadian law that would allow competitors to use patented inventions without authorisation during the patent term for regulatory approval and stockpiling before expiry. The European Communities (EC) challenged these exceptions, and the WTO Panel had to determine their compatibility with Article 30. Canada argued that TRIPS aims to balance IP rights with socioeconomic policies, including public health (as outlined in Article 8). Canada contended that patent rights should be interpreted flexibly to allow essential policy adaptations.

The EC, however, asserted that Articles 7 and 8 merely reflected pre-negotiated compromises in TRIPS and could not serve as a basis to "renegotiate" patent rights through expansive interpretations of Article 30.

The Panel provided no substantive response, and merely stated that the objectives and limitations set out in Articles 7 and 8(1) should naturally be considered alongside other provisions of the TRIPS Agreement that reflect its purpose and intent.[139] In its assessment of the exceptions allowed under Article 30, the Panel confined its analysis to a textual interpretation of TRIPS. As a result, Articles 7 and 8 were treated as part of the overarching structure of the Agreement, without assigning them a distinct or specific role. The decision also did not elaborate on the significance of these provisions despite the parties' arguments urging the Panel to clarify their scope. The lack of a detailed response suggests the Panel's reluctance to tackle this sensitive issue directly.[140] Whereas, therefore, the Panel recognised that the object and purpose of the TRIPS Agreement are articulated in Articles 7 and 8, it failed to apply the provisions in interpreting the expansive language of Article 30.[141] Had it done so, it could have possibly reached a different conclusion.[142]

[138] Canada – Patent Protection of Pharmaceutical Products (2000) WT/DS114/R (Panel Report).
[139] Tesoriero (2022) Supra at 520.
[140] Ibid at 520. Also see C Geiger & L Desaunettes-Barbero 'The Revitalisation of the Object and Purpose of the TRIPS Agreement: The Plain Packaging Reports and the Awakening of the TRIPS Flexibility Clauses' (2021).
[141] Tesoriero (2022) Supra at 521.
[142] Tesoriero (2022) Supra at 521.

Scholars have criticised the Panel's failure to recognise the articles' intrinsic flexibilities.[143] The Panel's evaluation was centered on the 'limited' nature of the exceptions, deducing that 'limited exception' implied only a minimal reduction of the patent holder's legal rights. The restrictive interpretation of 'limited' purely as a quantitative measure and excluding normative considerations such as the justifications for the exception unduly narrowed the scope of Article 30.[144] The WIPO - SCP Expert Report noted that this interpretation could deprive member states of valuable policy space for implementing patent exceptions.[145]

Moreover, since the 'limited' nature of the exception constituted the first prong of the Panel's tripartite test, not meeting this requirement obviated the need for the evaluation and interpretation of the remaining terms.[146]

Scholars have thus argued that the cumulative application of the three steps disproportionately favours right holders, perhaps explaining its limited utilisation.[147] A further complicated spin to this challenge has been the lack of understanding of Article 30 and its scope, made worse by the Panel's conclusion in Canada – Patents.[148]

Much as the Canada—Patents decision is widely criticised,[149] the fact, however, that the Report was not appealed to the AB makes its binding effect mostly relevant to the parties involved in the dispute. Moreover, the doctrine of *stare decisis* does not apply to the WTO - DSB. Consequently, there is potential for adopting an expansive interpretation of the terms in Article 30 or adopting a different approach altogether.[150]

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[143]A Kur 'Of Oceans, Islands, and Inland Water-How Much Room for Exceptions and Limitations Under the Three-Step Test' (2008) 8 *Richmond Journal of Global Law & Business* 287.
[144] Tesoriero (2022) Supra at 521.
[145] WIPO Standing Committee on the Law of Patents *'Experts' Study on Exclusions from Patentability and Exceptions and Limitations to Patentees' Rights'* (2011) (15th session, WIPO SCP/15/3 Annex I) available at https://www.wipo.int/export/sites/www/scp/en/meetings/session_15/pdf/scp_15_6_prov.pdf (accessed 30 May 2024).
[146] For instance, the specific parameters defining 'unreasonable conflict' were not clearly delineated. Similarly, the criteria for determining 'prejudice' or 'unreasonable' prejudice against the legitimate interests of the patent holder, the identification of 'relevant third parties' and the characterisation of their 'legitimate interests' remained unexamined.
[147] Kur (2008) Supra.
[148] Ibid.
[149] Garrison (2006) Supra 19–40; Kur (2008) Supra 311–326; H Grosse Ruse-Khan, 'The (Non) Use of Treaty Object and Purpose in Intellectual Property Disputes in the WTO' in *Sustainable Development Principles in the Decisions of International Courts and Tribunals* (1992) 11-15; and ICTSD-UNCTAD *Resource Book on TRIPS and Development* (2005).
[150] C Geiger & L Desaunettes-Barbero 'The revitalisation of the object and purpose of the TRIPS Agreement: the plain packaging reports and the awakening of the TRIPS flexibility clause' (2021) 267-294. Also see Kur (2008) Supra at 328.

Since the Canada—Patents decision, the understanding of Article 30 has evolved, particularly due to the Doha Declaration, resulting in different outcomes in subsequent cases such as Australia—Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging—Panel report (Australia-TPP No. 1), [151] and Australia – Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging—AB report (Australia—TPP No. 2). [152]

The following discussion dwells on the understanding of Article 30 in light of a number of possible interpretive sources that States can take advantage of to realise its potential utilisation and enable countries to implement more ambitious patent exceptions that can be useful in advancing the agricultural sector.

3.6.2.4.2 Key Interpretive Tools for Article 30

3.6.2.4.2.1 Articles 7 and 8

> Articles 7 and 8 of the TRIPS Agreement serve as its object and purpose provisions, negotiated by developing countries to provide flexibility in response to the IP standards set out by the Agreement. They reflect these countries' intentions and offer objective guidance for interpreting TRIPS' ambiguous terms, including Article 30. Consequently, they provide essential flexibility for WTO Members in interpreting and applying TRIPS to ensure a balanced protection of IPRs. Both articles can be carefully leveraged to facilitate the equilibrium between the IP system's incentivising capacity and the negative impacts of monopolistic rights.[153]

Article 7 establishes that IP protection and enforcement should serve two duo purposes; promote technological innovation,[154] and facilitate the transfer and spread of technology.[155]

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[151] Panel Report *Australia–Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging* WTO Docs WT/DS435/R, WT/DS441/R, WT/DS458/R, WT/DS467/R (28 June 2018) ('Australia-TPP No. 1').

[152] Appellate Body Report *Australia–Certain Measures Concerning Trademarks, Geographical Indications and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging* WTO Docs WT/DS435/R, WT/DS441/R (9 June 2020) ('Australia-TPP No. 2').

[153] WD Nordhaus *Invention, Growth, and Welfare: A Theoretical Treatment of Technological Change* (1969) at 76.

[154] TRIPS Agreement, art 7(1).

[155] Ibid Article 7(2).

This should be to the mutual benefit of both the creators and consumers of technological knowledge, in ways that promote social and economic welfare and ensure an equilibrium of rights and obligations. Article 7 endorses a reading of TRIPS that is favourable to both social and economic well-being. Some authors acknowledge Article 7's crucial role in establishing future exceptions to rebalance the global IP system.[156] Put another way, the article affirms the Agreement's balance of "social welfare" concerns among those in resource-poor countries with the "economic welfare" considerations of technology-based industries in developed countries.[157]

Article 8(1) requires that while creating or (revising) their laws and regulations, Members may implement measures necessary to protect public health and nutrition, and to advance public interests in sectors vital to their socio-economic and technological development, as long as the measures are in line with the agreement. The term 'public interest' and in 'sectors of vital economic importance' provides States with the autonomy to define the extent and nature of the measures they can possibly enact under Article 30, configured for their specific situations, priorities, and policy goals.

The flexibility can be essential for tackling various challenges in the agricultural sector and for advancing the agricultural objectives of Agenda 2063. Compulsory licensing provisions, for example, could be utilised to improve access to essential agricultural technologies in developing countries, especially given the challenges of climate change and food security. Likewise, parallel importation provisions could help make agricultural inputs like seeds and fertilisers more affordable and accessible to farmers. In this regard, Articles 7 and 8 provide an approach that equilibrates IPR with the public interest.

The aggregate of Articles 7 and 8, therefore is the essential link between IPR and wider public interest concerns.

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[156] KY Peter 'The Objectives and Principles of the TRIPS Agreement' (2009) 46 Hous. L. Rev. 979. Available at: https://scholarship.law.tamu.edu/facscholar/457 (accessed on 8 June 2024).

[157] MF David 'Technology Transfer and the TRIPS Agreement: Are Developed Countries Meeting Their End of the Bargain?' (2019) 10 *Hastings Science & Technology Law Journal* 1. (citing Keith E Maskus & Ruth L Okediji *Intellectual Property Rights and International Technology Transfer to Address Climate Change* (Int'l Ctr. for Trade and Sustainable Dev., Issue Paper No. 32 (2010).

3.6.2.4.2.2 The Vienna Convention on the Law of Treaties

The VCLT provides an essential basis for interpreting international treaties. Article 30 of the TRIPS Agreement can be interpreted following the customary rules of interpretation set out in Article 31 of the VCLT to enable countries to implement exceptions to IPR that are appropriate for achieving their social and economic (including agricultural) goals. The VCLT is recognised as binding on the WTO for interpreting all the covered agreements.[158]

Article 31 of the VCLT establishes the key principles of treaty interpretation, starting with the treaty's wording, which must be read in good faith, considering its ordinary meaning, context, and purpose.[159] Interpretation extends to the preamble, annexes, and related agreements to discern intent.[160] If ambiguity remains, additional interpretative methods may be employed. These include the treaty's preparatory work (*travaux préparatoires)*, the circumstances of its conclusion, subsequent agreements among the parties, and the treaty's application in practice.[161]

The structural and overarching application of Article 7 and 8 are legally supported by the general rules of interpretation set out in Article 31(1) VCLT discussed above. The TRIPS preamble and the text of Article 7 and 8 integrate public policy objectives of national IP protection systems which include developmental and technological goals. This validates measures affecting IP protection taken in respect of Article 30, adopted in achieving specific aims. The Doha Declaration on the TRIPS Agreement and Public Health reinforced this interpretative approach, especially regarding WTO Members' protection of public health in domestic IP regulations.

The Doha Declaration is, therefore, of great consequence in the TRIPS history for highlighting the role of Articles 7 and 8 as important traversal interpretive tools. [162]

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[158] WTO *United States – Standards for Reformulated and Conventional Gasoline: Report of the Appellate Body* WT/DS2/AB/R (29 April 1996) 15-16 (US – Gasoline).
[159] VCLT, Article 31(1).
[160] VCLT, Article 31(1)(a) and (b).
[161]VCLT, Article 32(a) and (b). In practice, tribunals routinely have recourse to supplementary materials, in particular the negotiating history of the treaty. See RK Gardiner *The Vienna Convention Rules on Treaty Interpretation* Oxford University Press (2012).
[162] On the Doha Declaration as an interpretive baseline that requires balancing the interests of producers and consumers of IPR, see J Gathii 'The Legal Status of the Doha Declaration on TRIPS and Public Health under the Vienna Convention on the Law of Treaties' (2011) 15 *Harvard Journal of Law & Technology* 291.

3.6.2.4.2.3 The Doha Declaration

The Doha Declaration on the TRIPS Agreement and Public Health is a statement adopted on November 14, 2001 at the Fourth Ministerial Conference of the WTO held in Doha, Qatar.[163] The Declaration addresses concerns regarding the interpretation and implementation of the TRIPS Agreement in relation to public health. The impetus for the Doha Declaration stemmed from apprehension by developing countries, particularly members of the African Group regarding the TRIPS Agreement's potential impact on access to essential medicines. In response to these concerns, the TRIPS Council convened a special session to address the issue of access to medicines, ultimately leading to the unanimous adoption of the Doha Declaration in November 2001. Specifically, it acknowledges that WTO Member States have the right to interpret each provision of TRIPS in accordance with Articles 7 and 8, which promote a balance of the interests mentioned above.[164] It therefore authorises States to employ the TRIPS flexibilities to manage public policy issues during implementation of the Agreement. Paragraphs 4 and 5(a) of the Declaration specifically charge the WTO - DSB to favour interpretations of specific provisions that support WTO Members' right to take measures in public interest.

The Doha Declaration is considered key in reinforcing the inherent flexibilities of the TRIPS Agreement and is now widely acknowledged as a 'subsequent agreement' under Article 31(3)(a) of the VCLT, and provides direction for interpreting TRIPS provisions.[165] Although not legally binding, the Declaration signifies the collective intention and understanding of WTO Members concerning the application of the TRIPS Agreement in matters of public health. Importantly, it revitalised the significance of Articles 7 and 8, emphasising the balance between IPR and public welfare.

Although the Declaration's prime emphasis is public health issues, its principles and provisions have wide implications and can be relevant in promoting agriculture-related policy objectives, especially in relation to access to agricultural inputs, technology transfer, and food security, since the Declaration recognises that Articles 7 and 8 are pertinent to the interpretation of all TRIPS provisions.

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[163] Doha Declaration on the TRIPS Agreement and Public Health adopted in November 2001 at the Fourth Ministerial Conference in Doha, Qatar, *WT/MIN (01)/DEC/2, 2001.*
[164] Para 4, Doha Declaration.
[165] JT Gathii 'The legal status of the Doha Declaration on TRIPS and public health under the Vienna Convention on the Law of Treaties' (2001)15 *Harv. JL Tech* 291.

3.6.2.4.2.4 Australia—Plain Packaging: A Pioneering Application of Articles 7 and 8

As discussed above, the case of Canada—Patent Protection of Pharmaceutical Products sparked debate regarding the interpretation of Articles 7 and 8 and brought to light differing perspectives on how these articles should be understood and applied. Following the Doha Declaration, however, the Panel and AB reports in the Australia– Certain Measures concerning Trademarks, Geographical Indications and other Plain Packaging Requirements applicable to Tobacco Products and Packaging case[166] proposed for the first time the application of Article 7 and 8 as vital interpretative tools for the TRIPS Agreement.

The key legal issue in the case of Australia—Plain Packaging was interpretation of 'unjustifiably' in Article 20 of the TRIPS Agreement. The controversy followed Australia's enactment of the Tobacco Plain Packaging Regulations (TPP) in 2010 that banned logos and branding on tobacco packaging and allowed only the brand name in a uniform font size. The aim was to deter smoking by reducing the appeal of tobacco products. However, tobacco producers Cuba, Honduras, the Dominican Republic, and Indonesia challenged this regulation as violating provisions of the TRIPS Agreement[167] and the Agreement on Technical Barriers to Trade (TBT).

The Panel was tasked with interpreting the terms 'special requirements,' 'encumber,' 'use of a trademark in the course of trade,' and 'unjustifiably,' and then applying the interpretations to the TPP Measures. Read together with the Preamble and Articles 7 and 8, the Panel underlined the requirement under Article 20 concerning the use of trademarks in the course of trade not to 'unjustifiably' encumber as reflecting a recognition that there may be legitimate reasons for which a Member may encumber such use. The Panel considered that paragraph 5 of the Doha Declaration on the TRIPS Agreement and Public Health constitutes a 'subsequent agreement' of WTO Members within the meaning of Article 31(3)(a) of the Vienna Convention and that the guidance provided by the Declaration supported the Panel's view that Articles 7 and 8 of the TRIPS Agreement are relevant for the interpretation of Article 20.[168]

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[166] Panel Report, Australia — Certain Measures Concerning Trademarks, and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging, WT/DS435/R, WT/DS441/R, WT/DS458/R, WT/DS467/R (28 June 2018).
[167] TRIPS Agreement, Article 20.
[168] Panel Reports *Australia – Tobacco Plain Packaging* para 7.2411.

The Panel concluded, and the AB[169] concurred, that the TPP Measures constituted special requirements that did encumber the use of a trademark in the course of trade. However, they determined that the requirements were not unjustified because they were intended to achieve a legitimate policy objective of protecting public health. Therefore, the TPP Measures were deemed to be compliant with the TRIPS Agreement.

The Panel's interpretation of 'unjustifiably' clarifies the WTO-DSB's approach to interpreting broad or vague terms in the TRIPS Agreement. The Panel recognised the normative value of these provisions, stating that Article 7 aims to establish and maintain a balance between the societal goals it mentions; and Article 8(1) clarifies that the TRIPS Agreement's provisions should not hinder Members from enacting laws and regulations for legitimate objectives. The Panel, which was supported by the AB, suggested a case-by-case approach to evaluate the balance between conflicting interests. The approach involves three considerations:

(1) the nature and scope of the burden imposed by the special requirements, considering the trademark owner's legitimate interest;
(2) the reasons for applying the special requirements, including any societal interests they aim to protect; and
(3) whether these reasons justify the burden imposed.

In evaluating the second factor, the Panel referenced Article 8(1) to identify valid reasons, particularly emphasising societal interests like public health. It highlighted the Doha Declaration's recognition of public health as a legitimate policy concern. Therefore, when considering the third factor, the Panel balanced the public health concerns associated with tobacco use which motivated the TPP Measures, against the burden on trademark use. The Panel determined that the TPP Measures effectively contribute to Australia's goal of improving public health, which justified the trade mark use restrictions. Importantly, the Panel and AB did not question the balancing exercise undertaken by Australia, acknowledging Australia's autonomy in determining its public policy measures.

[169] Appellate Body Report, Australia — Certain Measures Concerning Trademarks, and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging, WT/DS435/R, WT/DS441/R, WT/DS458/R, WT/DS467/R (9 June 2020).

While, therefore, the term 'unjustifiably' in Article 20 of TRIPS, as interpreted in this decision differs from the term 'necessary' used in Articles 7 and 8 of TRIPS and in the Doha Declaration, the decision affirms that such measures are permissible. The decision thus allows WTO members a reasonable degree of freedom to select interventions that address policy objectives, even if they impact the use of IPRs in trade, provided the reasons sufficiently justify any resulting encumbrance.[170] Moreover, it was clarified that in interpreting WTO provisions, both the goals and the limitations stated in Articles 7 and 8(1), as well as those in other provisions of the TRIPS Agreement that indicate its object and purposes, must be considered.[171]

The cases of Australia—Plain Packaging (Australia—TPP No.1 and 2) confirm that Articles 7 and 8 are cross-cutting interpretation tools for provisions of the TRIPS Agreement, particularly the flexibilities. Indeed, while the decisions only examine Article 20 which relates to trademarks, because the Panel's approach relied on Articles 7 and 8 which assist in interpreting all TRIPS provisions,[151] its reasoning can extend to other IPRs and other TRIPS flexibilities, and certainly, the use of the flexibilities to advance the agriculture related goals of Agenda 2063.

Finally, on this point, a further illustrative approach to using the flexibilities is provided by Peter Yu.[172] Upon tracing the origins and development of Articles 7 and 8 and examining their normative content, Peter Yu provides an insightful analysis of how these provisions have been interpreted by WTO Panels and the AB, as well as the ramifications of the two Doha declarations,[173] following which, he outlines five ways in which Articles 7 and 8 can facilitate a more flexible interpretation and implementation of the TRIPS Agreement: (1) as a guiding light for interpretation;[174] (2) as a shield against excessive IP protection demands;[175] (3) as a sword to challenge overprotective provisions;[176] (4) as a bridge to connect TRIPS with other international regimes;[177] and (5) as a seed for future international IP norms.[178] Peter Yu's

[170] Ibid para 7.2604, at 766.
[171] Ibid para 7.2402 at 725.
[172] Yu (2010) Supra at 1020 - 1041.
[173] During the Doha Ministerial Conference, WTO members adopted two key documents: (1) the Doha Ministerial Declaration (Ministerial Declaration) and (2) the Declaration on the TRIPS Agreement and Public Health (Doha Declaration). Both documents reaffirmed the objectives and principles outlined in Articles 7 and 8 of the TRIPS Agreement. See World Trade Organization, Doha Ministerial Declaration, *WT/MIN (01)/DEC/1,* 20 November 2001; and World Trade Organization, Declaration on the TRIPS Agreement and Public Health, *WT/MIN (01)/DEC/2*, 14 November 2001.
[174] Ibid at 1020.
[175] Ibid at 1025.
[176] Ibid at 1031.
[177] Ibid at 1039.
[178] Ibid at 1041.

crystallisation makes it clear that these provisions are available for countries to use should they choose to do so.

3.6.2.4.3 Compulsory Licensing

Compulsory licensing is covered under Article 31 of the TRIPS Agreement. It allows governments to authorise the use of patented inventions without the consent of the patent holder, particularly to address public needs such as access to medicines. Whereas it has been used predominantly in the health sector, it is expected that it can extend to cover agricultural technologies. The provision may be leveraged to override patent restrictions when essential technologies such as drought-resistant seeds or innovative farming equipment are needed to enhance food security or sustainable agricultural practices. Compulsory licenses are typically granted under specific conditions, such as national emergencies or public non-commercial use.

The rules pertaining to their use should be designed in a manner that ensures they can be deployed quickly and affordably. Aspects of this flexibility are discussed in section *2.3.1.1*, and a further discussion is carried out in sections *6.5.2.1.2*, which examine the conditions and procedures for granting compulsory licenses.

3.6.3 Flexibilities Under the PBR Regime – *Sui generis* system

Countries seeking to advance agriculture can utilise the PBR regime as a strategic tool. Although TRIPS requires member states to provide protection for plant varieties under Article 27(3)(b), it grants considerable flexibility by allowing them to choose the method of protection (patents, a *sui generis* system, or both). Countries opting for a *sui generis* system can determine its elements as Article 27(3)(b) is neither prescriptive in its requirements nor does it push for the harmonisation of global law. For instance, they may specify what constitutes a plant variety, set the criteria for protection, define the extent of protection, and establish the term of protection. Moreover, LDCs have no obligation to implement these requirements at this time.[179] Interestingly, unlike the provisions for patents or copyright, there are no textual references or obligations to join a pre-existing international treaty, such as UPOV.

[179]The WTO TRIPS Council approved, on 29 June 2021, an extension of the transition period under Article 66 of the TRIPS Agreement, postponing the compliance deadline for LDCs to 1 July 2034. See procedural flexibilities under section 3.6.

This segment discusses the importance of PBRs in Africa's agricultural development. Currently, there is no universal PVP system that meets the diverse needs of all countries. Thus, a successful model must be customised to the development objectives unique to each country. Accordingly, it is necessary that countries develop a balanced *sui generis* PVP system that takes advantage of Articles 7 and 8 of TRIPS, discussed above.

3.6.3.1 The Strategic Role of PBRs in Africa's Agricultural Development

At the outset, it was noted that the agricultural sector dominates the economy and livelihoods of most African countries. However, agricultural productivity in many of these countries is extremely low, a big portion of which is subsistence farming, which generates low financial income. Under such circumstances, it is unable to contribute to overall economic development or meet the challenges of feeding a growing population, improve food security, alleviate poverty, and mitigate climate change.[180] One of the reasons for this poor performance is the lack of progress in improving traditional plant varieties over the centuries,[181] which are fundamental for productive agriculture.

Yet, the advent of modern plant breeding has led to substantial increases in yields that were previously stagnating or declining.[182] Through the combined efforts of the public and private sectors, plant breeding substantially contributes to global agriculture by improving yield, resistance to biotic stresses, tolerance to abiotic stresses, quality traits, etc.[183] In Europe, improved varieties are estimated to account for more than 50 per cent of overall yield increases for key crops.[184] The remaining growth is the result of improved agricultural techniques such as fertilisers and better pest and disease control.[185]

IP protection (PBR), is essential for ensuring that plant breeding and seed supply contribute to agricultural development.[186] Public sector breeding alone cannot sufficiently enhance agricultural productivity in developing countries.[187] It is essential to encourage

[180]R Jordens *'Benefits of Plant Variety Protection'* WIPO Magazine (2010) 3, available at *https://www.wipo.int/wipo_magazine/en/2010/03/article_0007.html*, accessed (8 June 2024)
[181] Ibid.
[182] Ibid.
[183] FAO 'Responding to the Challenges of a Changing World: The Role of New Plant Varieties and High-Quality Seed in Agriculture' in *Proceedings of the Second World Seed Conference* Rome, FAO (2009) 8-10.
[184] Jordens (2010) Supra.
[185] Ibid.
[186] FAO (2009) Supra at 10.
[187] Jordens (2010) Supra.

creativity and investment in private and public breeding through an effective PVP system which provides breeders with a legal framework and administrative structure to control the reproduction of their varieties and recover their investment.[188]

Allied to, and closely connected with PBR are international instruments such as the CBD and ITPGRFA which complement IP systems by addressing access to and use of genetic resources. The ITPGRFA aims at providing food security through conservation, as well as the facilitated access to genetic resources under its Multilateral System (MS) of access and benefit-sharing. The MS represents a reservoir of genetic traits and constitutes a central element for achieving global food security.[189] The CBD, on the other hand affirms the sovereign rights of states to exploit their resources, limited by the recognition that these resources are a common heritage of humankind,[190] circumscribed by TK provisions.[191] The three objectives that frame the CBD include the conservation and sustainable use of biological diversity; the fair and equitable sharing of benefits arising out of the use of these resources; and the preservation of indigenous knowledge.[192]

The Bonn Guidelines give essence to the CBD's principles of prior informed consent (PIC) and ABS.[193] The Guidelines encourage applicants to disclose the country of origin of the genetic resources or TK upon which IPRs are based. However, due to their voluntary nature, binding rules were developed through the Nagoya Protocol on Access and Benefit Sharing. [194]

The flexibility inherent in Article 27(3)(b) of the TRIPS Agreement allows countries to enact tailored PBR laws and integrate ITPGRFA and CBD norms. Despite this, many countries have adopted UPOV–style PBR systems, which often disregard the said norms. Even without being scripted in TRIPS, UPOV has seen tremendous purchase, with widespread inclusion in the legal systems of African countries.[195]

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[188] Ibid.
[189] D Rangnekar 'Geneva rhetoric, national reality: The political economy of introducing plant breeders' rights in Kenya' (2014) 19(3) *New Political Economy* 359-383.
[190] TRIPS Agreement, Article 3.
[191] TRIPS Agreement, Article 8(j).
[192] CBD, Article 1.
[193] Bonn Guidelines on Access and Benefit Sharing as Related to Genetic Resources, Decision VI/24, in *Report of the Sixth Meeting of the Conference of the Parties to the Convention on Biological Diversity* (April 2002) UN Doc UNEP/CBD/COP/6/20.
[194] Nagoya Protocol on Access to Genetic Resources and their Fair and Equitable Sharing of Benefits Arising from their Utilisation to the Convention on Biological Diversity, 2010.
[195] See for example, OAPI.

Regarding farmers, developing countries have always sought the fulfilment of three key issues; farmers' rights, authorial recognition, and ancestral contributions.[196] Farmers' rights include entitlements such as saving, using, exchanging, and selling farm-saved seeds, protecting TK, participating in decision-making, and benefiting equitably from plant genetic resources. The UPOV 1991 Act classifies this as farmers' privilege, leaving it as an optional exclusion for members to consider 'within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder.[197] Authorial recognition acknowledges farmers as creators and innovators whose role is essential for preserving agricultural heritage and promoting diverse plant varieties.[198] Ancestral contributions emphasise the historical and cultural significance of traditional practices developed over centuries, forming the basis of modern agriculture and crucial for resilience against global challenges.[199]

The debate on PBR has for long revolved around the potential impact of the rights on traditional agricultural practices prevalent in developing countries of farmers saving, selecting, and reusing seeds which are considered essential for the continuous cropping and the food security of rural communities.[200] Traditional agricultural practices are also critical for maintaining agricultural biodiversity, particularly the genetic diversity found *in situ* (in natural environments). There is concern that PBRs, which typically favour commercial and industrial breeders threaten this biodiversity and result in the prevalence of monocultures.[201]

Historically, farmers' rights have served as a 'counterbalance' to IPRs, guided by values such as reward, recognition, and stewardship.[202] The rights acknowledge the valuable

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[196] See CS Srinivasan 'Exploring the feasibility of farmers' rights' (2003) *21*(4) *Development Policy Review* 419-447. Also see Rangnekar (2008) Supra at 366.

[197] UPOV 1991 Act, Article 15(2).

[198] Rangnekar (2008) Supra at 366–367.

[199] See P Koohafkan & ma Altieri '*Globally important agricultural heritage systems: a legacy for the future*' Food and Agriculture Organisation of the United Nations (2011).

[200]These practices are at odds with the UPOV 1991 Act and contradict Article 31 of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which asserts that indigenous peoples have the right to control, protect, and develop their cultural heritage, TK and resources, including genetic resources, seeds, medicines, and knowledge of fauna and flora. See P Munyi 'Plant Variety Protection Regime in Relation to Relevant International Obligations: Implications for Smallholder Farmers in Kenya' (2015) 18(1-2) *Journal of World Intellectual Property* 65-85.

[201] See A Christinck *The UPOV Convention, Farmers Rights and Human Rights: An Integrated Assessment of Potentially Conflicting Legal Frameworks* (2015); and KE Maskus 'Intellectual Property Rights and Economic Development' (2000) 32 *Case Western Reserve Journal of International Law* 471.

[202] M Halewood & K Nnadozie 'Giving Priority to the Commons: The International Treaty on Plant Genetic Resources for Food and Agriculture' in G Tansey & T Rajotte (eds) *The Future Control of Food: A Guide to International Negotiations and Rules on Intellectual Property, Biodiversity, and Food Security* London: Earthscan/IDRC (2008) 115–40.

contributions of farmers in conserving and developing plant genetic resources. However, with the adoption of UPOV-style PBR regimes, these essential values are often undermined, to the detriment of farmers and farming communities. A balanced PBR regime is needed to accommodate these interests.[203] Policymakers should consider exploring a range of approaches to develop a customised law. The framework in Chapter Six aims to balance PBR protection with adequate safeguards for farmers' rights, authorial recognition, and ancestral contributions.

3.6.3.2 Need for a Nuanced Approach —The Case study of Kenya

Kenya is a fascinating case study for illustrating the significance of PBR. It is acknowledged that PBRs have immensely contributed to the growth of commercial breeding in Kenya's horticultural sector, where advancements have been made in the quality and variety of products which have over time enhanced the country's competitiveness in the international market. Breeding innovations, particularly in horticulture, have positioned Kenya as a major global player in horticultural trade. The sector is the highest contributor to national agricultural GDP (AgGDP), surpassing traditional crops such as tea.[204]

Despite these advancements, Kenya still depends on informal seed systems, which are essential for maintaining seed diversity and availability for small-scale farmers. The informal seed system is the principal source of seeds for traditional crops, with approximately 80 per cent of smallholder farmers relying on it.[205] Recently, a group of 15 smallholder farmers petitioned the country's High Court seeking to compel the government to review sections of the Seeds and Plant Varieties Act[206] that ban the sharing and exchange of uncertified and unregistered seeds, arguing that rural smallholder farmers rely on informal farmer-managed systems to acquire seeds through seed saving and sharing.[207]

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[203] The UPOV framework was initially designed for commercial plant breeders in developed countries. As African countries navigate UPOV regulations or similar frameworks, they must adapt these standards to their domestic agricultural practices. See CM Correa, S Shashikant & F Meienberg Plant *Variety Protection in Developing Countries: A Tool for Designing a Sui Generis Plant Variety Protection System* APBREBES (2015).
[204] Agriculture and Food Authority (AFA) *Creating Wage Employment in the Horticulture Sector in Kenya* (2017).
[205] P Munyi & B De Jonge 'Seed Systems Support in Kenya: Consideration for an Integrated Seed Sector Development Approach' (2015) 8(2) *Journal of Sustainable Development* 161.
[206] Seeds and Plant Varieties Act,2012 – See generally Part V of the Act.
[207] On the ongoing debate to expunge sections of a law that ban the sharing and exchange of uncertified and unregistered seeds, see J Ambole 'Inside Kenya's Seed Control Battle: Why Smallholder Farmers Want to Share Indigenous Seeds' (2024) IPS, available at *https://reliefweb.int/report/kenya/inside-kenyas-seed-control-battle-why-smallholder-farmers-want-share-indigenous-seeds* (accessed July 18 2024).

Whereas Kenya operates a UPOV-style PBR regime and is one of the earliest members of UPOV,[208] it has consistently sought to balance breeder's rights for the advancement of commercial breeding, with farmers' rights. For instance, during the mandated review of Article 27(3)(b) in 1999, Kenya actively advocated for the TRIPS Agreement to incorporate principles and norms from other multilateral treaties, particularly the ITPGRFA and the CBD. It proposed two key amendments to Article 27(3)(b) to clarify the contours of a *sui generis* system: (a) the inclusion of provisions to protect indigenous innovations and TK, and (b) the inclusion of traditional farming practices such as the right to save and exchange seeds.[209]

In its submissions, Kenya emphasised that if a model was needed for *sui generis* systems under Article 27(3)(b) of the TRIPS Agreement, the African Group ought to look to the AU Model Law for inspiration.[210] Kenya also consistently advocated for the 'disclosure of origin in patent applications, viewing the identification of the source of genetic material as essential for upholding farmers' rights and promoting access and benefit-sharing as outlined in the CBD.[211]

Kenya's leadership in these matters became apparent when it emerged as a key interlocutor for the African Group,[212] particularly in efforts to address access to medicines through its contributions to the Doha Declaration in multiple WTO discussions, leading to the August 2003 decision on the implementation of paragraph 6 of the Declaration.[213] Kenya's submissions, including those on behalf of the Africa Group, highlight its abiding interest to the

[208] Kenya, South Africa, and Zimbabwe have the earliest Plant Breeders' Rights (PBR) systems in Africa. South Africa's Plant Breeders' Rights Act, No. 15 of 15 March 1976, came into effect on 1 November 1977 and was revised in 1980 and 1986. South Africa joined UPOV in 1977 and follows its 1991 Act. Zimbabwe's Plant Breeders' Rights Act, modeled on UPOV's 1961 Act, was enacted in 1973 and became effective in 1974.
[209] D Rangnekar 'Geneva Rhetoric, National Reality: The Political Economy of Introducing Plant Breeders' Rights in Kenya' (2014) 19(3) *New Political Economy* 359-383.
[210]WTO *Communication from Kenya on Behalf of the African Group, Council for Trade-Related Aspects of Intellectual Property Rights – Proposal on Paragraph 6 of the Doha Declaration on the TRIPS Agreement and Public Health* (24 June 2002) IP/C/W/351 para 145. Also see WTO *Review of the Provisions of Article 27.3(b) – Communication from Kenya on behalf of the African Group* IP/C/W/163 (1999).
[211] WTO *Council for Trade-Related Aspects of Intellectual Property Rights – Minutes of Meeting Held in the Centre William Rappard on 26–29 June 2000* (14 August 2000) IP/C/M/27 at paras 8-9.
[212] See for example, WTO, Communication from Kenya on behalf of the African Group, Council for Trade-Related Aspects of Intellectual Property Rights - Proposal on Paragraph 6 of the Doha Declaration on the TRIPS Agreement and Public Health, WTO Doc. No. IP/C/W/351, 24 June 2002.
[213] WTO, Declaration on the TRIPS Agreement and Public Health, Ministerial Conference, Doha: 9-14 November 2001, WTO Doc. No. WT/Min (01)/Dec/W/2. Also see WTO, *Decision of the General Council on Implementing Paragraph 6of the Doha Declaration*, WT/L/540, adopted 30 August 2003.

balancing of rights through both the TRIPS flexibilities and respect for the ITPGRFA and CBD norms.[214]

However, despite its strong stance at the WTO, domestic implementation of its Article 27(3)(b) rhetoric faced challenges likely attributed to external pressures advocating for UPOV-style PBRs. Kenya's PBR regime has been most successful in the floriculture sector, which is largely foreign-owned. The sector traces its origins to the inter-war years[215] and experienced major growth after independence, particularly following the establishment of the Horticultural Crop Development Agency (HCDA) in 1967[216] and the enactment of the Seeds and Plant Varieties Act (SPVA) in 1972. [217] Multinational firms like Del Monte entered Kenya's horticultural sector in 1968, and by 1974, horticulture would account for 3 per cent of agricultural exports.[218] Today, it is the largest contributor to AgGDP.[219]

Ironically, despite the success of Kenya's floriculture industry, most plant breeding for flowers occurs outside the country, with minimal domestic breeding activity. [220] The continued reliance on foreign-bred varieties highlights the enduring role of the informal seed sector, which remains vital for many farmers. Kenya's *dejure* and *defacto* PBR status points to the need to strike a balance between breeders' rights and farmers' rights for more sustainable and inclusive agricultural development. Thus, while PBRs are encouraged for Africa's agricultural development, this key balance must not be overlooked.

Important norms on farmers rights, PIC and ABS, considered key for the advancement of agriculture in Africa have been relaunched in the continental IP legislature. The AfCFTA IP Protocol mandates State Parties to offer distinctive protection for new plant varieties via a *sui generis* system, which embraces the recognition of farmers' rights, PIC and ABS mechanisms.[221]

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[214] WTO, Communication from Kenya, Council for Trade-Related Aspects of Intellectual Property Rights - Elements of a Paragraph 6 Solution, WTO Doc. No. IP/C/W389, 14 November 2002.
[215] Rangnekar (2014) Supra at 12.
[216] M Minot & M Ngigi 'Are Horticultural Exports a Replicable Success Story? Evidence from Kenya and Côte d'Ivoire' (2004) *International Food Policy Research Institute* Washington, DC.
[217] M Bolo 'Agricultural Systems of Science, Technology and Innovation: The Case of Kenya's Floriculture Industry' *Technical Center for Agriculture and Rural Cooperation (CTA), The Netherlands* (2005).
[218] D Rangnekar (2014) Supra (citing S Jaffee (1995), 'The Many Faces of Success: The Development of Kenyan Horticultural Efforts', in S. Jaffee and J. Morton (eds), *Marketing Africa's High Value Foods* (Washington, DC: World Bank) 319–76).
[219] Agriculture and Food Authority (2017) Supra.
[220] NP Louwaars et al *Impacts of Strengthened Intellectual Property Rights Regimes on the Plant Breeding Industry in Developing Countries* (2005).
[221] AfCFTA IP Protocol, Article 8. Also see, Article 18–20.

Policy makers might find it useful to consider a differentiated PVP system, where a small genus of species is protected, with expansion of coverage as deemed necessary. For example, the scope of protection could cover species with substantial breeding activity, with possible expansion as necessary, while at the same time, the informal seed system is allowed to thrive.

3.6.4 Sequencing the Development of IPR Regimes in Light of the Flexibilities – Key Considerations for a Reform Agenda

African countries need to strategically develop their IP regimes in harmony with their socio-economic development goals and indigenous capabilities, rather than merely aiming for compliance with global trade rules. In many developing economies, laws are frequently transposed from more developed systems, posing implementation challenges as countries then have to adapt these laws to meet their specific needs. When it comes. to IP however, societal benefit and public interest must epitomise the primary legislative rationale.

The discussion in section *5.3* shows that many IP laws in African countries are relics of colonial legacies, directly transplanted from more advanced economies. The aforesaid laws targeted Western industrial and commercial priorities, rather than local priorities, indigenous knowledge and practices. As a result, many African countries are left with rigid IP laws that inadequately support local innovation.[222] The TRIPS Agreement further complicates this situation by imposing a global standard that African countries had little influence in shaping, leading to challenges in implementation and enforcement. Many countries have also complied with TRIPS without fully utilising its built-in flexibilities. The stringent requirements and lack of customisation are barriers to local innovation, hence the need for reform to create more flexible and context-appropriate IP systems that can better support development and recognise indigenous contributions.

The preceding discussion demonstrated that TRIPS allows considerable policy space for countries to adapt their IP regimes in ways that promote growth in vital economic sectors, which provides an opportunity for countries to tailor their IP laws to meet their evolving agricultural technological needs. However, the flexibilities have not been fully utilised, possibly due to a lack of understanding of how they can be leveraged. The numerous challenges

[222] See T Adebola 'Mapping Africa's Complex Regimes: Towards an African Centred AfCFTA Intellectual Property (IP) Protocol (2020)1 *African Journal of International Economic* Law 233–290.

confronting Africa's agricultural sector necessitate a re-evaluation of the flexibilities to find a balance that is in harmony with the continent's agricultural ambitions.

For re-emphasis, Article 8(1) of the TRIPS Agreement permits countries, when formulating or revising their laws and regulations, to adopt measures necessary to safeguard public health and nutrition, and to promote the public interest in sectors crucial to their socio-economic and technological advancement, such as agriculture, provided that the measures comply with the provisions of the Agreement.

Only individual Member States can determine which sectors are crucial for their socio-economic and technological development, and thus where to tailor relevant actions.[223] Agriculture is a key sector in most African economies, especially when considered against traditional development indicators like GDP.[224] Scholars suggest that in determining a sector's vital importance, a Member State may look beyond the traditional indicators to social ones such as health and education levels.[225] For purposes of the current discussion, the central role of agriculture in Africa's economies alone justifies invoking Article 8(1) in the design of pro - development IP frameworks.

The sequencing of reforms in national IP systems should first of all prioritise vital economic sectors, coupled with a needs assessment involving an individual countries' economic development phase and existing technological capabilities (the caliber of their scientific, educational, and research institutions). Any reform agenda should be guided by a comprehensive assessment of these elements to attain an optimal level of IP protection. Such assessment is important because national factors largely influence the degree to which IP protection can promote innovation, technology spread, and the growth of domestic scientific and technological capabilities.[226] Moreover, such assessment is necessary because optimal levels of IP protection can be notoriously difficult to determine[227] and necessarily involve

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[223] C Correa *Trade Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* Oxford University Press (2007) at 93.
[224]FAO *The State of Food and Agriculture 2020* (2020) FAO, Available at: *http://www.fao.org/publications/sofa/2020/en/.* (accessed June 2024).
[225] Correa (2007) Supra at 106.
[226] CIPR (2002) Supra.
[227] KE Maskus *Intellectual Property Rights in the Global Economy* Peterson Institute (2000).

complex calculations of economic and social welfare that can at times prove difficult to resolve.[228]

It also has to be noted that levels of IP protection as applied in developed countries may not promote innovation in countries that do not have the necessary infrastructure and capabilities.[229] Countries must customise their national IP systems and the level of protection they provide to match their unique circumstances and development aspirations, but must not merely replicate frameworks, systems, and standards which may be deemed more suitable for economically advanced, industrialised countries.[230] Article 7 and 8 support the state-centric nature of the balancing of interests required.[231]

Policymakers also need to confront the difficult task of finding the right equilibrium between weaker and more stringent IP protection and the trade-offs tied to national policy goals. Resorting, however, to overly weak IP systems should be avoided as it can reduce the incentives for innovation and deter R&D investment. Maskus opines that an overly protective IPR system could limit the social gains from inventions by reducing incentives to disseminate its fruits,[232] while an excessively weak IPR system could hinder innovation by failing to offer sufficient returns on investment. [233] Weak IPRs generally create a negative dynamic by failing to address the uncertainty in R&D and the risks of competitive appropriation common in private markets.[234] Therefore, finding an equilibrium that integrates the interests of innovators with those of the general public is vital for IP regimes to successfully enhance innovation and promote economic growth.

Finally, it is essential to have realistic expectations of the scope and scale of IP regimes and systems that African countries can feasibly implement, considering their financial and other domestic resource constraints. The reform process might, therefore, require prioritising

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[228] Ibid.
[229]International Centre for Trade & Sustainable Development *Resource Book on TRIPS and Development* Cambridge University Press (2005).
[230] L Borgatti, & N Balchin Harnessing *Intellectual Property Rights for Innovation, Development and Economic Transformation in Least Developed Countries* (advance copy, January 2024) Commonwealth Secretariat, London & United Nations, New York (2024).
[231] A Slade 'The Objectives and Principles of the WTO TRIPS Agreement: A Detailed Anatomy' (2016) 53(3) *Osgoode Hall Law Journal* 948–998.
[232] KE Maskus 'Intellectual property rights and economic development' (2000) 32 *Case W. Res. J. Int'l L.* 471 at 473.
[233] Ibid at 474.
[234] Ibid at 471.

the advancement of certain forms of IP, especially due to the shortcomings in national technological capacities. This is particularly relevant since technological capacity can dictate the selection of IPRs[235] for a more significant impact. In many African countries where patent activities and formal industrial property registrations are typically low, the utility model system,[236] explored in the next Chapter, in conjunction with the judicious use of the aforementioned flexibilities could be advantageous.

3.7 Conclusion

To alter the course of agriculture, it is essential that countries confront the challenges in the sector by *interali*a using IP as a key instrument, making a case, thus for national IP systems to be formulated in a manner that makes full use of the flexibilities available within international IP rules, among other measures. Given the generally low technological capacity of African countries, the emphasis of IP reforms should be on the optimal use of Articles 7 and 8 to support the range of legislative flexibilities within the TRIPS Agreement, as countries progressively build their technological capacities to maximally benefit from the TRIPS Agreement.

[235]S Basheer & A Primi 'The WIPO Development Agenda: Factoring in the "Technologically Proficient" Developing Countries' in de Beer J (ed) *Implementing WIPO's Development Agenda* Waterloo: Wilfrid Laurier University Press (2014).
[236] L Borgatti & N Balchin (2024) Supra.

CHAPTER 4

ACCELERATING AFRICA'S TECHNOLOGICAL GROWTH: UTILITY MODELS AND RESEARCH DEVELOPMENT

4.1 Introduction

Chapter Three emphasised the need for countries to utilise the flexibilities within TRIPS to tailor their IP laws to their specific needs. However, it's necessary to acknowledge that the flexibilities, while important may not be sufficient on their own to activate the transformation of the agricultural sector to meet the ambitious goals of Agenda 2063.[1] Nonetheless, when combined with utility models, an alternative less stringent form of patent protection, there is potential to reshape incentives for technological innovation in a way that could be highly beneficial for the continent.

It has been argued that countries (LDCs) must build at least a critical minimum level of productive capacities and technological capabilities to fully leverage IPRs.[2] In this regard, utility models, when coupled with sustained investments in R&D could be helpful in establishing a formidable technological foundation required to achieve the aspirations of Agenda 2063.

The chapter specifically addresses research sub - questions 3 and 4 which explore how the problematic agricultural sector can possibly be repaired, and the legal and policy prescriptions necessary to support the realisation of the agriculture-related goals and aspirations of Agenda 2063. It investigates strategies for enhancing the endogenous technological base in African countries through the use of utility models and a Pan - African R&D strategy. It emphasises that Africa must have the ability to adopt and adapt technologies, as Japan, Korea, and Taiwan did, but reminds that TRIPS limits this approach, requiring creative solutions such as the strategic use of utility models (Section 4.2). It proceeds to discuss Africa's weak scientific and technological base (Section 4.3) before analysing the importance of utility models and a Pan-African R&D strategy in technological advancement.

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[1] Note that TRIPS does not cover utility models. See Article 2(1) Paris Convention and Article 43 PCT.

[2] L Borgatti, & N Balchin Harnessing *Intellectual Property Rights for Innovation, Development and Economic Transformation in Least Developed Countries* (advance copy, January 2024) Commonwealth Secretariat, London & United Nations, New York (2024).

The core analysis is structured in two parts. Part I (Section 4.4) explores utility models, covering their role as complementary IPR tools (Section 4.4.1) and their relevance to agricultural development (Section 4.4.2). It then examines their application at global and national levels (Section 4.4.3) and considers China's patent law as a model (Section 4.4.4). Part II (Section 4.5) presents an R&D strategy to enhance Africa's technological capacity. Finally, Section 4.6 outlines additional measures to strengthen IP systems, suggesting an expanded role for the AfCFTA IP office in supporting R&D and agricultural development.

4.2 TRIPS and the Limits of Developmental Flexibility

Africa must have the flexibility to adopt and adapt technologies, as Japan, Korea, and Taiwan did during their growth phases.[3] However, TRIPS offers limited room for such approaches and does not, *per se*, explicitly permit the kind of knowledge appropriation that supported East Asian economic success. To address this challenge, the continent should consider a wide array of creative solutions including the strategic use of utility models for technological learning and industrial growth, open innovation frameworks, technology pools,[4] regional cooperation to achieve economies of scale in R&D and IP management, South-South partnerships, and a Pan-African R&D strategy to promote localised innovations.

It can be said with certainty that some of the most powerful Asian economies such as Japan, South Korea and Taiwan could not have achieved their remarkable development trajectories had the WTO been established and the TRIPS Agreement been in place thirty years earlier. South Korea's export-led growth very much relied on copying and protection of its domestic market through the imposition of steep barriers, practices that clash with the regulatory frameworks established by the WTO later on.[5] These economies started industrialising before the imposition of modern IP regimes, which allowed them to exploit knowledge diffusion without the legal constraints that developing countries face today.[6] For example, the Japan Patent Office notoriously delayed the granting of a semiconductor patent

[3] On the role of technology diffusion and adaptive innovation rather than a rigid IP-centric approach, see S Lall 'Indicators of the Relative Importance of IPRs in Developing Countries' (2003) 32 Research Policy 1657.
[4] See C Oguamanam 'Open Innovation in Plant Genetic Resources for Food and Agriculture' (2013) 13:1 *Chi.-Kent J. Intell. Prop* 11.
[5] A Amsden '*Asia's Next Giant: South Korea and Late Industrialization'* Oxford University Press (1989). Also see HJ Chang Kicking Away the Ladder: Development Strategy in Historical Perspective Anthem Press (2002).
[6] R Wade 'Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization' Princeton University Press (1990).

to Texas Instruments, a company in the United States of America' for close to 30 years,[7] by which time it had already advanced in silicon chip manufacturing, surpassing the United States in the field. The regulatory door that once allowed for such strategies has since closed.

The Uruguay Round's insertion of IP norms was, in part, intended to restrict latecomers from following Japan, Korea, and Taiwan's strategies. Susan Sell observed that TRIPS was the result of lobbying by powerful multinational corporations seeking to reshape international IP to protect their markets, [8] in effect curtailing the policy space available to emerging economies.

Chapter 3 methodically examined the interpretation of TRIPS flexibilities and illustrated how countries can strategically utilise them. However, they are far from sufficient in enabling the scale of technological appropriation necessary for meaningful development. Moreover, while flexibilities such as compulsory licensing and parallel importation technically exist, they can be constrained by legal, institutional, and diplomatic challenges. Utility models can be important complementary measures.

4.3 Enhancing Local Innovation: Addressing Africa's Weak Scientific Technological Base

Many African countries have a weak domestic scientific and technological base and largely depend on imported technology, which suppresses local innovation and the development of high-value industries.[9] Since innovation is vital for the production and the development of a local knowledge base, the lack of protection for minor inventions may impede a country's capacity to transform knowledge and new ideas into economic and social advantages.[10]

Understanding the underlying reasons for Africa's low technological base is essential to appreciate why utility models become a key measure, as countries work toward improving capacities. The deficiency in technological capacities stems from several factors, including low

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[7]The Washington Post 'Japan Gives U.S. Firm Circuit Patent' (2 November 1989) Available at https://www.washingtonpost.com/archive/business/1989/11/22/japan-gives-us-firm-circuit-patent/632fe570-f565-4c1c-af2e-fc4dcbb15b9a/ (accessed 27 September 2024).

[8] SK Sell 'Private Power, Public Law: The Globalisation of Intellectual Property Rights' (2003)88 Cambridge University Press.

[9] See World Bank (2001) Supra; and UNCTAD *The Least Developed Countries Report 2005: Mobilising and Developing Productive Capacity* New York and Geneva: United Nations (2005).

[10] UNCTAD *World Investment Report 1999: Foreign Direct Investment and the Challenge of Development* United Nations publication, New York and Geneva (1999). See also KE Maskus *Encouraging International Technology Transfer* ICTSD (2004).

R&D investments, lack of a critical mass of university-educated personnel skilled in practical technology, insufficient high-quality laboratories and scientific equipment, limited access to long-term financing, and weak private sector initiatives.[11] Structural limitations such as gaps in STI also play a key role. While technological capacities may be promoted through the transfer of technologies by foreign investors, such transfer is limited by the absorptive capacity in the host countries.[12] To benefit from both foreign and indigenous technologies, countries need a certain level of technological knowledge, without which, opportunities such as collaboration, licensing, or joint ventures can be extremely limited.[13]

The current weak level of technological expertise has implications for the ability to realise Agenda 2063. While the technology gap can be addressed through education-especially STEM education which is crucial for building and strengthening Africa's innovation capacity,[14] it is pragmatic to combine STEM with efforts to enhance countries' abilities in incremental innovation. A recurrent rationale for utility models is that the right would be particularly beneficial for developing countries seeking to advance their technological capacities through local innovation by SMEs.[15] Therefore, utility models can be a useful tool to stimulate incremental innovation capabilities through adaptations and novel application of existing technologies to facilitate catch-up. Suthersanen has suggested that utility models could also help address concerns often raised by local industries regarding the vulnerability of indigenous innovation to unfair copying by foreign competitors and the lack of protection that deprives artisans of essential lead-time to recoup R&D costs.[16]

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[11] See S Lall & C Pietrobello 'Africa's technology gap: case studies on Kenya, Ghana, Tanzania and Uganda. United Nations Conference on Trade and Development(2003),available *at* *https://unctad.org/system/files/official-document/iteipcmisc13_en.pdf*(accessed 8 June 2024).; and UNCTAD '*Technology and Innovation Report 2021: Catching technological waves innovation with equity*. (2021), available *at* *https://unctad.org/page/technology-and-innovation-report-2021* (accessed 8 June 2024).

[12] UNESCO *Recommendation on Science and Scientific Researchers* (2017). Also see J Wyndham et al *UNESCO Recommendation on Science and Scientific Researchers and the United States: An Analysis of Key Themes* American Association for the Advancement of Science (2022).

[13] G Mengistie & United Nations Economic Commission for Africa *The Patent System in Africa: Its Contribution and Potential in Stimulating Innovation, Technology Transfer, and Fostering Science and Technology* Economic Commission for Africa (2010).

[14] World Bank *Empowering Africa's Future: Prioritising STEM Skills for Youth and Economic Prosperity* (2023), available at *https://blogs.worldbank.org/en/education/empowering-africas-future-prioritising-stem-skills-youth-and-economic-prosperity* (accessed 30 May 2024).

[15] Suthersanen (2019) Supra at 9.

[16] U Suthersanen 'Utility Models: Do They Really Serve National Innovation Strategies?' in Drexl J & Kamperman Sanders A (eds) *The Innovation Society and Intellectual Property* Edward Elgar (2019), available at *https://ssrn.com/abstract=3139963* (accessed 15 May 2024).

4.4 Part I – The Concept of Utility Models

A utility model is an exclusive right granted in relation to a technical invention which permits the right holder to prevent others from commercially exploiting the invention without their permission for a limited period (usually 6 to 15 years). Fundamentally akin to a patent, the subject matter of a utility model balances on the edge of what is protectable under patent and design laws.[17]

The rights provided by utility model legislation closely resemble those provided by patent laws but are ideally suited for inventions that enhance or modify existing products.[18]

Incremental advancements that make only slight improvements to existing technology often fail to meet the threshold for patent protection. In patent law parlance, such advancements may be considered "new" but not sufficiently "inventive" to qualify as patentable inventions. As a result, they are often categorised as "innovations" rather than "inventions." Utility models are designed to provide patent-like protection to such innovations. In simple terms, utility models reward less sophisticated results of R&D, or what are referred to as intermediate innovations. Similar to patents, utility model applications must include a proper disclosure of the advancement for which protection is sought[19] so that an ordinary skilled person in the relevant technical field can make and/or use the disclosed advancement.[20]

Regarded as second-tier rights to patents or hybrid rights, utility models do not have a universal or standardised nomenclature. They are known by various terms in different jurisdictions such as utility innovations, innovation patents, short-term patents, and petty patents.[21] In this discussion, the term "utility models" is used in specific reference to agricultural tools or machinery.

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[17] U Suthersanen 'Incremental Inventions in Europe: A Legal and Economic Appraisal of Second Tier Patents' (2001) *Journal of Business Law* 319–319.
[18] Ibid.
[19] Ibid.
[20] World Intellectual Property Organisation (WIPO) 'Inventing the future: An introduction to patents for small and medium-sized enterprises' (2006). Available at https://www.wipo.int/edocs/pubdocs/en/wipo_pub_917_1.pdf (Accessed 20 September 2024)
[21] Malaysia, Australia, Belgium and Indonesia respectively.

4.4.1 Leveraging Utility Models as Complementary Tools

The use of IPR as a tool to promote innovation is a subject of ongoing debate, [22] particularly regarding its effectiveness in countries with limited infrastructure and innovation capacity. While developed countries agitate for strong IPR protection, the ability of such measures to stimulate innovation in LDCs is questioned.[23] IPR's monopolistic nature can, in some cases, stifle innovation,[24] despite the inclusion of provisions like Articles 7 and 8 of the TRIPS Agreement (discussed in Chapter Three), which aim to address this potential risk.

To enhance innovation and technological advancement, a strong national R&D system is crucial, particularly in sectors like agriculture. Sustainable and tailored technologies are required to address the specific needs of the agricultural sector. Article 66 of the TRIPS Agreement underscores the importance of technology transfer in fulfilling such roles. However, LDCs[25] have not fully benefited from this provision.[26] Technology transfer either via informal channels (such as the acquisition of machinery and equipment, reverse engineering and subcontracting) or through formal modes including FDI remains limited. Licensing of foreign technology is mostly inaccessible by firms in LDCs, which often lack sufficient absorptive capacity since their domestic productive capacities are either not fully exploited or are too weak.[27]

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[22] For analysis of research in this area, see KE Maskus *Intellectual Property Rights in the Global Economy* Peterson Institute (2000); J Rantanen 'Patent Law's Disclosure Requirement' (2013) 45 *Loyola University Chicago Law Journal* 369; W Daley 'In search of optimality: Innovation, economic development, and intellectual property rights' *Global sustainable development report prototype, briefs* (2014), available at *https://sustainabledevelopment.un.org/content/documents/5580Innovation,%20Economic%20Development%20and%20Intellectual%20Property%20Rights.pdf* (accessed 8 June 2024); and J Amankwah-Amoah, SK Medase 'Extracting innovation value from intellectual property: Evidence from sub-Saharan Africa' (2024) *Journal of the Knowledge Economy*, *15*(2), 8933-8967.

[23] For limitations of implementing robust IP protection in developing countries, see JH Reichman 'Intellectual Property in the Twenty-First Century: Will the Developing Countries Lead or Follow?' (2009) 46 *Houston Law Review* 1115–1185; S Lall 'Indicators of the Relative Importance of IPRs in Developing Countries' (2003) 32(9) *Research Policy* 1657–1680.

[24] M Boldrin & DK Levine 'The Case Against Patents' (2013) 27(1) *Journal of Economic Perspectives* 3–22. Boldrin and Levine argue that whereas patents are intended to incentivise innovation, they often have the opposite effect by granting monopolistic power and stifling competition.

[25] Most African countries are LDCs. See United Nations. (2023). *List of least developed countries (as of 24 November 2023)*. Available at *https://www.un.org/development/desa/dpad/least-developed-country-category.html(accessed 5 May 2024).* (Accessed 8 June 2024).

[26] See D Fox 'Technology transfer and the TRIPS agreement are developed countries meeting their end of the Bargain' (2019). *Hastings Sci. & Tech. LJ*, *10*, 1.

[27] UNCTAD '*Revisiting Development Innovations in Least Developed Countries: A Practical Review of Selected Intellectual Property Rights Measures'* (2023), available at *https://unctad.org/system/files/official-document/aldc2023d3_en.pdf (accessed 8 June 2024).*

As a result of these challenges, innovation occurs mainly through small, gradual improvements to existing products or processes, mostly led by SMEs. Technological learning and technical change in LDCs takes place primarily by means of using and improving technologies that already exist in advanced countries, which need to be adapted to local conditions and for which second - tier protection can be sought.[28]

To establish a stronger technological base, African countries should concentrate on strengthening their endogenous knowledge base—the ability to develop and innovate technologies without excessive dependence on external sources. This can be achieved through several methods including the adoption of utility models. As a less stringent form of patent protection, utility models offer an additional IPR mechanism to complement the already existing solid patent framework which countries can use, coupled with the flexibilities afforded by TRIPS.

4.4.2 Relevance of Utility Models in Agricultural Development

Patents and utility models are closely related. Whereas patents are intended to protect technical solutions that solve specific problems in a technological field, utility models cover objects that may not aim for a specific technical effect (which would qualify as an invention) but are designed to improve the object's utility, potentially leading to greater efficiency or convenience. Shapes or configurations may be categorised as either a patent or a utility model, depending on whether they provide an improved effect or functionality protected by a utility model, or a new technical functional effect protected by a patent.

The generally accepted patentability criteria necessitates an invention to be new in the world (absolute novelty), involve an inventive step (may be much lower or absent altogether), be commercially applicable, and the subject matter must not be excluded from patentability. The patentability criteria is overly stringent for small firms, yet, inventions by SMEs often consist of minor improvements to existing technologies, resulting in incremental rather than radical innovations.

[28] See X Fu & L Shi '*Direction of innovation in developing countries and its driving forces'* World Intellectual Property Organization (WIPO) Economic Research Working Paper Series. (2022). 69 available at *https://www.wipo.int/edocs/pubdocs/en/wipo-pub-econstat-wp-69-en-direction-of-innovation-in-developing-countries-and-its-driving-forces.pdf* (accessed 8 June 2024).

In some instances, an incremental advancement may offer enormous benefits while differing only slightly from existing technologies. This is particularly common when established technologies are adapted to suit the specific needs of developing countries.[29] Although the adaptations may closely resemble the original technologies, small but essential modifications motivated by local conditions enable the adapted technology to be successful. While such modifications may not meet the threshold for "inventiveness," they are sufficiently "new" to qualify for utility model protection.[30]

Utility models are therefore designed to protect minor yet useful inventions such as the type of incremental innovations often seen in agricultural machinery and techniques. In many cases, the innovations are practical adaptations of existing technology aimed at improving efficiency, reducing labour, or enhancing productivity. In the agricultural sector where many smallholder farmers rely on traditional methods and low-cost tools, utility models can provide vital protection for inventions that improve the utility of existing technologies. For instance, the adaptation of mechanical tools or equipment to improve agricultural processes such as planting, harvesting, or irrigation can be protected by utility models. These types of innovations may not possess the inventive step required for a full patent but are critical for the agricultural sector's development.

In countries, therefore, where technological development in agriculture is lagging, utility models can be an important mechanism for stimulating incremental improvements that cumulatively lead to higher productivity, as it enables innovators to protect their inventions, even if those innovations are not revolutionary *per se*. For example, improvements in agricultural machinery such as low-cost plows, irrigation systems, or small-scale mechanisation tools often cone about through small, incremental innovations rather than groundbreaking inventions.

For developing countries, utility models are important to the extent that they ameliorate the shortcomings of patent law as they offer an accessible, cost-effective, and fast means of protection to domestic innovators concentrating on minor inventions or technological adaptations that fall short of the stringent standards for patents.

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[29] U Suthersanen 'Utility Models and Innovation in Developing Countries' ICTSD Issue Paper no.13, ICTSD (2006)

[30] NA Boztosun, 'Exploring the utility of utility models for fostering innovation' *Journal of Intellectual Property Rights* (2010). 15(6) 429-439.

Scholars in legal and economic fields consider the regime essential in aiding struggling economies in developing homegrown innovations,[31] particularly those operating in an environment dominated by local incremental inventions.

It is arguable that utility model protection may be an important part of the suite of measures for developing economies to strengthen their indigenous innovation capabilities.[32] They are also a useful data source on innovative activity[33]—as a further importance.

4.4.3 Utility Models within the Global and National Legal Frameworks

Although utility model rights have been available in various forms in several jurisdictions for at least 160 years, they remain far from being widely implemented or harmonised as a species of law.[34] There are currently no international norms regarding the nature and extent of a utility model, and TRIPS does not particularly mention it.

A peripheral mention of utility models appears in the Paris Convention, and the PCT (2001 version), but both instruments lack substantive guidelines on them. Article 43 of the PCT simply states that applicants can specify in their international application whether they are seeking utility model protection in any designated state that provides such protection under its national laws, which essentially allows an applicant to choose between a standard patent and a utility model, based on the specific legal framework of the jurisdictions they are applying to. Article 1(2) of the Paris Convention[35] on the other hand merely states that the protection of industrial property has as its object; patents, utility models, industrial designs, trademarks, service marks, trade names, indications of source or appellations of origin, and the repression of unfair competition.

The Convention does not establish any benchmark for this form of protection and is silent on the definition, its nature and scope. Its nexus with the TRIPS Agreement can be assumed by the incorporation of the main provisions of the Paris Convention[36] into TRIPS. At

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[31] U Suthersanen 'Utility Models: Do They Really Serve National Innovation Strategies?' in Drexl J & Kamperman Sanders A (eds) *The Innovation Society and Intellectual Property* Edward Elgar (2019).
[32] See a similar conclusion by Kim, Lee, Park & Choo at, 359, and Suthersanen (2019) Supra at 17.
[33] C Juma *The Gene Hunters: Biotechnology and the Scramble for Seeds* Princeton University Press (1989).
[34] Ibid at 4.
[35] Paris Convention for the Protection of Industrial Property of 20 March 1883, revised 1967.
[36] The TRIPS Agreement, Article 2(1), mandates that Members comply with Articles 1 to 12 and Article 19 of the Paris Convention (1967) for Parts II, III, and IV. This incorporates the substantive obligations of the Paris Convention, and by extension, those on utility models, into TRIPS.

continental level, the AfCFTA IP Protocol has highlighted the importance of utility models by enjoining State Parties to provide for their protection and make relevant technical assistance available to entrepreneurs and MSMEs in various manufacturing fields.[37]

There is no bar against implementing a utility model regime. A country adapting it has scope to exclusively calibrate it to local socio-economic conditions and infrastructure. Paris Union countries with utility model regimes however are bound by the national treatment principle[38] when it comes to acknowledging and enforcing the right. Other relevant provisions include the right of priority,[39] importation and forfeiture clauses,[40] and compulsory licensing arrangements.[41] The lack of international rules and restrictions on utility models thus means countries can supplement extant IPR frameworks with a utility model system,[42] and the policy space countries enjoy in designing such systems is quite wide.[43]

At national level, one of the earliest national laws recognising utility models as a distinct form of IP was the German Patent Law of 1891.[44] In 1905, Japan introduced its own utility model law, inspired by the German framework..[45] Today, utility model protection is available in several countries worldwide.[46] Approximately 70 countries provide second-tier patent protection resembling utility model protection in one form or another, including highly successful innovation-driven economies such as Japan, South Korea, China, and Germany..[47] It must be noted that there are also countries with similar economic histories of innovation, including the United States, United Kingdom (UK), Singapore, Sweden, and Canada[48] that have not adopted any utility model regime, suggesting that there are diverse pathways to

[37] AfCFTA IP Protocol, Article 13.
[38] Paris Convention Article 2(1). See GHC Bodenhausen *Guide to the Application of the Paris Convention for the Protection of Industrial Property, as Revised at Stockholm in 1967* (1968).
[39] Paris Convention, Article 4(e)(1), 4(e)(2), 5A, 5D, and 11.
[40] Ibid Article 5A
[41] Ibid Article 5D and 11.
[42] U Suthersanen, G Dutfield & KB Chow (eds) *Innovation Without Patents: Harnessing the Creative Spirit in a Diverse World* Edward Elgar Publishing (2007).
[43] A WIPO study on flexibilities in the international patent system reaches the same conclusion. See WIPO *Patent Related Flexibilities in the Multilateral Legal Framework and Their Legislative Implementation at the National and Regional Level: Document Prepared by the Secretariat* (CDIP/5/4, 1 March 2010) at 26.
[44] DK Kardam 'Utility Model – A Tool for Economic and Technological Development: A Case Study of Japan' (2007). Also see J Richards 'Utility Model Protection Throughout the World' Ladas & Parry LLP (2010).
[45] Ibid
[46] H P Brack 'Utility Models and Their Comparison with Patents and Implications for the US Intellectual Property Law System' (2009) Boston College Intellectual Property and Technology Forum, 1-15.
[47] Suthersanen (2019) Supra at 1
[48] Ibid at 2.

achieving technological growth. Therefore, countries must assess and adopt the approach most relevant to their specific needs.

In Africa, a number of countries have implemented utility model protection, many as part of their membership to organisations such as OAPI.[49] Kenya is one of the earliest African countries to provide for utility model protection under Section 16 of its Industrial Property Act of 1989,[50] now superseded by the current Industrial Property Act No. 3 of 2001.

4.4.4 From Adaptation to Innovation: Utility Models and Technological Progress

The effectiveness of patent protection in promoting innovation and economic growth varies depending on the research and innovation capacity of a country.[51] In countries with advanced research capabilities, patent systems are instrumental in propelling innovation, while in countries where research capacity is limited, a system that incentivises incremental inventions is important for growth.[52] Even though robust IPR are commonly associated with development, their efficacy hinges on the appropriateness of the IPR mix chosen for each specific situation.[53]

Literature highlights the historical importance of utility model regimes in enabling technological development and catch-up by several East Asian countries. Prud'homme,[54] quoting several authoritative sources such as Evenson and Westphal,[55] Maskus and McDaniel,[56] Kumar,[57] Kardam,[58] Odagiri et al.,[59] and Kim et al.,[60] has succinctly encapsulated

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[49] ED Du Plessis, SB Brown & DF Tanziani eds. *Adams & Adams Practical Guide to Intellectual Property in Africa*. PULP (2012).
[50] Industrial Property Act No.12 of 1989.
[51] Kim et al 'Appropriate Intellectual Property Protection and Economic Growth in Countries at Different Levels of Development' (2012) 41(2) *Research Policy* 358-375.
[52] Ibid at 358.
[53] Ibid at 358–75.
[54] D Prud'homme 'Utility Model Patent Regime "Strength" and Technological Development: Experiences of China and Other East Asian Latecomers' (2017) 42 *China Economic Review* 50-73.
[55] R Evenson & Westphal L 'Technological Change and Technology Strategy' in Behrman J and Srinivasan TN (eds) *Handbook of Development Economics* vol 3A (North-Holland, Amsterdam 1995) 2209.
[56] KE Maskus & C McDaniel 'Impacts of the Japanese Patent System on Productivity Growth' (1999) *Japan and the World Economy* 557-574.
[57] N Kumar 'Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries' (2003) *Economic and Political Weekly* 209-26.
[58] KS Kardam *Utility Model -A Tool for Economic and Technological Development: A Case Study of Japan* World Intellectual Property Organisation and Japanese Patent Office (2007) available at http://www.training-jpo.go.jp/en/uploads/text_vtr/ws_pdf/kardam.pdf (accessed 30 May 2024).
[59] H Odagiri, A Goto & A Sunami 'IPR and the Catch-Up Process in Japan' in H Odagiri, A Goto & A Sunami & R Nelson (eds) *Intellectual Property Rights, Development, and Catch-Up* Oxford University Press (2010) 95-132. Also see H Odagiri, A Goto & A Sunami & R Nelson 'Introduction' in Odagiri H, Goto A, Sunami A & Nelson R (eds) *Intellectual Property Rights, Development, and Catch-Up* Oxford University Press (2010) 1-28.
[60] Kim et al., (2012) Supra.

the consensus that utility models are highly beneficial for technological development in developing economies. For instance, Evenson and Westphal found that the utilisation of utility models in South Korea facilitated technological advancement to a great extent and propelled the country to higher technological frontiers. Similarly, Maskus and McDaniel demonstrated through rigorous econometric analyses that utility models in Japan aided the country's technological catch-up.

Furthermore, Kumar, in his comprehensive examination of the utility model systems in Japan, South Korea, and Taiwan suggested that utility models are instrumental in promoting technological learning which leads to incremental innovation and ultimately culminates in higher levels of innovation. Kardam corroborated these findings, showing that Japan's utility model system substantially enhanced technological diffusion and learning, thereby promoting incremental innovation. Odagiri et al. also highlighted that Japan's utility model system was a pivotal institutional component that enabled the country to bridge the technological gap with Western countries. Lastly, Kim et al. found that the protection of minor/incremental innovations provided by utility model systems in East Asia and other regions where domestic firms previously lagged in technological capabilities has been instrumental in encouraging economic growth.

The empirical evidence presented by these studies is persuasive for the strategic implementation of utility model systems to stimulate innovation and technological progress. Indeed, developing countries in East Asia and elsewhere intentionally manipulated their IP regimes to facilitate technological catch-up, following a gradual process of first encouraging imitation and then transitioning to encourage innovation.[61] In China, South Korea and Taiwan for instance, deliberate weak IPR protection and the availability of second-tier patents invigorated technological learning.[62] The weak IPRs helped by allowing for local absorption of foreign innovations, while second-tier systems encouraged minor adaptations and inventions by local firms.[63] As local technological capacity became sufficiently advanced to generate a substantial amount of innovation, IP systems became stronger.[64]

[61] See Prud'homme (2017) Supra at 53. Also, N Kumar 'Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries' (2003) *Economic and Political Weekly* 209-26.
[62] Kumar (2003) Supra ; Prud'homme (2017) Supra.
[63] Suthersanen (2019) Supra at 11.
[64] Ibid at 17.

South Korea's economic development is an often-quoted example, having relied extensively on utility models during its economic progression. Before the 1980s, South Korea massively relied on reverse engineering and the importation of equipment and machinery, due to a lack of local technological capabilities.[65] Precisely, in 1961, the Korean government revised its IP laws and established its first autonomous IPR system to protect both patents and minor innovations. During the 1960s and 1970s, Korean firms began to actively import foreign technologies to meet local needs.[66] Domestic inventors would often modify the imported products[67] and subsequently file for utility model protection for incremental innovations.[68] During its economic progression, the quantity of utility model applications surpassed that of patents, until the late 1980s.[69]

In a study investigating the indigenous technological development of Korean firms,[70] the above phenomenon was underlined. The study noted that utility model innovations contribute to firm performance when firms are technologically lagging and that the minor innovations can be a learning device and stepping stone for developing more patentable inventions later on.[71] As firms progress technologically, there is a noticeable shift towards greater reliance on patents over utility models.[72] This notion finds support in an Australian economic review which revealed a decline in the economic benefits associated with utility models as industries progress technologically.[73] However, even in countries where technological capacities have matured such as Japan and Germany, utility models continue to play an essential role in development.[74]

Brazil, known for its progressive agricultural sector leveraged utility models to enable domestic producers to capture a substantial portion of the farm-machinery market. Brazil's

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[65] K Lee, D Park & C Lim *Industrial Property Rights and Technological Development in the Republic of Korea* (2003) WIPO Policy Monograph.
[66]YK Kim et al. 'Appropriate intellectual property protection and economic growth in countries at different levels of development.' Research policy 41.2 (2012): 358-375 at 359.
[67] Ibid at 359
[68] K Lee &, YK Kim 'IPR and technological catch-up in Korea. *Intellectual Property Rights, Development and Catch-up: An International Comparative Study' Oxford* University Press, Oxford. (2011) 133-167.
[69] Kim (2012) Supra at 360.
[70] L Kim *Imitation to Innovation: The Dynamics of Korea's Technological Learning* Harvard Business School Press (1997).
[71] Suthersanen (2019) Supra at 9.
[72] Kim (2012) Supra at 359.
[73] J Zeitsch *'The Economic Value of the Australian Innovation Patent: The Australian Innovation Patent Survey*' Verve Economics, Canberra (2013).
[74] Ibid.

success is attributed to the adaptation of foreign technologies to meet local conditions.[75] Case studies compiled by the World Bank on Brazil's farm machinery sector underscored the value of utility models in the customisation of foreign innovations to suit local requirements and conditions.[76]

In sum, utility models, being less stringent than patents, are particularly relevant in agricultural innovation, where the majority of technological advancements are related to practical modifications and adaptations of existing tools. This is especially true in Sub-Saharan Africa, where local agricultural practices often rely on traditional methods, and there is a growing need for innovations tailored to specific local agricultural conditions (such as climate-specific irrigation systems or small-scale machinery for family farms).

In countries with limited technological capacities, many of which are in Africa, utility models can serve as a tool to bridge the technological gap. Local farmers and small agricultural enterprises, for example, may innovate through adaptations of existing agricultural machinery or improvements to traditional farming tools. While these innovations may not be revolutionary, they can enhance productivity and sustainability tremendously. Utility models offer a mechanism to protect these adaptations, which encourages local innovation that is vital for agricultural development in resource-constrained settings. The experiences of countries like South Korea and China where utility models have been central to technological advancement highlight the potential of such protection mechanisms to stimulate innovation in sectors like agriculture.

China leads the world in utility model applications, accounting for 90 per cent of global filings by 2013. [77] Its utility model regime was strategically implemented to encourage SME R&D and cultivate a culture of innovation.[78]

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[75] See Evenson & Westphal (1995) at 2261, citing KW Mikkelsen *Inventive Activity in Philippine Industry (Research, Patents, Technology)* Yale University (1984).
[76] World Bank *Global Economic Prospects and Developing Countries* Oxford University Press (2002).
[77] WIPO: "IP Facts and Figures" (2013)
available at *https://www.wipo.int/edocs/pubdocs/en/statistics/943/wipo_pub_943_2013.pdf* (accessed 8 May 2024). For a broader discussion, see D Prud'homme 'Utility model patent regime "strength' and technological development: Experiences of China and other East Asian latecomers." *China Economic Review* 42 (2017): 50-73. For latest statistics, see WIPO '*IP Facts and Figures'* (2024).
Available at *https://www.wipo.int/edocs/pubdocs/en/wipo-pub-943-2023-en-wipo-ip-facts-and-figures-2023.pdf* (accessed 8 May 2024).
[78] See P Ganea 'China's amended legal regime on patents for inventions and utility models' (2010)5.9 *Journal of intellectual property law & practice* 650-662.

4.4.4.1 China's Patent Law: A Brief Overview

China's Patent Law, first enacted in 1985, includes utility models, invention, and design patents. The latest amendment, adopted in 2020 took effect on June 1, 2021. The 1985 Act established three types of patents: utility models, invention, and design. Utility models, distinct from invention patents, cover simpler innovations with a lower patentability threshold and undergo no substantive examination to reduce costs and streamline the process.

China's growth is attributable to a careful balance between weak IP laws and a progressive strengthening of the same.

Prud'homme for example observed that initially, China's simple utility model system boosted domestic industry by increasing usage and enabling technological learning, [79] but the lack of examination later on raised concerns about quality and inventiveness, prompting the introduction of preliminary examinations and search and evaluation reports to enhance rigor while keeping costs and processing times low.[80]

Scholars of East Asia's technological catch-up[81] have argued that IPR systems should adapt to a country's stage of economic development rather than follow a uniform model. Weaker patent regimes often support early-stage growth,[82] with stronger IP protection developed as economies advance[83] and prioritise competitiveness, innovation, and FDI attraction. [84]

China's strategic use of utility models is reflected in its innovation performance. The Global Innovation Index ranked China 4th globally in 2021, [85] with its IP-generated income

[79] Prud'homme (2017) Supra (citing several empirical studies).
[80] Ibid. For a discussion of the salient aspects of the Chinese utility model system, see: C Heath *Intellectual Property Law in China* Wolters Kluwer (2021).
[81] Kim (1997) Supra, Lee (2003) Supra, Lee & Kim (2010) Supra, Kim et al (2012) Supra, Suthersanen (2019) Supra, Zeitsch (2013) and Evenson & Westphal (1995).
[82] However, some developed countries such as Germany, Japan and Italy have sustained utility models even after their economies reached maturity.
[83] Prud'homme (2017) Supra.
[84] See Evenson & Westphal (1995) Supra, at 2244–45. For a comprehensive discussion on the incentives for net technology-importing countries to maintain weak IPR systems, see SJ Lacroix 'The Political Economy of Intellectual Property Rights in Developing Countries' in Woumasset JA & Barr S (eds) *The Economics of Cooperation: East Asian Development and the Case for Pro-Market Intervention* (1992) 79-84.
[85] S Dutta, et al. (eds) *Global innovation index 2021: tracking innovation through the covid-19 crisis*. WIPO (2021).

rising from 76th place in 2015[86] to 36th in 2021.[87] The country also advanced in PCT patent value climbing from the 27th place globally in 2015[88] to 13th in 2021.[89]. Today, patent-intensive industries contribute approximately 13 per cent of China's GDP, [90] reinforcing its status as an innovation leader among middle-income economies. [91]

Based on evidence of this nature, some scholars argue that latecomer countries should initially maintain relatively weak IPR to enable local firms to build technological capabilities through imitation and reverse engineering.[92]

In Africa, where agriculture plays a key role in economic development, utility models offer an avenue for addressing the continent's agricultural challenges. Many African countries face obstacles such as limited access to advanced technology, inadequate infrastructure, and a reliance on traditional farming methods. The adoption of utility models can protect local innovations that adapt and improve agricultural tools, thus promoting domestic innovation and reducing dependence on foreign technologies.

For example, in countries with limited access to sophisticated machinery, utility models can protect innovations related to low-cost, locally manufactured agricultural tools that improve productivity without the need for high-tech machinery. Such inventions can range from hand-held irrigation systems to modified plowing tools designed to cope with specific soil types or climates. Protecting these types of innovations through utility models enables innovators to recoup R&D costs and incentivises further improvements.

Generally, utility models can support the development of agricultural machinery that addresses the specific needs of smallholder farmers such as machines that are affordable, easy to use, and adapted to local agricultural practices. This is useful for Africa's predominantly small-scale farming sector, where access to modern agricultural tools is limited.

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[86] S Dutta, B Lanvin, LR León & Wunsch-Vincent S (eds) *Global Innovation Index 2021: Tracking Innovation through the COVID-19 Crisis* (2021) WIPO.
[87] S Dutta, B Lanvin, LR León & Wunsch-Vincent S (eds) *Global Innovation Index 2021: Tracking Innovation through the COVID-19 Crisis* (2021) WIPO.
[88] Ibid at 58.
[89] Ibid at 59.
[90] Ibid.
[91] E Osuch-Rak 'Intellectual Property in Light of the WTO, the WIPO, the EU, and the OECD in Global Public Goods and Sustainable Development in the Practice of International Organisations (2023) at 301.
[92] Suthersanen (2019) Supra, Prud'homme (2017) Supra.

In light, therefore, of the potential benefits of utility models, African countries should consider adopting this practical method of IP protection as part of a wider strategy to advance the agricultural sector. This research conceives utility model protection as a pragmatic approach to enhance agricultural technological innovations and accelerate progress towards the ambitious goals and aspirations of Agenda 2063. Moreover Article 13 of the AfCFTA IP Protocol affirmed the rights of African countries to enhance extant IP frameworks with utility model systems to strategically support their development priorities.

4.5 Part II - Research and Development

Modernising agriculture demands decisive investment in R&D and innovation to catapult technological advancement so as to unlock the sector's full potential. Global trade hinges on maximising innovation worldwide, underscoring not only the importance of IPR, but also of R&D and innovation.[93]

This segment closely examines R&D funding, particularly its role in linking innovation and IP to the achievement of the agriculture-related goals and aspirations of Agenda 2063.[94] In agriculture, innovation is essential for improving efficiency, promoting environmental sustainability, reducing labour intensity, and increasing yields. Advancements in these areas require substantial investment in R&D, which constitutes the knowledge production component of innovation. While R&D funding traditionally comes from both the public and private sectors, recent years have witnessed a decrease in private sector investment, with public funding remaining inadequate.[95]

Many African governments struggle to prioritise R&D investment and consequently allocate minimal resources to it.[96] Most have failed to meet their commitments to spend 1 per

[93] S Ezell & N Cory *The Way Forward for Intellectual Property Internationally* (2019) Information Technology and Innovation Foundation.
[94] See OECD *Growth: Rationale for an Innovation Strategy* (2007).
[95] V Simpkin et al 'Investing in Health R&D: Where We Are, What Limits Us, and How to Make Progress in Africa' (2019) 4(2) *BMJ Global Health* e001047. Also see R Levinson 'Financing Innovation in Africa: Rebranding the Sustainable Development Goals as an Asset Class' (2018).
[96] J Midega et al '*African Countries Must Muscle Up Their Support and Fill Massive R&D Gap'* The Conversation 18 (2021), available at *https://theconversation.com/african-countries-must-muscle-up-their-support-and-fill-massive-randd-gap-161024* (accessed 30 May 2024,).

cent of GDP on R&D[97] or allocate at least 10 per cent of national budgets to agriculture and rural development as per their CAADP commitment. [98]

Set within the broader innovation principle that positions innovation at the heart of societal prosperity, the key message here is that Africa requires consistent, adequate, and sustainable R&D funding, especially in the agricultural sector to accelerate innovation, generate IP, enhance product competitiveness, and achieve the agriculture-related goals and aspirations of Agenda 2063. Therefore, a proposal is made for a continental R&D strategy to serve as an innovative vehicle for channeling R&D efforts on the continent. Accelerated R&D efforts will lead to more competitive agricultural products embodying IP, with better prospects in both regional and global agricultural markets.

4.5.1 Contextualising the complexity of the problem

The success of Agenda 2063 hinges on how swiftly Africa can address its most persistent challenge, especially those that prevent its agricultural progress, where most of its development fortunes may emerge. Today, R&D dominates industry sectors such as agriculture, biotech, and ICTs. Unfortunately, research systems in Africa present critical gaps and needs that tend to suffocate R&D. Common problems include under investment in research infrastructure, low R&D funding, a small number of researchers, poor institutional linkages, under-resourced institutions, among others.[99] To move forward, Africa must establish an environment that supports scientific and technological innovation, which will lead to breakthrough product and process developments expected to push the continent to its desired level of growth.

Fortunately, countries are increasingly aware of the importance of technological innovation as a tested means to enhance development,[100] as evidenced by the emphasis on STI in key continental documents.[101] The challenge however is that there is little innovation going

[97]UNCTAD *Technology and Innovation Report 2021: Catching Technological Waves-Innovation with Equity* (2021).
[98] Ibid.
[99] M Fosci *Strengthening Research Institutions in Africa: A Synthesis Report* (2020).
[100] See R Veugelers 'The World Innovation Landscape: Asia Rising?' *Bruegel Policy Contribution* (2013)
[101] For example, STISA-2034, the successor of STISA 2024 is part of the continental framework for accelerating Africa's transition to an innovation-led, knowledge-based economy within the overall framework of the AU Agenda 2063. STISA and the Science Agenda for Agriculture in Africa S3A are very closely aligned with CAADP and Agenda 2063 and put agricultural STI at the forefront of Africa's socio-economic development and growth.

on, despite having abundant resources whose value could be unlocked by innovation.[102] Africa is one of the most natural resource endowed continents, yet, also, the least developed Many countries continue to export raw materials with little or no value addition, resulting in persistently low returns from trade and missed opportunities for economic growth.[103] Transforming the agricultural sector towards agri-tech and agro-allied industrialisation could open wider markets. It requires the full participation of firms in value added activities and their insertion in regional and global value chains.[104] Sustained R&D funding and protection for the resulting inventions remain essential.

The AfCFTA paints an optimistic picture of what its implementation may portend. Initial steps shall require putting in place mechanisms that enable countries to enhance their capabilities for effective competition in regional and global markets.[105] It implies investing in R&D and innovation capabilities, areas where African countries have the farthest to go, compared to counterparts in Asia,[106] Europe[107] and the USA.[108] Moreover, the continent must identify and develop the lead sectors that will help it further to expand the base for the creation of wealth and give it the possibility to compete successfully within today's world economy. That means R&D funding has to be strategically channeled to areas where the greatest development impact may be realised. Already, African countries identified agriculture as a strategic pillar for growth under Agenda 2063.[109]

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[102] See United Nations Technology Bank for the Least Developed Countries *The State of Science, Technology and Innovation in the Least Developed Countries* (2022).

[103] H Asche & M Grimm 'Industrialisation in Africa: Challenges and Opportunities' (2017).

[104] A Ahouassou 'Why does Africa's industrialization matter? Challenges and opportunities' *African Development Bank Group* (2017): 2019-1407.

[105] See Economic Commission for Africa '*AfCFTA implementation strategies'* (2024), available at *https://repository.uneca.org/bitstream/handle/10855/50098/b12041920.pdf?sequence=5&isAllowed=y* (accessed 11 August 2024). Continental frameworks were developed to address key sectors such as agriculture, trade, transport, energy, and mining, considered crucial for AU Member States to achieve their development goals. These frameworks are included in the priority areas of Agenda 2063's First Ten-Year Implementation Plan. They include CAADP, BIAT, PIDA, the African Mining Vision (AMV), STISA, and the Accelerated Industrial Development for Africa (AIDA). See African Union Commission *Agenda 2063 First Ten-Year Implementation Plan 2014–2023* (2015) Addis Ababa, Ethiopia.

[106] See UNESCO 'How much does your country spend on R&D?' UNESCO Institute of Statistics, available at *https://uis.unesco.org/apps/visualisations/research-and-development-spending/* (accessed 30 May 2024); and Midega et al (2021) Supra. Asia has three of the top eight R&D best-performing countries, collectively accounting for about 75 percent of global R&D. China contributes 22 percent of global R&D expenditure, followed by South Korea at 4 percent and India at 2 percent.

[107] Ibid (Germany 6 per cent, France 3 per cent and UK 2 per cent).

[108] In 2019, the USA led global R&D performance with 28 per cent, followed by China at 22 per cent. R&D is concentrated in a few countries, with the USA, China, Japan, Germany, South Korea, France, India, and the UK accounting for about 75 per cent of global R&D. African countries collectively contributed less than 1 per cent.

[109] See STISA-2024, which addresses the demand for STI to impact critical sectors such as agriculture, health, energy, and the environment.

4.5.2 The role of R&D and Innovation in Bringing about Agenda 2063

R&D is a key input for innovation, and involves the creation of new products and services, or the improvement of existing ones. However, it is costly and requires huge investment in materials, equipment, and skilled personnel. Many countries face challenges in securing adequate funding to support these activities.

Yet, the level of R&D spending of a country tends to increase its innovation and patent rate and, in consequence, its economic development.[110] Funding for R&D is perennially low in Africa. Much as external challenges have mounted in recent times such as the Covid 19 pandemic and civil strife, African governments have traditionally only marginally funded R&D. In 2016, the latest year for which data is available, Africa allocated only 0.39 per cent of its GDP to AgR&D, a decrease from 0.54 per cent in 2000.[111] Despite African leaders acknowledging the importance of agriculture in economic growth, job creation, and poverty alleviation, there remains serious underinvestment in agricultural research.[112]

The majority of countries exhibit agricultural growth rates that are still markedly below the 6 per cent target set under CAADP.[113] In terms of gross domestic expenditure on research and development (GERD), the UNESCO Institute of Statistics (UIS) data shows that worldwide, the top 5 GERD performers spent just over 3 per cent of their GDP on GERD in 2017,[114] including Israel and the Republic of Korea being the world leaders (4.6 per cent), followed by Switzerland (3.4 per cent), Sweden (3.3per cent, Japan (3.2 per cent),[115] and none from Africa.[116]

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[110] FDO Paula & JFD Silva 'R&D Spending and Patents: Levers of National Development' (2021) 18(2) *Innovation & Management Review* 175-*191*.

[111] GJ Stads, A Nin-Pratt & N Beintema *'Boosting Investment in Agriculture Research in Africa: Building a Case for Increased Investment in Agricultural Research in Africa'* (2022).

[112] Pillar IV of CAADP emphasises the essential role of agricultural R&D, technology dissemination, and adoption in the growth of the agricultural sector.

[113] B Ousmane & J Collins *'Agricultural growth and productivity in Africa: Recent trends and future outlook'* Investing in Future Harvests (2016), available at https://cgspace.cgiar.org/server/api/core/bitstreams/5dad706b-2bef-4428-b0c4-eb8bc12ccb3f/content (accessed 11 August 2024). Also see GJ Stads, A Nin-Pratt & N Beintema (2022) Supra.

[113] Pillar IV of CAADP emphasises the essential role of agricultural R&D, technology dissemination, and adoption in the growth of the agricultural sector.

[114] UNESCO '*New UIS Data for SDG 9.5 on Research and Development'* (2019), available at *http://uis.unesco.org/en/news/new-uis-data-sdg-9-5-research-and-development* (accessed 8 June 2024).

[115] Ibid.

[116] Also see R Sooryamoorthy 'Science, policy and development in Africa: Challenges and prospects' Cambridge University Press (2020).

The AU set a target of 1 per cent of GDP for investment in R&D, but UIS data indicates that only three sub-Saharan African countries—South Africa, Kenya, and Senegal—are nearing this goal, with each investing approximately 0.8 per cent of their GDP.[117]

To more effectively tackle agricultural productivity issues, governments must commit to increase their investment in agricultural research, and donor support must closely align with national and regional priorities for the clear reasons explained in section *4.5.3.7* below.

As far back as the 1970s, there has been an abiding effort to encourage sustainable R&D funding by African countries. The Monrovia Declaration of 1979,[118] and the Lagos Plan of Action, 1980[119] (adopted subsequently) all made calls for increased investment in science and technology, particularly in the area of R&D. The 8th Ordinary Session of the Executive Council of the AU in Khartoum[120] and the 9th Executive Council of the African Union held in Addis Ababa endorsed a similar call in 2006 and 2007 respectively, with the former obligating Member States to raise their national science and technology budget to 1 per cent of GDP to ensure implementation of programmes;[121] and the later urging them to promote R&D and develop innovation strategies for wealth creation by allocating at least 1 per cent of their GDP. These decisions evolved to imply 1 per cent allocation of GDP to support R&D activities,[122] a goal that remains elusive.

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[117] See J Lewis, S Schneegans & T Straza *UNESCO Science Report: The Race Against Time for Smarter Development* UNESCO Publishing (2021). Note that this figure declined slightly in 2021. Regions have been setting their own spending targets. The European Union (EU) aimed to raise overall R&D investment to 3 per cent of GDP by 2020. However, only two EU countries reached this target (Sweden with 3.3 per cent and Austria with 3.1 per cent).

[118] Monrovia Declaration on Guidelines and Measures for National and Collective Self Reliance in Social and Economic Development for the Establishment of a New International Economic Order 1979.

[119] Lagos Plan of Action for the Economic Development of Africa (1980). An OAU-backed plan to increase Africa's self-sufficiency.

[120] African Union *EX.CL/Dec.254 (VIII)* Decision on the Report on the Conference of Ministers of Science and Technology – Doc. *EX.CL/224 (VIII)* (2006).

[121] For further details, refer to the Executive Council decision of the Eighth Ordinary Session, held from 16 to 21 January 2006 in Khartoum, Sudan. see *https://au.int/sites/default/files/decisions/9639-ex_cl_dec_236_-_277_viii_e.pdf* (Accessed 30 May 2024).

[122] UNECA *Towards Achieving the African Union's Recommendation of Expenditure of 1per cent of GDP on Research and Development* (2018) Policy Brief No. ECA/18/004 available at *https://archive.uneca.org/sites/default/files/PublicationFiles/eca_policy_brief_beyond_funding-_the_research_and_development_rev1.pdf* (accessed 30 May 2024).

Assumptions underpinning the need for higher levels of R&D funding have been highlighted before, that is, R&D is integral to development.[123] Since, however, resources are limited, it is essential to prioritise and direct R&D initiatives to the areas that offer the greatest opportunity for impact. Key strategic documents such as Agenda 2063, Boosting intra- African Trade, STISA-2024(and soon STISA-2034), CAADP, as well as country specific National Development Plans (NDPs) have built consensus around the scientific priorities that promise the greatest potential for impact, such that countries can direct resources towards discovering, developing and delivering game-changing interventions in areas that will help the region to achieve its goals sooner.[124]

Agriculture, trade, IPR, and innovation are consistently highlighted as the tonic for development in these strategies. The strategies emphasise the need for Africa to revolutionise its agriculture and trade sectors, develop products that can compete in regional and global markets, penetrate GVCs, and establish itself as a global player in the world economy.[125] At the moment, however, the majority of African countries lack the requisite scientific and technological capabilities to effectively engage in transformational agricultural development. The operationalisation of the AfCFTA, and the rise of knowledge economies tests Africa's readiness to realise Agenda 2063 by effectively leveraging R&D and innovation.

4.5.3 Identifying the Causes of Low R&D and innovation

The role of innovation in improving agriculture, enhancing competitiveness, and addressing climate change has sparked interest in understanding innovation and R&D activities within the agricultural sector, as well as the appropriate laws and public policies needed to promote these efforts (discussed in Chapter Five and Six). From cloud computing and big data to drones and robotics in farming, modern R&D demands not only the mastery of innovative techniques but also the ability to adapt to and utilise advanced cutting-edge technologies.[126] The many

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[123] See United Nations Economic Commission for Africa *Towards Achieving the African Union's Recommendation of Expenditure of 1per cent of GDP on Research and Development* (2018), available at *https://hdl.handle.net/10855/24306* (accessed 30 May 2024).

[124] See for example Kenya Vision 2030 available at *https://vision2030.go.ke* (accessed 28 May 2024).

[125] See for example, Kenya National Trade Policy (2016).

[126] See S Das 'Transforming Agriculture: Harnessing Robotics and Drones for Sustainable Farming Solutions' (2024) 46 (7) *Journal of Experimental Agriculture International* 219-31; and KPMG *The Changing Landscape of Disruptive Technologies: Global Technology Innovation Insights* (2014) KPMG available *at https://assets.kpmg/content/dam/kpmg/pdf/2016/07/changing-landscape-disruptive-technologies.pdf* (accessed 30 May 2024);.

technological solutions that exist in agriculture today are opportunities to transform the sector, which points toward both human capital and financial investment.

Since the launch of STISA-2024, there have been important developments in many national systems of innovation. Institutions have developed R&D and innovation programmes and attempted to align them with their national needs, with some countries creating innovation funds and incubation programmes to support the development of innovations, strengthen technology diffusion and harness the entrepreneurship of the science and technology community.

However, the positive steps forward, aimed at improving agriculture also reveal that there are some persistent challenges, to which the region must respond. Key among these is financial capital, which transcends all other problems. The factors that account for the likelihood that a country starts producing technology are R&D funding, education, technological capital and the quality of its institutional settings.[127] This is in addition to several factors discussed below. R&D ignites innovation; education provides the R&D sector with the raw material, that is, scientists, engineers, innovators and inventors; institutions play a key role, basically through the channel of property rights protection; and technological capital fuels R&D activity.

A complex set of factors accounts for Africa's under performance in R&D, including the following:

4.5.3.1 Funding Deficits

The research output of many countries is influenced by the level of funding allocated to R&D, with the ideal expenditure often set above 1.5 per cent of GDP to achieve research excellence. [128] However, Africa's contribution to global knowledge generation remains minimal.

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[127]JB Roure '*Factors that influence the formation of new technological enterprises'* (1988), available at *https://www.iese.edu/media/research/pdfs/DI-0131-E.pdf* (accessed 15 May 2024).

[128]Wondwosen Tamrat '*Catalysing R&D – The need for more government funding'* University World News (2019), available at *https://www.universityworldnews.com/post.php?story=20191028062534176#:~:text=The%20'critical%20mass'%20of%20overall%20R&D%20expenditure,often%20set%20as%20above%201.5%%20of%20GDP*. (accessed 17 August 2024).

According to UIS estimates for 2019, sub-Saharan Africa allocated only 0.4 per cent of its GDP to R&D, far below the global average of 1.7 per cent, and the lowest in the world.[129] In 2018, global R&D spending approached US$1.7 trillion, with about ten countries accounting for 80 per cent of this expenditure—none of which were African, [130] which points to Africa's underinvestment in research and innovation.

4.5.3.2 Capacity

Despite the growing emphasis on innovation for Africa's development, there are still serious bottlenecks that hinder its effectiveness, including lack of specific capacities, critical technical skills, and resources to promote R&D.[131] Whereas nearly all African countries have moved to design and adopt STI policies and strategies, majority still lack the requisite capacity to leverage and benefit from investment in STI.[132] Most countries have not solved the challenge of sustainably funding R&D and innovation and as a result they have failed to effectively generate and deploy knowledge and technological innovations for development.[133] Moreover, the capacity to utilise R&D resources is also important. No matter the amount of financial resources mobilised for Africa's development, such funds can only yield modest results unless countries develop the human, organisational and institutional capacity to absorb and effectively utilise them.[134]

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[129]UNESCO Institute for Statistics *Global Investments in R&D* (2019) available at *https://uis.unesco.org/sites/default/files/documents/fs54-global-investments-rd-2019-en.pdf* (accessed 30 May 2024).Also see UNESCO Institute for Statistics 'Global Investments in R&D' UIS/FS/2018/SCI/50 (2018), available at https://uis.unesco.org/sites/default/files/documents/fs50-global-investments-rd-2018-en.pdf (assessed 11 August 2024).

[130] UNESCO '*Global Investments in R*&D' (2020) Fact Sheet No. 59 FS/2020/SCI/59 available at *https://uis.unesco.org/sites/default/files/documents/fs59-global-investments-rd-2020-en.pdf* (accessed 11 August 2024.

[131] Africa Capacity Building Foundation *Africa Capacity Report 2017: Building Capacity in Science, Technology and Innovation for Africa's Transformation* (2017).

[132] J Mugwagwa et al 'Optimising Governance Capabilities for Science, Research and Innovation in Africa' (2022) 68 *Technology in Society* 101804.

[133] OO Banji, V Bertha & Shruti '*Towards effective public-private partnerships in research and innovation: a perspective for African Science Granting Councils*' African Technology Policy Studies Network (2018).

[134] See AM Kedir 'Drivers of Economic Growth in Africa: Opportunities, Financing and Capacity Issues' (2017).

4.5.3.3 STI Institutions

Most African countries have weak STI institutions[135] which fail to effectively generate and deploy knowledge and technological innovations for socioeconomic growth.[136] Their conceptualisation of innovation is narrow, and they tend to emphasise science and technology, but fail to adequately address innovation.[137] At the same time, the STI policies are not supported by strong implementation mechanisms, governance frameworks, funding, and impact assessments which reduces their impact, particularly so in terms of achieving development goals and addressing social challenges.[138] Evidence also suggests that African countries lack specific human and institutional capacities to promote STI.[139]

4.5.3.4 Education

Achieving Agenda 2063 necessitates investment in human resource development, which contributes to R&D research capabilities and subsequent innovations. Education forms the bedrock of innovation, particularly well-educated scientists, engineers, and technologists. However, the limited capacity to produce qualified researchers is a key challenge for Africa's R&D. Globally, investing in education has proven to be an effective method for developing high-caliber innovative scientists capable of groundbreaking innovations. Concentrating on STEM education is useful to realise this goal. There is however concern that Africa's progress in producing scientists, engineers and technologists is not yet satisfactory.[140] As an example, the proportion of researchers in the African population is 25 and 28 times lower than the proportion in UK and USA respectively; and the percentage of Africans pursuing graduate study is three times lower than the global average.[141] Interventions are required to strengthen the continent's STI capacity to achieve increased numbers of people working in key fields that are of importance to Africa's future.

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[135] African Capacity Building Foundation '*Africa Capacity Report 2017: Building Capacity in Science, Technology, and Innovation for Africa's Transformation'* (2017), available at *https://elibrary.acbfpact.org/acbf/collect/acbf/index/assoc/HASH01ad/e44e7241/b749d69a/1a6c.dir/ACR2017%20English.pdf* (accessed 8 June 2024).

[136] B Vallejo, B Oyelaran-Oyeyinka, N Ozor &, M Bolo 'Open innovation and innovation intermediaries in sub-Saharan Africa'. (2019).11(2), *Sustainability* 392.

[137] Ibid.

[138] African Capacity Building Foundation (2017) Supra at 3.

[139]Ibid at 7.

[140] Also see African Academy of Sciences '*Africa Beyond 2030: Leveraging Knowledge and Innovation to Secure Sustainable Development Goals'* (2018).

[141] United Nations Economic Commission for Africa *African Science, Technology and Innovation Review 2013* (2013).

4.5.3.5 Researchers

Related to education is the number of researchers. Africa has a narrow research pool. A UIS report shows that the sub-Saharan Africa research pool per million inhabitants stood at 0.7 per cent in 2018 (an improvement from 0.6 per cent in 2014); representing a density of 124 researchers per million inhabitants in 2018, up from 102 in 2014. Despite however, the small global share,[142] several African countries were among the 38 countries in the world that increased their researcher density per million inhabitants by more than 15 per cent between 2015 and 2018. These include Mauritius (86.3 per cent), Ethiopia (67.8 per cent), Madagascar (45.4 per cent), Togo (26.3 per cent), South Africa (21.4 per cent) and Uganda (15.8 per cent).[143]

Countries have also made strides in research output related to artificial intelligence, robotics, animal and plant biology. [144] For instance, Kenya contributes about 10 per cent of sub-Saharan Africa's publications in animal and plant biology. Unfortunately, most Individuals, organisations, and governments that fund and conduct R&D on the continent do not have a mechanism for systematic collaboration. As a result, they are not connected to the full range of expertise needed to get to the point of impact. [145]

4.5.3.6 Infrastructure

African countries have not only insufficiently invested in infrastructure that supports R&D, they also lack the resources to build the infrastructure.[146] Backbone hard and soft infrastructure such as electricity, reliable and high-speed internet connectivity and digital skills are general prerequisites for the application of technologies.[147]

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[142] W Kigotho *Countries spend less than 1% of GDP on research'* University World News (2021), available at *https://www.universityworldnews.com/post.php?story=20210616151534847* (accessed 11 August 2024).China's pool of researchers, for example, expanded by 11.5per cent between 2014 and 2018.

[143] Ibid.

[144] J Lewis, S Schneegans & T Straza *UNESCO Science Report: The Race Against Time for Smarter Development* UNESCO Publishing (2021).

[145] Coalition for African Research and Innovation 'The Need for Robust African Research & Development.' Available at:*https://wellcome.org/sites/default/files/coalition-for-african-research-and-innovation-approach.pdf* (Accessed 30 May 2024).

[146] C Juma & L Yee-Cheong *Innovation: Applying Knowledge in Development* Earthscan (2005). According to the authors, the capacity of countries to innovate is dependent on existing physical infrastructure and how it is used.

[147]See T Lynn et al 'Infrastructure for Digital Connectivity' in *Digital Towns* Palgrave Macmillan (2022), available at *https://doi.org/10.1007/978-3-030-91247-5_6* (accessed 5 June 2024).

As of 2019, 52.8 per cent of the LDC population did not have access to electricity, whereas the global access average stood at 90.1 per cent.[148] Interestingly, three-quarters of LDCs' population are covered by a mobile broadband network, although only one-quarter have internet access. If African countries are to harness the potential of the evolving technologies, access to and affordability of both digital broadband infrastructure would be critical.[149]

4.5.3.7 Donor Reliance

African countries not only invest the least in R&D but also, most of the investment is obtained from abroad.[150] Africa's overreliance on international funding has *interalia* contributed to the under-representation of Africans in both local and international R&D platforms.[151] The impact of this overreliance became all too clear when UK announced in 2019 that the UK Research and Innovation, the public body that directs research and innovation funding had cut UK's overseas aid budget from 0.7 per cent of GDP to 0.5 per cent. The result was a fall[152] in overseas research programmes managed by the institution in 2021–2022.[153] Overreliance on external sources leads to a failure to direct research priority setting and misalignment of national and donor research goals,[154] leading to poor results.

In view of these challenges, it is hardly possible to achieve the continent's ambitions based on approaches that are defined by limited financial funding from local sources. A clear strategy, backed by an investment plan for technological innovation, acquisition and upgrading, is needed to enable Africa to achieve desired growth. Overall, Africa must rise and take greater responsibility for R&D. Ultimately, the responsibility for closing the existing gaps rests with African countries and their continental, regional, and national institutions.

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[148] UNCTAD *Technology and Innovation Report 2021* United Nations Conference on Trade and Development, United Nations, Geneva (2021).
[149] United Nations Industrial Development Organisation *Propelling LDCs in the Digital Age: A 4IR Perspective for Sustainable Development* (2021) UNIDO's 9th Ministerial Conference of the Least Developed Countries, Vienna.
[150] W Kigotho (2021) Supra.
[151] Midega et al. (2021) Supra.
[152] Ibid.
[153] Ibid.
[154] W Kigotho (2021) Supra.

4.5.4 Building Robust R&D and Innovation Systems

4.5.4.1 The Role of National Agricultural Research Systems

NARS are the backbone of an agricultural innovation system and include all public, semi-public, and private AgR&D institutions in a country, *viz:* universities, government laboratories, private sector research, and NGO or producer-led research enterprises.[155]

Agriculture related Agenda 2063 goals ought to be delivered through a synergised structure where national agenda and priorities correspond with the continental agenda (operationalised under CAADP). The existence of NARS allows it to be a conduit for the implementation of the continental agricultural goals and their domestication and/ or mainstreaming into national policy papers to create an institutional research agenda with a bias on national needs, policy and partnerships, research capacity (human and infrastructure) and funding diversity.

Most African NARSs are however fragmented, with numerous individual agencies conducting R&D, often without well-defined research mandates.[156] To pursue an innovation renaissance that lends support to agenda 2063, the apparatus through which the much-needed funding is channeled at national level must be carefully networked with the requisite infrastructure. This apparatus, the so-called national system of innovation (NSI) is the thread that links various institutions and networks them so that they relate to each other to perform the innovation function. It is necessary for NARS to be effectively linked to the NSI to promote interactive activities between and among institutions in order to support the generation of new products, processes and organisational practices.[157]

NSI provides a useful framework for understanding how knowledge, institutions, and policies interact to promote technological progress. Originally introduced by Chris Freeman in his analysis of Japan's industrial policies,[158] NSI was later expanded by Bengt-Ake

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[155] AGRILINKS '*Capacity Development for National Agricultural Research Systems: Rethinking USAID's Role*' (2013).
[156] GJ Stads, A Nin-Pratt & N Beintema *Boosting Investment in Agriculture Research in Africa: Building a Case for Increased Investment in Agricultural Research in Africa* (2022).
[157] For the definition of NSI, see OECD *National Innovation Systems* (1997) OECD, Paris.
[158] See C Freeman '*The National System of Innovation 'in historical perspective'* (1995)19(1) Cambridge Journal of economics 5-24. Also see, M McKelvey '*How do national systems of innovation differ? A critical analysis of Porter, Freeman, Lundvall and Nelson'* In Rethinking Economics (1991)117-137 Edward Elgar Publishing.

Lundvall,[159] who emphasised the role of interactive learning among firms, universities, and government institutions. Richard Nelson further refined the framework and demonstrated how institutional structures and economic environments influence the success of innovation policies.[160] In the African agricultural sector, the slow uptake of modern agricultural technologies, including improved seed varieties, precision farming tools, and biotechnology applications can be attributed to weak knowledge-sharing networks and fragmented innovation systems, which makes NSI principles highly relevant. A well-functioning NSI would require closer collaboration between research institutions, agricultural extension services, and policymakers to ensure that innovations reach and benefit small-scale farmers.

Moreover, African governments must recognise the importance of localised, demand-driven innovation, as opposed to a top-down, externally imposed approach. Lundvall argues that successful innovation is not simply about transferring technology but about adapting it to local settings through interactive learning. This perspective supports the argument in this thesis that Africa's agricultural transformation should not only rely on external innovations but also promote homegrown solutions that cultivate the use of local knowledge systems and IP tools.

4.5.4.2 The Role of Partnerships and Institutional Linkages

Partnerships are important in advancing R&D and innovation. Key actors in the innovation ecosystem, including government, academia (universities and research institutions), the private sector, and communities must build strong, collaborative relationships. In this loop, government and academia are expected to exert the push for innovation by supporting the creation, protection, and utilisation of R&D outputs and creative works.[161] Academia also has the task of developing a skilled network of scientists to strengthen local innovation capacity, while the private sector plays a crucial role in translating research into market-ready products and services. However, in many African countries, government support for innovation remains limited, and most universities and research institutions lack the infrastructure to incubate innovations or launch spin-offs.

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[159] BA Lundvall *'National innovation systems and globalisation'* (2016) The learning economy and the economics of hope, 351.
[160] RR Nelson*, 'National innovation systems: A comparative analysis'* Oxford university press (1993).
[161] D Kamugasha *Formulation & Implementation of National Research & Innovation Framework Program (Uganda Country Experience)* WIPO-ARIPO-OAPI/INN/HRE/19/C1/4/C WIPO, Geneva (2019).

4.5.5 The Case for a Continental R&D Strategy

The collective challenges that confront the agricultural sector including climate variability, pests, diseases, post-harvest losses, and soil degradation can be tackled through a unified common approach to agricultural transformation, and a funding strategy to support the necessary measures. Given the difficulty in accessing funds for R&D activities, AU Member States could consider putting in place an overarching continental R&D strategic framework that can provide R&D funds to support research in key areas as guided by Agenda 2063 (including agriculture). The R&D strategy would allow African countries to work together to generate new knowledge and resources, harness technological advancements, and increase agricultural output, among others. It would also be useful in facilitating the necessary reforms, increase funding from diversified sources to support R&D activities, determine the human capacities required at all levels, match actions and resources, and facilitate effective collaborations with partners.

The rationale behind a continental R&D Strategy is that science has consistently proven to be a key factor in technological progress, economic growth, and innovation.[162] Its importance in economic progress has grown due to an increase in the role of knowledge as a driver of competitiveness in global markets and from emerging technologies that have opened up new opportunities for development. The opportunities are however missed because of low levels of R&D funding.

A study that investigated the status of agricultural research and innovation systems in 13 countries across all the sub-regions of Africa for the period 1996–2016 found that the generation of agricultural technologies and innovations in Africa was very low compared with the rest of the world.[163] Only 1.3 per cent of the money spent globally on R&D is spent in Africa.[164] As stated earlier, on average, Africa spends just 0.4 per cent of its GDP on R&D for all sectors of the economy. Agriculture often takes a small share of this already limited funding. Some authors have argued that even if investments were increased across the board to reach 1

[162]A Arundel, S Athreye & S Wunsch-Vincent (eds) *Harnessing Public Research for Innovation in the 21st Century: An International Assessment of Knowledge Transfer Policies* Cambridge University Press (2021).
[163] PARI *National Innovation Studies in 12 African PARI Countries* (2016).
[164]Wellcome Trust '*The Need for Robust African Research & Development'* available at *https://wellcome.org/sites/default/files/coalition-for-african-research-and-innovation-approach.pdf* (accessed 5 June 2024).

per cent of AgGDP, it would not alter the R&D trajectory in major ways.[165] It is posited thus that a more effective approach would be to define regional priorities and promote sub-regional collaboration between countries, with the support of the AU. This research advocates for pooling resources at the continental level to *interalia* address budget constraints, the undersupply of researchers, etc. Thus, a continental R&D strategy is proposed.

A Continental R&D Strategy is justified by the economic capability of constituent countries. Most countries are poor, necessitating the pooling of technological resources to address common challenges.[166]Africa comprises a group of countries that are mostly at the periphery of the development pyramid,[167] and which share similar situations of vulnerability and comparable challenges.[168] They have asymmetrical relations with the west, on whom they often depend for donor support. Developed countries have offered varied support in individual capacity and through international institutions and agencies. Developed countries often set the research agenda, sometimes misaligned with current R&D interests, prompting the need for an R&D strategy designed by Africans to address African circumstances.

Although African countries have diverse needs and priorities making it challenging to develop a continent-wide R&D strategy that meets each country's specific requirements, their limited financial capacity calls for collaboration on a long-term R&D agenda. This is particularly important given that many African economies are relatively small, and some lack the ability to independently mobilise the scientific and technological resources needed for development. R&D cooperation among African countries is essential for pooling and sharing scarce resources, including infrastructure, expertise, and funding.

A Pan - African R&D Strategy shall help countries to exploit their combined strengths to undertake R&D and invest in technological innovation. The Strategy will be important for collective technological learning and peer influence among the countries. Countries with weak

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[165] GJ Stads, A Nin-Pratt & N Beintema *'Agricultural R&D investment in Africa: Indicators that matter'* (2021), available at https://www.asti.cgiar.org/sites/default/files/pdf/au_rnd_africa/AU-SAFGRAD-ASTI-presentation.pdf (accessed 5 June 2024)..

[166] See Article 21(d) of the Declaration and Treaty establishing SADC, which enjoins SADC member countries to cooperate in science and technology as one of the major areas necessary for fostering regional development and integration; Articles 5, 80 and 103 of the EAC Treaty which are explicit on the role of cooperation in promoting the region's scientific and technological development, as is the EAC Science, Technology and Innovation Protocol 2007; Article 3 of the Treaty establishing ECOWAS; and Article 100(d) of the Treaty creating COMESA.

[167]AK Fosu & SA O'Connell 'Explaining African Economic Growth: The Role of Anti-Growth Syndromes' in *Annual Bank Conference on Development Economics (ABCDE)* Washington, DC: World Bank Publications (2006) 31–66.

[168] Ibid.

and underdeveloped R&D systems will be able to learn from those that have better developed systems and share information and experiences on what works better; and how to better organise R&D institutions and other aspects of innovation.

The Strategy will set the R&D agenda for the continent in all its development priority sectors as articulated by Agenda 2063. With specific reference to the agricultural sector, the strategy should be at the center of strengthened cooperation between countries to enable them to leverage the right technologies by improving human capital formation for R&D and innovation capacity; and attracting skilled and experienced partners to help them build and customise innovative ideas.

4.5.5.1 An Opportunity to integrate R&D in the AU Institutional and Development Architecture

Achieving Goal 5 of Agenda 2063 requires greater investment in R&D, stronger cooperation in agricultural research and extension, and advancements in technology, biology, agronomy, and digitisation. Infrastructure investment and supportive laws on PBR and patents are also essential. All these aspects need to be coordinated, preferably by an institution that will oversee the R&D Strategy.

It is proposed that the Strategy be domiciled within existing AU structures or institutions such as NEPAD, or within the soon-to-be-established IP office proposed under Article 31(1) of the AfCFTA IP Protocol. Alternatively, a specialised delivery unit may be created within NEPAD, mandated to give impetus to policies and institutional frameworks for R&D and innovation. The idea is to provide the necessary focus, resources, and expertise to accelerate the development and adoption of innovative solutions, and improve the productivity and resilience of Africa's key sectors. Institutionalising the Strategy within the AU offers clear advantages, including access to policymakers and technical experts essential for its implementation.

Whilst the strategy should cover continent-wide development priorities, the emphasis here is on agriculture. In this respect, the R&D strategy will have to *interalia* chat ways through which African States can transform their agriculture and deal with the pervasive challenges of the sector, which unfortunately remain deep-rooted. To succeed, the proposed institutional office/delivery unit should guide AgR&D and national policies on innovation (agricultural)

and direct bold measures to position agriculture as a national priority. This role must not conflict with existing mandates by institutions such as NEPAD or its agricultural technical arm, FARA. Rather, it should complement and enhance their efforts, or better still be incorporated.

In addition, the strategy could spearhead the development of shared continent-wide infrastructure through the design and implementation of common innovation infrastructure spread across different geographical locations, with proximate countries sharing resources such as innovation hubs to address the problem of limited resources. Support can be channeled through innovation clusters for continent-wide R&D projects. The regional innovation hubs/innovation clusters would function as a collective conduit through which innovation support is channeled for the collective benefit of countries.

The Pan-African R&D Strategy would also help the continent to think long-term, be pragmatic, and develop the ability to adjust quickly to ever-changing circumstances that may impact the success of Agenda 2063, by adopting innovative solutions to Africa's challenges.

Once the idea of the R&D Strategy is considered, it would be prudent to institutionalise the Strategy within the AU system. Overall, NEPAD, the IP office created under the AfCFTA IP Protocol, the delivery unit or where ever else the strategy is implemented shall support countries in changing, driving, and streamlining their AgR&D innovation systems to make them more effective in originating, promoting, and implementing innovations. This work starts with understanding the stakeholders in the innovation network who must also lend support to the process, including countries' political leaders, universities, R&D institutions, scientists, the private sector, and the general public. Most importantly, there must be a commitment and provision of adequate financial resources on a predictable basis for the success of any continent-wide R&D initiative.

The following strategic initiatives can be incorporated into the design of a continental R&D strategy to enhance and strengthen R&D capabilities:

(a) Supporting the development of agricultural technologies through targeted R&D.
(b) Promoting the adoption and spread of existing agricultural technologies.
(c) Conducting comprehensive assessments of agricultural innovation in Africa to identify specific needs, challenges, and opportunities in various sub-sectors and regions.
(d) Strengthening R&D innovation consortia and networks, including NARS.

(e) Providing access to global patent information relevant to agriculture disclosed in filed documents, among other measures.

It is important to highlight the fact that there is currently no emphasis on a Pan - African R&D Strategy to guide R&D efforts for homegrown technological solutions. This suggests a gap in the current discourse on Africa's development. Without such framework, limited coordination in allocating resources, setting priorities, and promoting collaboration among stakeholders can be expected. It is recommended that a discourse on developing a continental R&D strategy tailored to the continent's unique needs and opportunities commences, with the above proposals potentially serving as a foundation for consideration.

4.6 The AfCFTA IP Office – A Proposal for an Enhanced Role

The AfCFTA IP Protocol calls for the establishment of the AfCFTA IP Office, as outlined in Article 31(1). The office is designed to include the AfCFTA Secretariat, the Africa Centre for Disease Control and Prevention (Africa CDC), and the African Medicinal Agency (AMA). According to Article 31(2) of the Protocol, the Council of Ministers is tasked with recommending to the Assembly of Heads of State and Government of the African Union the adoption of suitable governance and administrative structures, as well as the rules and procedures necessary for the administration and operation of the office.

The IP office proposed under the AfCFTA IP Protocol could have an expanded mandate to include promoting R&D (agricultural) and technological development and/ or implement the R&D Strategy. The proposed responsibility neatly fits within the general and specific objectives of the Protocol.

Article 2 of the AfCFTA IP Protocol states that the general objective of the Protocol is to support the AfCFTA's goals by establishing harmonised rules and principles for promoting, protecting, cooperating, and enforcing IPR. The specific objectives outlined in Article 2(1)(a) include: (i) supporting intra-African trade, (ii) promoting African innovation and creativity while deepening an IP culture in Africa, (iii) fostering coherent IPR policy across Africa, (iv) contributing to the promotion of science, industrialisation, investment, digital trade, technology, technology transfer, and regional value chains (RVCs), (v) ensuring a harmonised system of IP protection throughout the continent, (vi) encouraging African positions on IPR, (vii) supporting and promoting creative and cultural industries by establishing a legal

framework and providing incentives for their development, and (viii) enhancing access to knowledge and supporting the public health needs and priorities of State Parties.

It can be gleaned from the objectives of the Protocol that it aims to support the AfCFTA by establishing principles and rules for the promotion, protection, and enforcement of IPR, and to promote African creativity and innovation. If, therefore, the success of the AfCFTA hinges on the production of globally competitive goods, then the IP office is well positioned to facilitate technology integration into production systems in African countries, including in the agricultural sector. The IP office can thus bring together R&D teams from various African countries to collaborate on research on common problems, to find common solutions.

The other envisaged role would be to e promote innovation, licensing and technology transfer by providing a platform for IP owners to showcase their agricultural technologies, patents, and know-how to potential licensees, investors, and collaborators.

Finally, another critical role for the office would be to establish and maintain databases, repositories, and online platforms containing information on agricultural patents and other IPRs, and providing access to comprehensive and up-to-date IP information. It is also well positioned to engage in technology scouting, market intelligence, and strategic decision-making to facilitate the continent's agriculture and wider development objectives.

4.7 Conclusion

In summary, this chapter has explored two critical elements that support agricultural development, complementing the flexibilities discussed in Chapter Three; utility models and R&D. Regarding utility models, the chapter emphasised the importance of their implementation as a way to encourage innovation, particularly in African countries where focus on incremental innovation could be most beneficial. Regarding R&D, the chapter highlighted the need to collectively address the challenges of the agricultural sector, noting that African countries' economies are too small and some lack the capacity to single handedly marshal scientific and technological resources for development, necessitating a Pan-African R&D strategy to enable a unified approach to tackle the challenges more effectively through initiatives such as joint research, knowledge exchange and the sharing of R&D facilities by proximate countries.

CHAPTER 5

COMPLEMENTARY LEGAL AND POLICY PRESCRIPTIONS

5.1 Introduction

Chapter Five addresses the fourth research sub-question, which examines the legal frameworks and policy measures essential to achieve the agricultural goals and aspirations of Agenda 2063. It emphasises the importance of coherent policies that integrate agriculture, innovation, IP and trade, and the coordination of corresponding policies in industry, competition, investment and the environment.

The chapter opens with Section 5.2, which emphasises the need to promote sustainable agricultural technologies, given that low productivity is closely linked to climate change. Addressing Africa's agricultural challenges will require environmentally sustainable technologies, often protected by IP, necessitating effective access mechanisms. Section 5.3 then examines the historical foundations of national IP systems which have resulted in the current patchwork of IP in African countries, and impacted the nature of IP laws applied. Section 5.4 explores policy measures required to realise the sector's growth and transformation. Following the analysis in Section 5.4, Section 5.5 argues that the lack of coordinated and coherent policies at both national and regional level hinders development outcomes in the sector, and proposes solutions. Section 5.6 suggests a Whole-of-Government Approach to create multi-sector synergies that can unlock the sector's development potential.

5.2 Cultivating Sustainable Agricultural Progress

Modern agriculture is experiencing profound transformation as it embraces sustainable development, prompting a re-evaluation of its practices and a growing awareness of its environmental impact.[1] This has led to policy reforms, challenging traditional perceptions of agriculture. In the past, agricultural policies principally emphasised increasing output. However, contemporary agricultural objectives now go further than mere productivity to include considerations such as international competitiveness, product quality, and sustainability.

[1] MA Altieri *'Ecological Impacts and the Possibilities for Truly Sustainable Farming*' (2003).

Africa's agriculture is vulnerable to climate variability, as shifting weather patterns, extreme weather events, and rising temperatures pose risks to crop yields, livestock health, and overall farm productivity. Smallholder farmers, in particular, are highly susceptible to these impacts due to their reliance on rain-fed agriculture, limited adaptive capacity, and constrained resources to invest in climate-resilient practices and infrastructure.

Climate-smart agricultural practices are vital for enhancing resilience and mitigating the adverse effects of climate change on agriculture. Integrating environmental sustainability into policy measures for agricultural development should therefore be fundamental to efforts aimed at transforming the sector. While this research generally emphasises agricultural technologies, the target should be environmentally sustainable innovations, as they offer opportunities for technology leapfrogging, which can strengthen climate resilience.

5.3 Historical Foundations of National IP Systems

The history of national IP systems in Africa is complex and varied, influenced by colonial legacies, international agreements, and local economic and developmental priorities. In most countries, the systems originated from legal frameworks inherited from former colonial powers.[2] Colonial-era IP laws were mainly designed to serve the interests of the colonial administration rather than address the needs of the local population.[3]

At independence, many African countries inherited a body of international IP obligations that were not originally negotiated with their interests in mind, [4] and little effort was made to modify the systems to reflect national priorities. In the years that followed, African countries adopted global trends in IP regulation, particularly through harmonisation with the TRIPS Agreement.[5] TRIPS standardised and globalised IPR by setting minimum standards, and entrenched the perspective of strong IP protection as essential for economic prosperity. However, with developed countries dominating the creative and technological landscape, developing countries found themselves adhering to IP standards that did not necessarily match

[2] J De Beer, J Baarbé & CB Ncube 'Evolution of Africa's Intellectual Property Treaty Ratification Landscape' (2018) *The African Journal of Information and Communication* 53-82.
[3] Ibid.
[4] T Adebola 'Mapping Africa's Complex Regimes: Towards an African Centred AfCFTA Intellectual Property (IP) Protocol' (2020)1 *African Journal of International Economic* Law 233-290.
[5] Ibid.

their economic realities, in effect perpetuating a system that largely benefited more advanced economies while offering limited benefits to Africa's development needs.

The TRIPS Agreement has often been viewed as a tool to not only standardise but also harmonise IP laws in member states, ostensibly to reduce trade distortions arising from piracy, counterfeiting, and varying patent laws[6] to achieve uniformity and compatibility of IP systems. Prior to TRIPS, many countries had divergent rules on patents, particularly in sectors such as pharmaceuticals, where exclusions of certain medicines from patent protection were common.[7] Disparities in IP regulations often led to distortions in trade, undermining market access and fair competition.

TRIPS sought to address these challenges by establishing a global baseline for IPR, aiming to create a more predictable and stable international trading environment. However, critics argue that the harmonisation of IP standards under TRIPS on the whole served to strengthen the rights of multinational corporations, particularly in industries like pharmaceuticals, where stronger patent protections could limit access to affordable medicines in developing countries.[8] While TRIPS was presented as a solution to trade distortions, it also raised concerns about the balance between promoting innovation and ensuring equitable access to essential goods and technologies. [9]

Countries revised their IP laws in pursuit of TRIPS compliance without clear policy goals and without attempting to exploit policy spaces and flexibilities that could enable them to meet individual development needs. The absence of IP policies in most African countries also seems to have contributed to the failure of their IP systems in making meaningful contributions to development. The lack of national IP policies could further have led countries to join regional and international IP agreements without fully understanding the benefits and challenges of being party to such instruments or cooperation arrangements. As a result, they assumed onerous responsibilities that were misaligned with their development stages, making

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[6] H Sun 'The road to Doha and beyond: Some reflections on the TRIPS agreement and public health' (2004)15(1) *European journal of international law*,123-150. Also see, S Mukherjee 'Patent Exhaustion and International Trade Regulation' (2023)13 BRILL.

[7] A Subramanian ''Medicines, Patents, and TRIPS: Has the intellectual property pact opened a Pandora's box for the Pharmaceuticals industry' In *Health and Development*. International Monetary Fund (2004).

[8] SK Sell 'Private Power, Public Law: The Globalisation of Intellectual Property Rights' (2003)88 Cambridge University Press.

[9] R Newfarmer et al 'Intellectual property: balancing incentives with competitive access' (2002) Development Prospects Group, eds. Global Economic Prospects.

it difficult to correctly identify specific needs, exploit policy spaces in IP agreements, and tailor national IP systems accordingly.

More than two decades after the entry into force of TRIPS, local capacity in IP policy, lawmaking, and administration remains weak, limiting countries' ability to take advantage of the opportunities provided by the agreement. In particular, many have paid little attention to the TRIPS flexibilities discussed extensively in Chapters Three and Six. Although the majority of countries have developed homegrown IP laws and policies, they have not been able to use them to reach a level of technological development where industry and scientists can develop, innovate, screen, borrow, or adapt scientific knowledge and technology to their specific environments,[10] a major limitation of current IP frameworks.

Generally, the IP landscape in Africa remains diverse, with varied legal frameworks and enforcement mechanisms.

5.3.1 The Effect of Disparities in National IP Regimes

Due to the colonial origins of many of the IP systems as discussed above, countries find themselves with inconsistent or weak IP systems, creating barriers to adopting new technologies (agricultural). Unfortunately, the RECs have not been successful in achieving harmonisation of the IP laws in member countries. A clear example is the EAC, as seen further below with the case of Kenya and Rwanda. Variations in national IP systems have potential to negatively impact agricultural trade, innovation, and technology transfer, increase compliance costs and restrict access to advanced technologies, which affects the development and dissemination of agricultural innovations.

Inadequate IP protection and enforcement in many African countries has also diminished incentives for both local and foreign entities to develop new technologies and invest in R&D, causing the region to lag technologically. Conversely, countries with solid well-developed IP laws find it easier to facilitate technology transfer through licensing agreements, as innovators are more inclined to license their technologies when assured of legal protection, which eases the dissemination of advanced agricultural technologies.

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[10] L Borgatti, & N Balchin *Harnessing Intellectual Property Rights for Innovation, Development and Economic Transformation in Least Developed Countries* (advance copy, January 2024) Commonwealth Secretariat, London & United Nations, New York (2024).

The diversity in national IP systems thus negatively impacts the flow of agricultural innovations across borders and affects the consistency of legal protection for new technologies. Consequently, the pace and trajectory of agricultural development on the continent is affected to the extent that innovation diffusion is inhibited, investor confidence is undermined, and the adoption of advanced agricultural practices obstructed. To drive this point home, a few examples are warranted. Currently, countries in Africa vary in their policies regarding exhaustion of rights. Kenya for instance operates an international exhaustion, regime[11] while Rwanda follows national exhaustion.[12] Differences in IP policies result in inconsistent protection for innovations, which potentially complicates cross-border use and distribution. It may also create complexities for innovators who may find their rights either limited or unenforced depending on where the innovation is used or sold.

Kenya is an exemplar of how an IP system can contribute to economic success, particularly through its PBR law, despite the criticisms outlined in Section *3.6.3.2*. While Kenya's IP framework continues to evolve, it has made progress in leveraging IP to support key industries, especially horticulture, which is a major pillar of its economy. [13] According to the Kenya Flower Council, the country is one of the largest exporters of cut flowers to the European Union (EU).[14] In 2019, the horticulture sector accounted for 24 per cent of total export earnings in 2019, overtaking tea and coffee as the top export earner.[15]

Although Kenya's PBR law, which supports commercial breeding has successfully attracted considerable foreign investment, it is fraught with criticism for its failure to equilibrate breeders and farmers rights, including authorial recognition and ancestral contributions;[16] and the fact that most of the breeding is conducted abroad. The above notwithstanding, Kenya's example illustrates how IP laws can influence innovation and investment in agriculture.

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[11] Section 58(2) Industrial Property Act No.3 of 2001 (Kenya).
[12] Article 196 Law No. 31/2009 of 26/10/2009 on the Protection of Intellectual Property (Rwanda).
[13] Agriculture and Food Authority *Creating Wage Employment in Horticulture Sector in Kenya* (2017). See D Rangnekar 'Geneva Rhetoric, National Reality: The Political Economy of Introducing Plant Breeders' Rights in Kenya' (2013) 19(3) *New Political Economy* 359-383.
[14] Most PBRs are however concentrated in the horticultural sector and held by foreign companies.
[15] J Thorpe, H Odame & E Kangai 'Horticulture in Kenya: Lessons from the Covid-19 Pandemic' *IDS Policy Briefing* 212 Brighton: Institute of Development Studies (2023).
[16] For insights into recent protests related to the Seed Act, see J Ambole *'Inside Kenya's Seed Control Battle: Why Smallholder Farmers Want to Share Indigenous Seeds'* IPS (2024), available at *https://www.ipsnews.net/2024/02/inside-kenyas-seed-control-battle-smallholder-farmers-want-share-indigenous-seeds/* (accessed June 18, 2024).

Organisations such as the East African Community (EAC),[17] Economic Community of West African States (ECOWAS),[18] the Southern African Development Community (SADC),[19]Common Market for Eastern and Southern Africa (COMESA)[20] have endeavored to harmonise IP laws and practices among Member States to establish a more consistent IP framework so as to ease trade and innovation flows, and mitigate the adverse effects of diverse national IP systems. The aggregate of these efforts represents a movement towards streamlining IP systems, trade facilitation, and enhanced collaboration among member countries. The AfCFTA IP Protocol, most recently adopted, is expected to play a key role in harmonising these laws to enable countries to collectively benefit from improved agricultural trade, innovation, and technology transfer.

5.3.2 Analysis of the treatment of IP, Trade and Agriculture in RECs

Chapter Two demonstrated the interconnectedness of innovation, IP, and trade in advancing development, particularly in the agricultural sector. IP is crucial in this relationship for two reasons: (1) it incentivises innovation and ensures the protection of new agricultural technologies and plant varieties, and (2) it facilitates the commercialisation and trade of these innovations. However, a review of how RECs have addressed these issues shows limited efforts to create a cohesive development strategy that effectively harnesses these elements. In the absence of such coordination, the opportunity for synergistic benefits is missed, and progress towards agricultural and wider economic development goals is hindered.

Trade in Africa, particularly in the agricultural sector is generally expanded through RECs. Africa's regional integration features several RECs, eight of which are recognised as part of the AfCFTA *acquis*. These include the Arab Maghreb Union (AMU), the Community of Sahel-Saharan States (CEN-SAD), the Economic Community of Central African States (ECCAS), the Intergovernmental Authority on Development (IGAD), ECOWAS, COMESA, EAC, and SADC.[21] Trade agreements within these communities often include provisions related to IP, which influences how innovations in sectors like agriculture are shared, protected, and commercialised.

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[17] Treaty for the Establishment of the East African Community, 1999.
[18] Revised Treaty of Economic Community of West African States, 2010.
[19] Southern African Development Community Regional Indicative Strategic Development Plan (2003.
[20] Treaty Establishing the Common Market for Eastern and Southern Africa, 1993.
[21] Article 5(b) of the AfCFTA Agreement underlines the 8 RECs as constitutive elements of the AfCFTA.

The ambition for economic integration in Africa traces back to foundational documents like the Lagos Plan of Action and the OAU Charter, which culminated in the establishment of the Treaty creating the African Economic Community, known as the Abuja Treaty.[22] Article 4 of the treaty outlines steps to achieve the Community's objectives. It emphasises the synchronisation of national agricultural policies and the establishment of entities to oversee agricultural trade. Chapter VIII of the treaty specifically addresses food and agriculture, and prioritises cooperation in agricultural development and food production to enhance productivity and stabilise export commodity prices. Of significance, Article 46(2)(e) underscores the need for harmonising agricultural development strategies and policies at regional and community levels, particularly regarding production, trade, and marketing of essential agricultural products and resources.

In addition to the above treaty provisions, continental instruments such as CAADP and various STI policies reaffirm Africa's commitment to advancing agriculture. Africa's Science and Technology Consolidated Plan of Action (CPA), for instance, provides a coordinated framework for implementing science and technology initiatives, including those targeting agriculture and biotechnology. Likewise, STISA is synchronised with the goals of Agenda 2063 by promoting STI as enablers of Africa's economic development.

Through these initiatives and approaches, Africa demonstrates a clear prioritisation of agriculture in continental policymaking, as the documents recognise agriculture's central role in achieving development and economic prosperity. CAADP has played a key role in shaping agriculture by encouraging countries to harmonise their agricultural policies with continental and global development agendas.[23] One of the key components of CAADP is the development of NAIPs that serve as blueprints for prioritising and coordinating agricultural investments within individual countries.

In relation to IPR with relevance to agricultural technologies, the AU adopted two important IPR instruments: the AfCFTA IP Protocol, and the African Model law. The AU model legislation provides an alternative to the UPOV Convention and addresses Africa's unique needs and priorities in the agricultural sector by offering a structured framework for

[22] Treaty Establishing the African Economic Community, 1991. Also see Article 6, para 1. The Article provides for the creation of the community within a maximum of 34 years. The intended completion date was originally set for 2025 based on the signing year.

[23] R Mkandawire et al 'Catalysing African Leadership and Coordination for Food Systems Transformation' in *African Food Systems Transformation* 38.

formulating national laws concerning local community rights, PBRs, and access to biological resources, while the AfCFTA IP Protocol seeks to harmonise IP protection on the continent.

At the sub-regional level, four of Africa's eight RECs have developed IP instruments, with some addressing agriculture, albeit minimally. These RECs are COMESA,[24] EAC,[25] ECOWAS,[26] and SADC.[27]

Various aspects of these REC instruments are notable concerning their treatment of IP, agriculture, and trade. First, while the instruments emphasise IP, the direct connection to agricultural trade is not immediately apparent but can be inferred indirectly. Secondly, the instruments indicate a fragile foundation for agricultural trade and development. Although continental policies like CAADP prioritise agriculture, greater impact could be achieved through more explicit linkages between IP, trade, and agricultural development within the REC frameworks.

A deeper understanding of how agricultural trade is accommodated can be gleaned from protocols, decisions, and administrative instruments. For example, Chapter 18 of the COMESA Treaty highlights various areas where members agreed to cooperate and the specific actions they are required to take.[28] Article 32 requires members to coordinate and harmonise their policies concerning the export of crops, livestock, livestock products, fish and fish products, and forest products, while Article 131 commits Member States to ensure an adequate supply

[24] COMESA Policy on Intellectual Property Rights and Cultural Industries of the Common Market for Eastern and Southern Africa (2011). See particularly paragraphs 9 and 39(d) and (e) on harmonisation of industrial property legislation within COMESA in view of the establishment of the customs union of the Treaty Establishing the Common Market for Eastern and Southern Africa, 1994. Also see Articles 75, 104(1)(d), 103(1)(i), and 112(2)(n) of the COMESA Treaty.

[25]EAC Regional Intellectual Property Policy on the Utilisation of Public Health-Related WTO-TRIPS Flexibilities and the Approximation of National Intellectual Property Legislation,2013. Also see the EAC Seed and Plant Varieties Bill (SPVB),2018, which is entirely modelled on the UPOV 1991 Convention. The SPVB also diverges from the AU Model Law, which foregrounded Africa's small-scale farming history.

[26] See ECOWAS TRIPS Policy and Guidelines for the Implementation of TRIPS Flexibilities (2012) which aims to enhance access to medicines by fully incorporating TRIPS flexibilities into national legislation. to enhance access to medicines.

[27] The SADC Regional IP Framework and Guidelines, 2018, aim to enhance cooperation on IP issues to support industrialisation, trade, socioeconomic development, and the shift to innovation-driven knowledge economies in the region. In 2014, SADC endorsed the SADC Protocol for the Protection of New Varieties of Plants (Plant Breeders' Rights), pending full ratification. The instruments are mandated by Article 24 of the SADC Protocol on Trade, which requires Member States to implement IPR protection policies in line with TRIPS. See CB Ncube *Science, Technology & Innovation and Intellectual Property: Leveraging Openness for Sustainable Development in Africa* UCT Press (2021).

[28] Article 129 and 130, COMESA Treaty.

and availability of food by promoting agricultural development resulting in food surpluses, establishing sufficient storage facilities, and strategic grain reserves.

Chapter IV of the ECOWAS Treaty is dedicated to cooperation in the food and agricultural sectors. Article 25(2)(f) mandates Member States to work together to harmonise their food security policies, particularly through the establishment of regional food security agreements. Article 25 further specifies the measures members are to take to advance agriculture, forestry, livestock, and fisheries. Although IPR is not directly addressed in the ECOWAS Treaty, action in this area is undertaken pursuant to the provisions of Article 67, where Member States undertake to cooperate with each other in harmonising policies in areas not specifically mentioned in the Treaty for the efficient functioning and development of the Community.

The SADC Treaty on its part provides that Members shall cooperate in all areas necessary to enhance regional development and integration.[29] Food security, land and agriculture are some of the areas of cooperation specified in the Treaty. [30]

Apart from the RECs, Africa also has two IPR specialised organisations, that is, ARIPO and OAPI. The organisations comprise different Member States and adopt distinct approaches to IPR issues, including those related to agriculture. Under OAPI, PBRs are covered by the PVP annex of the revised Bangui Agreement,[31] which borrows from the UPOV 1991 Convention. ARIPO on the other hand addresses agricultural issues through its Protocol for the Protection of New Varieties of Plants (Arusha Protocol).[32] The Arusha Protocol establishes a regional system for PBR which provides plant breeders with exclusive rights over the production, reproduction, and commercialisation of their protected varieties with the intention to promote innovation in plant breeding. It also provides exceptions for smallholder farmers that allow them to save and replant seeds, balancing, to an extent, breeders' rights with the needs of Africa's predominantly small-scale agricultural sector.

[29] Article 21(1) SADC Treaty.
[30] Ibid Article 21(3)(a).
[31] Annex X of the revised Bangui Agreement concerning the protection of new varieties, 1999.
[32] ARIPO Protocol for the Protection of New Varieties of Plants (the Arusha Protocol). Adopted on July 6, 2015, in Arusha, Tanzania.

Similar to OAPI's PVP annex, the Arusha Protocol's PBR system conforms to UPOV standards and both establish standards and procedures for protecting new plant varieties in constituent countries.

In general, RECs have not made an intentional endeavour to integrate the treatment of IP, agriculture, and trade into a unified development strategy. As seen above, while there are instruments that emphasise IP, agriculture, and trade, they do so independently, and the direct connection with agricultural trade is not immediately apparent but rather indirectly inferred, implying that the current approach lacks a cohesive and strategic framework that directly integrates agriculture's key development levers, with the result that the areas are addressed in isolation of each other, resulting in missed opportunities for synergy and comprehensive development. Consequently, the potential benefits of coordinated policies and initiatives that could enhance agricultural trade and innovation more effectively are not fully realised. The current approach only leads to inefficiencies, reduced impact of policies, and slower progress in achieving the agricultural development goals.

5.4. Policy Measures

The foregoing discussion has shown that the IP space in Africa is fragmented, characterised by a multitude of instruments operating at both regional and continental levels, establishing a clear imperative to harmonise the disparate initiatives. The AfCFTA IP Protocol is primed for this role, specifically crafted to suit the unique African needs for which it is designed.

Yet, the immediate challenge confronting the AfCFTA IP Protocol lies in leveraging IP to stimulate intra-African trade to surpass current levels. Despite an upward trend, studies tell that intra-African trade falls behind its optimal potential. [33] In 2017, intracontinental trade stood at approximately 17 per cent, a stark contrast to Europe (69 per cent), Asia (59 per cent), and North America (31 per cent).[34] However, there is considerable scope for growth, particularly in trade involving IP-intensive goods which have the potential to bolster agricultural exports and make substantial contributions to the economic growth of countries.

An essential policy measure is the expansion of the technology base of countries as a key framework condition for innovation-led agricultural development. The prescriptions made

[33] V Songwe '*A Continental Strategy for Economic Diversification through the AfCFTA and Intellectual Property Rights'* (2020).
[34] Ibid.

in this thesis rely almost entirely on countries strengthening technological capabilities, as this is crucial for making IPR and sector-specific policies more effective. Before analysing the proposed policy measures, it is vital to suggest that countries dwell on building their technology base and developing a technology transfer strategy to enable them to move technological capabilities along the relevant stages; from technology importation to indigenous R&D and home-grown solutions. The current low technology base implies that the basic knowledge required for breakthroughs is lacking, since innovations are often built upon existing technological knowledge. The absence of a solid technological base limits the ability of countries to create novel solutions to challenges and may impede overall progress. Therefore, a technology growth and transfer strategy for countries, along with a Pan – African R&D strategy proposed in section *4.5.5* are essential to boost development prospects.

Equally important are policies specifically designed to support sector growth. IP policies that encourage innovation, trade policies that aim to reduce barriers, harmonise standards, improve logistical efficiency, expand market opportunities, and facilitate the global exchange of agricultural technologies, along with policies in education, taxation, environment, and infrastructure, are vital in strengthening agricultural capabilities. It is therefore necessary to integrate these elements into a cohesive strategy to maximise the sector's growth potential, particularly so since the elements collectively interact with one another to create an interdependent system of change. The specific contributions of policies in IP, innovation, trade and agriculture merit closer examination.

5.4.1 Innovation Policy

Innovation is essential for the successful implementation of Agenda 2063, as it intersects various sectors and requires integration into multiple policy areas. Its critical importance is acknowledged by several countries that have developed national legislation, policies, and strategies to support R&D and innovation. Archetypal innovation policies often include provisions for funding R&D activities, establishing research institutions, promoting innovation, and the protection of IPR. At the continental level, STISA outlines the strategic priority areas for scientific research, technology development, and innovation, intricately linked with Africa's overarching development objectives as articulated in Agenda 2063.[35]

[35] See STISA 2024 and soon, STISA 2034.

Nationally, countries like South Africa, Kenya, Nigeria, Rwanda, and Ghana have implemented various policies and frameworks to promote R&D and innovation. For instance, South Africa developed the National Research and Development Strategy[36] and the White Paper on Science and Technology,[37] which provide strategies for R&D funding, establishment of research institutions, innovation promotion, and IPR protection. Similarly, Kenya's National Science, Technology, and Innovation Policy[38] offers a structure for R&D and innovation, while Nigeria's National Science, Technology, and Innovation Policy[39] details strategies for R&D, innovation, and technology advancement. Rwanda, Ghana and several others also have their own STI policies.[40]

While there are diverse approaches African countries employ to advance R&D and innovation (national laws, policies, and strategies), it's important to note that such policies and strategies are not always developed with the explicit intention of alignment, complementarity, and mutual support to agriculture, hence the perpetual slow progress of the sector.

Countries that have a strong agricultural underpinning could consider mainstreaming innovation priorities into overarching policy frameworks such as NDPs, NAIPs, strategies, and sectoral policies. Since innovation is the glue that connects all aspects of development, it should be seamlessly integrated into the core components of key national strategies, with the ultimate goal of spanning across all sectors. The rationale for mainstreaming is twofold. First, innovation intersects with various sectors such as agriculture and industry. A cohesive innovation policy would allow countries to maximise synergies between these sectors. Secondly, innovation can induce development by addressing interrelated challenges and opportunities in different sectors.

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[36] South African Department of Science and Technology *National Research and Development Strategy*, 2002.
[37] White Paper on Science and Technology 2019. Also see the first White Paper on Science, Technology and Innovation, 1996.
[38] Government of Kenya *Validates Science, Technology, and Innovation Policy* (2024). Available at: *https://www.kenyanews.go.ke/kenya-validates-the-first-science-technology-and-innovation-policy/* (accessed 15 May 2024).
[39] National Science, Technology and Innovation Policy, 2022.
[40] See for example, Rwanda's Science, Technology and Innovation Policy, 2020.

5.4.2 IP Policy

While IPR may not be the primary driver of agricultural development, it provides essential infrastructure that promotes innovation and progress in the sector. IPR intersects with agriculture in multiple ways, including the development of new crop varieties, advanced technologies such as farming equipment, precision agriculture, data-driven smart farming, and other technological processes. It is contended that with the appropriate tailoring of measures, the IP system can act as an important policy instrument to boost agricultural development to fulfill the goals and aspirations of African countries as outlined in Agenda 2063.

Unfortunately, the lack of clear IP policy guidelines, the non-integration of IP into national science, technology, and economic development plans, the absence of IP laws tailored to individual country specific needs, weakness of institutions administering IP, and inadequate awareness of the IP system have all contributed to the minimal impact of IP on development and socio-economic progress.[41]

5.4.3 Agricultural Policy

At the continental level, CAADP represents the agricultural policy for the continent, and provides the structure and principles for national implementation. Each country develops its NAIP as a key instrument for implementing CAADP. NAIPs outline the country's strategic priorities, investment needs, and policy reforms in the agricultural sector, in line with the four CAADP pillars.[42] Obstacles such as lack of policy coherence and coordination, limited resources, and poor political commitment however hinder the translation of CAADP policy commitments into tangible results. Agricultural transformation at national level will require the coordination and consistency of policies in different sectors, levels of government, and policy spheres to achieve common objectives and maximise positive outcomes.

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[41] For a discussion on how the non-integration of IP into national plans and the lack of tailored IP laws hinder socio-economic progress in LDCs See United Nations Conference on Trade and Development. *The least developed countries report 2007: Knowledge, technological learning and innovation for development* (2007). On inadequate IP awareness and institutional weaknesses as key factors limiting IP's contribution to economic growth and development, see WIPO *Intellectual Property and Development: The Role of IP in Economic Growth and Development* (2011), available at https://www.wipo.int/edocs/pubdocs/en/intproperty/944/wipo_pub_944_2011.pdf (accessed June 8, 2024).

[42] The four CAADP pillars are: (1) sustainable land and water management, (2) improved market access, (3) increased food supply and reduced hunger, and (4) agricultural research and technology adoption.

The complex challenges in agriculture require multidisciplinary solutions that leverage knowledge and expertise from diverse areas, and the input of various stakeholders. Agriculture, and the policies that support it, including IP, innovation, trade, investment, competition, SME, immigration, education, taxation, and allied policies essential for achieving agricultural growth must be brought in line with agricultural policy at formulation and implementation stages, and resources sufficiently mobilised for development goals.

5.4.4 Trade, Investment, and Competition Policies

Trade plays a key role in advancing agriculture as it has potential to amplify agricultural outcomes, in cases where the right trade policies are formulated and implemented. The AfCFTA marks an important step toward establishing a competitive market for agricultural goods.[43] Alongside this monumental initiative, countries have to design and implement policies that promote progression in agriculture, to pave the way for transformation of the sector.[44] However, countries lack the necessary policy perspective and instruments to convert the gains in trade negotiations to actual benefits[45] (specifically, countries need to identify and address the strategic bottlenecks in the sector so as to produce more competitive products and increase trade). Whereas the sector is promising, the opportunities remain largely aspirational unless countries take active steps to transform their agriculture, fulfil their trade commitments, and establish the requisite trade infrastructure.

The dismal performance of intra-African and global trade estimated at 15 per cent[46] and 3 per cent respectively[47] indicates that the continent needs to undertake reforms to scale up productivity especially in its niche sector (agriculture), while linking its production and trade

[43] For the AfCFTA to succeed, countries must eliminate the trade barriers that hinder the integration agenda, to allow them to emerge as key global suppliers of goods and fully capture the benefits of trade.
[44] MM Tenywa et al *Agricultural Innovation Platform as a Tool for Development Oriented Research: Lessons and Challenges in the Formation and Operationalisation* (2011).
[45] JO Mugabe 'Science, technology and innovation in Africa's regional integration: From rhetoric to practice' (2011). Also see BM Hoekman, A Mattoo & P English (eds) *Development, Trade, and the WTO: A Handbook* World Bank Publications (2002).
[46] TRALAC *Intra-Africa Trade: Facts and Figures* (2022).
[47] S Farhat *'Expanding African trade to boost growth and reduce poverty'* World Bank (2022), available at *https://www.worldbank.org/en/news/feature/2022/02/10/expanding-african-trade-to-boost-growth-and-reduce-poverty* (accessed 8 June 2024).

to the global economy.[48] If it does so, it stands to gain from unlimited demand of agricultural products, along the agricultural value chain.[49]

It is imperative for countries to realise that agricultural outcomes are affected by policy and regulations in a number of areas, including areas outside the agricultural sector itself such as IP, trade, investment, competition, industry, education,[50] labour and taxation policies. The so-called allied policies are key in sculpting the agricultural landscape as they affect production, commerce, and market dynamics. Therefore, stakeholders in allied sectors need to be extensively engaged during the design of agricultural policies and their roles in the realisation of the policy agenda clarified.

In the trade sector for instance, tariffs, quotas, and Non-Tariff Barriers (NTBs)[51] dictate the degree of market penetration for agricultural commodities, while high tariffs and stringent Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) measures may restrict market entry. While lowering these barriers can broaden market access and enable producers to reach wider and more varied markets, technocrats in the trade sector must have this perspective while developing their sector policies so that they do not unduly burden agricultural trade. At the continental level, the AfCFTA aims to dismantle NTBs by offering specific guidelines for SPS measures in Annex 7,[52] TBT in Annex 6,[53] and trade facilitation in Annex 4, although their effectiveness in promoting agricultural trade remains to be seen.

It is also important for trade policies to be designed in a manner that enhances agricultural regional value chains. Here, IP plays a special role, as the insertion into value chains requires the development of innovative competitive products. An agricultural value chain refers to the series of actors and activities involved in bringing a basic agricultural

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[48] S Coulibaly, W Kassa, AG Zeufack (eds) *Africa in the New Trade Environment: Market Access in Troubled Times* World Bank Publications (2022).
[49] Ibid.
[50] See F Cinnirella & J Streb J 'The role of human capital and innovation in economic development: Evidence from post-Malthusian Prussia' (2017) 22(3) *Journal of Economic Growth* 193–227; J Shambaugh, R Nunn & B Portman 'Eleven facts about innovation and patents' (2017) *Economic Facts - The Hamilton Project* 1; and World Trade Organisation *World Trade Report 2020: Innovation Policy, Trade and the Digital Challenge* (2020).
[51] Article 1(e) of the AfCFTA Protocol on Trade in Goods defines NTBs as barriers that impede trade through mechanisms other than the imposition of tariffs.
[52] Agreement on Sanitary and Phyto Sanitary Measures (SPS) - Annex 7 of the Protocol on Trade in Goods of the African Continental Free Trade Area.
[53] Agreement on Technical Barriers to Trade (TBT) Annex - 6 of the Protocol on Trade in Goods of the African Continental Free Trade Area.

product from the field to the final consumer, with value being added at each stage of the production process.[54] It encompasses primary production, transformation, marketing, and final consumption.[55]

Trade policies should be designed to strengthen regional agricultural value chains which are essential for promoting agricultural development,[56] with IP playing an indispensable role. Regional value chains involve the production and export of finished agricultural products within the region, which offers countries the opportunity to leverage local trade and markets, enhance their competitive advantage, and produce and export higher-value goods.[57] As countries improve the value of their agricultural products, the ability to secure IP protection for innovations is increased, which in turn supports intra-regional trade, diminishes dependence on food imports, and catapults agricultural trade.

Last, the AfCFTA ambitiously aims for a zero-tariff rate on 90 per cent of tariff lines, employing a phased approach over ten years for LDCs and five years for other countries. [58] Upon dismantling tariffs, the true measure of success in agricultural trade will depend not only on the reduction of tariffs but also on the effective management of NTBs and NTMs, alongside persistent challenges related to high trade and logistics costs.[59] While the agreement includes important provisions such as mutual recognition of standards and licences, harmonisation of SPS measures, rules of origin, establishment of a Pan-African payment and settlement system, all of which are expected to benefit SMEs, many systemic challenges remain entrenched. The extent to which such issues can be resolved will determine the AfCFTA's impact on agricultural trade.

Countries must also legislate appropriately in the areas of investment and competition by designing investment policies that facilitate foreign investment and the transfer of agricultural technologies, while ensuring that IP laws and competition policies work in tandem

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[54] UNCTAD *African Continental Free Trade Area: Developing and Strengthening Regional Value Chains in Agricultural Commodities and Processed Food Products* (2016).
[55] UF Ugwu *Harnessing the Multilateral Patent and Plant Variety Protection Regimes to Advance Food Security: Implications of the EU-ECOWAS Economic Partnership Agreement* South Centre, Geneva (2022).
[56] Decision on the Summit on Food Security in Africa, Abuja, Nigeria - (Doc. Assembly/Au/6 (Viii)
[57] UNCTAD 'From regional economic communities to a continental free trade area: Strategic tools to assist negotiators and agricultural policy design in Africa' (2018).
[58]OECD/FAO *OECD-FAO Agricultural Outlook 2024–2033* OECD Publishing (2024).
[59] Ibid.

to encourage fair competition and prevent the abuse of IP, which could otherwise stifle innovation. Article 40 of the TRIPS Agreement allows states to prevent the abuse of IP through anti-trust legislation. Additionally, competition policies aimed at easing market entry and lowering barriers should be explored for efficiency. The AfCFTA Protocol on Investment and the AfCFTA Protocol on Competition are expected to play key roles in achieving these goals.[60]

5.4.5 Environmental Policy

Environmental policy warrants particular attention, especially where it intersects with innovation, IP, agriculture, and trade. Africa is confronted with challenges adapting to and mitigating climate change as it strives to improve agricultural productivity under fluctuating environmental conditions, while also aiming to reduce greenhouse gas (GHG) emissions.[61] Climate has obvious and direct effects on agricultural production. GHG implications of agriculture are also obvious and large.[62] Innovative agricultural practices and technologies can be important in climate change mitigation and adaptation, with IP encouraging their development and diffusion. At the same time, trade policies can support the adoption of these innovations by promoting the purchase and preference of eco-friendly products.

Agenda 2063 must be pursued with environmental considerations at the forefront. Environmental policies should act as drivers of innovation by setting standards, regulations, and incentives that encourage the development of cleaner technologies and sustainable methods. Policy frameworks that offer incentives like tax deductions for R&D in environmental technologies have potential to spur innovation in the agricultural sector. In the trade sector, for instance, countries that impose environmental standards on imports influence trade patterns and strategies for market entry by exporters. Blending environmental considerations into sector-wide policies is key to the reduction of environmental degradation, and encouraging the growth of greener economies, an area where Africa has historically placed modest emphasis.[63]

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[60]The AfCFTA Protocols on Investment and Competition were adopted by African Heads of State in February 2023 at the 36th African Union Summit in Addis Ababa, Ethiopia.

[61] T Lybbert & D Sumner *'Agricultural technologies for climate change mitigation and adaptation in developing countries: Policy options for innovation and technology diffusion'* (2010).

[62] Climate has obvious and direct effects on agricultural production. Greenhouse gas (GHG) implications of agriculture are also obvious and large.

[63] See IA Adekunle 'On the search for environmental sustainability in Africa: The role of governance' (2021) 28(12) *Environmental Science and Pollution Research* 14607–14620.

In sum, the alignment of policies in agriculture, IP, innovation, and trade, coupled with the coordination of allied policies in areas such as industry, environment, investment and taxation is important for Africa's technological progress as it enables different sectors to converge to address challenges, leverage opportunities, and achieve holistic development goals.

5.5 The Case for Inter – Policy Coherence

In Africa, policymakers face numerous challenges in formulating, executing, and implementing policies. Often, there is a lack of coherence and coordination during the policy-making and implementation processes. For instance, while the agriculture and trade ministries may collaborate in developing sectoral policy frameworks like the NAIPS or national export strategies, such cooperation frequently disintegrates during execution.[64] A persistent issue is the absence of ongoing collaboration necessary for the coordinated implementation of policies.

Policy coherence is defined by the OECD as the systematic promotion of mutually reinforcing policy actions across government departments and agencies, creating synergies toward achieving the agreed objectives.[65] It aims to ensure that policies are aligned so that efforts in one area do not undermine efforts in another to be able to achieve development goals, address complex challenges, and maximise synergies.[66] It is used by governments to reduce conflicts and strengthen the cumulative effect of their actions.

Inter-policy coherence is key for the agricultural sector to effectively tackle its widespread challenges. Coherence must be achieved for policies in agriculture, innovation, IP, and trade, while allied policies in education, industrialisation, immigration, investment, and taxation would require coordination, setting the stage thus for a discussion of Whole-of-Government Approach in the next section.

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[64] FAO and ECDPM. '*Policy coherence for agricultural transformation in African least developed countries (LDCs): aligning agriculture and trade policymaking processes'* (2018).
[65] OECD *Building Blocks for Policy Coherence for Development* Paris: OECD (2009).
[66] African Union: Continental Agribusiness Strategy Framework Document - Driving Africa's Inclusive Growth' (2012).

5.6 Cross – Sector Collaboration and the Idea of the Whole-Of-Government Approach

IP, innovation and agricultural issues need to be championed by a multi-sectoral coalition of MDA's composed of ministries responsible for scientific research, agriculture, trade, industry, education, finance, economic development and planning, etc., following what is known as a Whole-of-Government Approach, or joined-up government.

The Whole-of-Government Approach[67] is a holistic strategy that involves all relevant government MDAs working together towards a common goal, in this case, promoting agricultural growth and development.[68] In this approach, the government actively uses formal and informal networks in the different agencies within the government to coordinate the design and implementation of a number of interventions to increase the effectiveness of those interventions in achieving the desired objectives.[69] As a concept, it emphasises the need for greater collaboration and coordination across departmental boundaries to eliminate duplication, maximise resources and create complementarities among agencies.[70] Agriculture, IP and innovation merit special attention in a Whole-of-Government approach.

The approach is recommended for the agricultural sector given its pervasive challenges earlier discussed. Addressing the challenges requires joined-up thinking (policy-making at the center) and joined-up working to achieve a shared vision.[71] With this approach, all stakeholders have the same vision and buy–in, as well as the same strategic priorities and are consulted at the agenda-setting stage and throughout policy development and implementation.[72] The approach recognises that agriculture is not solely the responsibility of the agriculture ministry but requires multidimensional efforts. A key benefit of this approach is the removal of silos, i.e., MDAs working in isolation of one another, to achieve seamless government.[73] Moreover, it aims to avoid having different policies cut across and undermine each other, and maximises

[67] C Pollitt 'Joined-up government: A survey' (2003)1(1) Political *Studies Review* 34–49.
[68] T Christensen & P Laegreid *The Whole-of-Government Approach–Regulation, Performance, and Public-Sector Reform* (2006).
[69] F Stepputat & L Greenwood *'Whole-of-government approaches to fragile states and situations'* (2013).
[70] Ibid.
[71] A Colgan, L Kennedy & N Doherty '*A Primer on Implementing Whole of Government Approaches'* Dublin: Centre for Effective Services (2014).
[72] Ibid.
[73] F de Bri, F Bannister ' Whole-of-government: The continuing problem of eliminating silos' *In Proceedings of the 10th European Conference on eGovernment*, National Centre for Taxation Studies and University of Limerick, Ireland (2010) 122–133.

the impact of government by using all the instruments at the disposal of the State in an integrated way in support of particular outcomes.[74]

The fact that agricultural transformation depends on linking policy development and implementation at several levels of public policy and several actors within and outside government, the approach would allow policy implementation to go beyond a single ministry, department or agency. It also carries a reduced risk of failure to meeting planned objectives.[75] Just as agriculture merits special attention in a whole-of-government approach, so too, do IP and innovation policies, due to their cross-cutting nature and role in advancing other sectors. IP and innovation underpin progress in various sectors as they influence economic policies, regulatory frameworks, educational strategies, among others.

The Whole-of-Government Approach, however, does not necessarily suit all circumstances and is considered appropriate in the agricultural sector due to the deeply rooted challenges that can only be effectively addressed through policy mainstreaming and collaboration among institutions.[76] It is also recommended for IP and innovation policies due to their cross-cutting nature and role in the development of other sectors.

5.7 Conclusion

This chapter has demonstrated how innovation, IP, and trade-related legal and policy frameworks can synergistically support agricultural development. It highlighted the necessity of coherent policies in agriculture, IP, and trade, and emphasised the need to coordinate these with complementary measures in areas such as industry, competition, investment, tax, and the environment.

[74] Ibid.
[75] Stepputat & Greenwood Supra (2006).
[76] Bri& Bannister (2010) Supra.

CHAPTER 6

MODEL FRAMEWORK FOR IP PROTECTION TO ENHANCE AGRICULTUAL PRODUCTIVITY IN AFRICA

6.1 Introduction

This chapter addresses the fourth research question which examines the legal frameworks and policy measures essential to achieve the agricultural objectives of Agenda 2063. The backdrop of the discussion is the acknowledgment that extant IP laws, as examined in Chapters Three, Four, and Five fall short in supporting agricultural advancement in Africa. Many countries have adopted IP protection standards that exceed their TRIPS obligations, and several have implemented PVP systems modeled on UPOV, often without adequate consideration of local needs. It emphasises the need for IP laws to be responsive to the socioeconomic realities of each country and calls for a strategic determination of the optimal mix of legal and policy instruments to support progress of the sector.[1]

The key contribution of the chapter is the formulation of a pro-development TRIPS-compliant IP framework that countries can adopt to meet their developmental goals. Section 6.2 outlines the basic quality requirements for an ideal IP legal framework, while Section 6.3 details its components. Section 6.4 examines the legal underpinning for a pro-development legal framework. Section 6.5 elaborates on the specifics of the framework, and emphasises the implementation of legal regimes that utilise TRIPS flexibilities. Section 6.6 discusses the need for *sui generis* IP legislation, as allowed by Article 27(3)(b) of TRIPS, including the protection of TK and traditional cultural expressions (TCEs). Section 6.7 cautions against a generalist one-size-fits-all approach, and Section 6.8 concludes the chapter.

[1] Scholars argue that TRIPS was a compromise between developed and developing countries, but it has been detrimental to the latter in some respects (See JF Duffy 'Harmony and Diversity in Global Patent Law' (2002) 17 *Berkeley Tech. LJ* 685, 695; CAD Wilson ‘The TRIPS Agreement: is it beneficial to the Developing World, or Simply a Tool used to Protect Pharmaceutical Profits for Developed World Manufacturers’(2005): 243 *J. Tech. L. & Pol'y* 10 and G Ghidini 'On TRIPS impact on "least developed countries": The effects of a double-standard approach' In G Ghidini, JR Rudolph & PM Ricolfi (eds) *TRIPS and Developing Countries: Towards a New Intellectual Property World Order?* Cheltenham: Edward Elgar Publishing (2014).

6.2 Constructing an Ideal Pro-Development IP Legal Framework

The WTO was initially established by 128-member countries.[2] Formulating the trade agreements within the WTO necessitated a careful balancing of the varied interests of its Members. In the case of the TRIPS Agreement, the WTO prescribed strict enforcement of IPR and also standardised IP protection worldwide, driven by the economic theory that robust protection would enable firms in developing countries to attract greater investment opportunities and access innovative technologies through licensing more readily.[3]

However, the adoption of stringent IPR standards has often led to increased costs of agricultural inputs, limited access to patented technologies and restricted use of farmer-saved seeds, prompting the need for the strategic use of the built-in flexibilities designed to ease the Agreement's stringent requirements, and for reforming national IP laws to better serve local priorities and socio-economic conditions. The framework proposed in this chapter aims to assist countries in developing IP systems that are configured to account for the factors outlined in section *3.6.4.* Specifically, it advocates for frameworks attuned to national realities, while incorporating best practices to create IP regimes that suit each country's unique circumstances.[4]

6.2.1 The Basics of a legal framework

A legal framework is defined as a comprehensive system of rules that govern decision-making.[5] It comprises laws, policies, administrative and enforcement structures. To fuel the technological innovation necessary for transformation, a legal system and environment that both incentivises and protects innovative outcomes is necessary.[6]

The TRIPS flexibilities, and the provisions under Articles 27, 30, and 66 offer essential tools for African countries to tailor their IPR regimes to meet local needs. Article 7 emphasises the importance of IPR systems in contributing to socioeconomic development and public

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[2] For countries that signed GATT by 1994, see https://www.wto.org/english/thewto_e/gattmem_e.htm (accessed 13 December 2023).

[3] See DM Fox, 'Technology transfer and the TRIPS Agreement: Are developed countries meeting their end of the bargain?' (2019) 10 *Hastings Sci. & Tech. LJ* 1 (citing KE Maskus & RL Okediji, *Intellectual Property Rights and International Technology Transfer to Address Climate Change* 1 (Int'l Ctr. for Trade and Sustainable Dev., Issue Paper No. 32, 2010).

[4] Ibid.

[5] World Law Dictionary Project, Translegal Dictionary, online: https://www.translegal.com/legal-english-dictionary/legal-framework.

[6] M Guo et al 'Integration mechanism of intellectual property and scientific and technological innovation from a cross-domain perspective: International experience and enlightenment' (2023) 12 *Frontiers in Business, Economics and Management* 26–32.

welfare, while Article 8 builds upon these goals by explicitly allowing members to create laws and regulations that support public interest goals. Together, the provisions, along with the TRIPS preamble reflect the negotiated compromise between developed and developing countries during the establishment of the WTO. Therefore, countries need not hesitate to use them to their advantage.

In conjunction with these flexibilities, the implementation of *sui generis* systems for PBR and TK is essential. *Sui generis* PBR frameworks need to be customised to accommodate longstanding agricultural practices and ensure that while plant breeders enjoy protection for their innovations, farmers' rights to save, use, exchange, and sell seeds are preserved so as to support food security and encourage sustainable agricultural practices. Similarly, *sui generis* TK frameworks should be developed to protect TK from exploitation, promote cultural preservation, safeguard biodiversity and ensure equitable benefit sharing within communities. In relation to TK, Chidi Oguamanam observes that despite its presumed importance and Africa's active advocacy for indigenous knowledge in international forums, it remains marginal in key legal instruments, possibly reflecting a lingering colonial-era disregard for indigenous knowledge systems.[7] As such, there must be a deliberate effort to legislate effectively in this area.

The framework should be comprehensive, coherent, and compliant with international standards and domestic legal principles. The fundamental principles of a legal framework include legality, effectiveness, efficiency, subsidiarity, and proportionality. Legality implies the need for laws governing IP to be harmonised with constitutional principles, international treaties, and established legal norms.[8] They should also be effective and efficient so that they can achieve their intended objectives without undue complexity or bureaucratic hurdles.[9] Subsidiarity and proportionality emphasise the importance of addressing issues at the appropriate level of governance, and ensuring that legal actions are commensurate with the challenges they seek to address.[10] Practicality and enforceability imply IP laws must be

[7] C Oguamanam 'A critical examination of the African legal framework for indigenous knowledge' (2023) 67(1) *Journal of African Law* 1-21.
[8] V Aitken 'An Exposition of Legislative Quality and Its Relevance for Effective Development' (2013) *ProLaw Student Journal* 2 (2013): 1-43.
[9] Ibid at 4–6.
[10] Ibid. Also see U Karpen 'Efficacy, effectiveness, efficiency: from judicial to managerial rationality.' *Rational Lawmaking under Review: Legisprudence According to the German Federal Constitutional Court* (2016): 295–313.

practical to implement and enforce, with clear mechanisms for resolving disputes and enforcing rights.

Harmonisation with international, regional, and sub-regional agreements is essential to ensure consistency and cooperation among jurisdictions. Simplicity, clarity, and accessibility further enhance the effectiveness of the legal framework, making it understandable and navigable by all stakeholders.

Countries considering the implementation of *sui generis* legislation or utilising TRIPS flexibilities in their patent laws and regulations should have a clear understanding of the objectives and the outcomes they reasonably seek to accomplish. Preparatory guidance is provided in section *3.6.4*, and briefly reiterated below. Once the policy objectives are well-defined, it becomes easier to formulate the appropriate rules.

6.3 Essential Components of a Pro-Development National IP Legal Framework and Policy

In designing a national IP legal framework that supports the development of key sectors, several essential elements must be considered. First, a comprehensive assessment of the country's socioeconomic profile, including its development goals should inform both the legal and policy design processes. Secondly, an IP audit should be undertaken to assess the current state of IP legislation and institutional capacity. The audit's findings are essential in identifying gaps and areas requiring improvement, such as mechanisms for technology transfer and licensing. Finally, the IP laws and policies must align with the national development agenda and be harmonised with relevant international, regional, and continental obligations to ensure both coherence and effectiveness.

Once the above considerations have been incorporated, it becomes feasible to engage with the main policy issues such as maximising the utilisation of the TRIPS flexibilities and nurturing local R&D and technological capabilities. Particular attention should be given to agriculture, with focus areas including biotechnology, genetic resources, PBR, and the effective protection of TK.

In general, the following key issues should be considered in the formulation of IP law and policy:

(1) Comparison Shopping

(2) Coherence with related national and international laws such as the CBD, ITPGFA, Nagoya Protocol and proximate human rights instruments.
(3) Utilisation of TRIPS flexibilities.

6.3.1 Comparison Shopping

An examination of the IP strategies of various countries, as illustrated in Chapters Three and Four with examples from China and Korea shows that technological advancement fundamentally depends on the establishment of a legal system predicated on local developmental realities.[11] While it is essential to base IP strategies on a country's specific realities, it is equally important to draw on the best practices and approaches from all sources.[12] Noteworthy examples in the area of PBR include India, Thailand, Malaysia, and Bangladesh, which are discussed further below. The emphasis should be on indigenous innovation and applying these insights for national benefit to help shape an IP legal framework with national characteristics.

6.3.2 Coherence with National and International Laws

It is essential to harmonise domestic IP law with international commitments. African countries are signatories to a number of international agreements including non-IP treaties such as the CBD, Nagoya Protocol, ITPGRFA, Universal Declaration of Human Rights (UDHR),[13] and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)[14], etc. The instruments remain binding upon them and must be executed in good faith based on the general international law principle of "*Pacta Sunt Servanda."*[15] Treaties that address the same subject matter as IP regulations such as those governing plants and genetic resources (Nagoya Protocol, CBD and ITPGRFA) should be considered when interpreting regional and multilateral IP agreements,[16] and in the design of national legal frameworks. National frameworks should integrate the obligations in these agreements regarding ABS, PIC for access to genetic material,

[11] M Guo et al (2023) Supra at 26–32.
[12] Ibid.
[13] See Universal Declaration of Human Rights, 1948. Article 25 recognises the right to an adequate standard of living, including food, clothing, housing, and medical care.
[14] See the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), 2007, which affirms indigenous people's rights to maintain their systems, secure subsistence, and engage in economic activities (Article 20), as well as their rights to traditionally owned, occupied, or used lands, territories, and resources (Article 26).
[15] Article 26 VCLT
[16] Articles 30 & 31, VCLT.

and state sovereignty,[17] particularly because they address the needs of Africa's farming and non - farming communities.

Because IPRs are regulated by a mix of multilateral and regional laws with varying objectives, conflicts sometimes arise between the agreements. Examples include the provisions of the AfCFTA IP Protocol (Article 18 and 20), Articles 15 and 8(j) of the CBD,[18] Article 9 of the ITPGRFA and the African Model Law,[19] which conflict with UPOV. Particularly, breeders under UPOV are seen as restricting traditional farmers' rights to save, re-use, and exchange seeds either individually or collectively. Resolving such conflicts necessitates the application of conflict resolution principles under general international law. [20] For instance, the principle of interrelatedness and mutual supportiveness of rights[21] mandates that IP agreements be interpreted in a manner that upholds human rights and promotes sustainable development. [22]

In addition to IP-specific regulations, extrinsic legal frameworks that influence the functioning and effectiveness of IP regimes such as the International Covenant on Economic, Social and Cultural Rights (ICESCR), [23] the African Charter on Human and Peoples' Rights (ACHPR), and competition laws, must also be considered in the design and implementation of IP laws.

The framework proposed below is seamlessly harmonised with current international and regional IP laws, including the TRIPS Agreement and the AfCFTA IP Protocol. It integrates the flexibilities of TRIPS Articles 7 and 8, Article 27(3)(b) (*sui generis*), and Article 23(1) of the AfCFTA IP Protocol. It accommodates TRIPS provisions both *ex-ante,* allowing

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[17]See Article 15 of the CBD which requires Parties to take legislative administrative, or policy measures to share benefits from R&D and commercialisation equitably and based on mutually agreed terms.

[18] Refer to the Joint Communications from the African Group and African countries to the WTO in the following documents: *IP/C/W/404*, *IP/C/W/206*, *IP/C/W/163*, *IP/C/M/40*, paras. 76-79; Kenya, *IP/C/M/47*, para. 68; IP/C/M/36/Add.1, para. 233; and IP/C/M/28, para. 144.

[19] SI Strba 'Legal and institutional considerations for plant variety protection and food security in African development agendas: Solutions from WIPO?' (2017) 12 *Journal of Intellectual Property Law & Practice* 191-205.

[20]UF Ugwu *Harnessing the Multilateral Patent and Plant Variety Protection Regimes to Advance Food Security: Implications of the EU-ECOWAS Economic Partnership Agreement* South Centre, Geneva (2022).

[21] See art 31(3)(c) VCLT; and the Vienna Declaration and Programme of Action which states that "all human rights are universal, indivisible, and interdependent and interrelated."

[22] See HG Grosse Ruse-Khan *The Protection of Intellectual Property in International Law - An Introduction* Oxford University Press (2016), Available at SSRN: *https://ssrn.com/abstract=2836644* (accessed June 15, 2024).

[23] See C Oguamanam 'Intellectual Property and the Right to Adequate Food: A Critical African Perspective' (2015)23 *African Journal of International and Comparative Law* 503-525. The author draws attention to the necessity of developing context-sensitive agricultural policies in the service of the human right to adequate food by drawing inspiration from developing countries that have maintained the primacy of the right to health over unfavorable patent laws.

flexibility in patentability criteria and transition periods during patent consideration, and *ex-post*, concerning rights granted post-patent approval. Additionally, it provides insights into the necessary provisions for sui generis PBR legislation and acknowledges key environmental treaties such as the CBD and ITPGRFA, effectively embedding a sustainability dimension into the framework.

6.4 Model IP Framework to Advance Agricultural Innovations in Africa

The structural components of a tailored framework are summarised in the table below and discussed in detail under section *6.5* and *6.6.*

6.4.1 Structural Components of the Proposed Legislative Framework.[24]

Table 1: Flexibility and Legislative Rationale

Category	Flexibility	Legislative Rationale	Provision
***Ex-ante* Flexibilities**	Transition Periods	Allow countries time to develop and adapt their IP systems.	Articles 65 and 66
	Definition of Invention	Prevent the appropriation of naturally existing subject matter.	Article 27
	Patentability Requirements	Avoid patents on minor developments to safeguard competition	Article 27(1)
***Sui Generis* Plant Variety Protection (PVP)**	Calibrated PBR Regimes	Address regional agricultural needs.	Articles 27(3)(b) and 8 of the AfCFTA IP Protocol
***Ex-Post* Flexibilities**	General Exceptions (Research Exception)	Allow research on patented inventions to support follow-on innovation.	Article 30
	Bolar Exception	Facilitate the entry of generic competitors after patent expiry.	Article 30
	Parallel Imports	Enable access to products at lower prices, promoting competition.	Articles 6 and 31
	Compulsory Licenses	Address anti-competitive practices and enable local exploitation of patented inventions	Articles 8, 31 and 40.
Additional Considerations	Utility Models	Increase opportunities for innovation.	Article 1(2) of the Paris Convention and Article

[24] Some aspects are derived from CM Correa & RM Hilty *Access to Medicines and Vaccines: Implementing Flexibilities Under Intellectual Property Law* Springer Nature (2022).

Category		Flexibility	Legislative Rationale	Provision
				13 of the AfCFTA IP Protocol.
		Traditional Knowledge and Cultural Expressions	Protect traditional knowledge and cultural heritage	Articles 18–20 of the AfCFTA IP Protocol.
Extrinsic Frameworks	Legal	Human Rights Laws (Right to Food and Health)	Ensure IP protection does not infringe on the rights to food and health by restricting access to essential goods.	Article11(1) & (2), 12(1) and 12(2)(c) ICESCR; and Article 16(1) and (2) ACHPR.
		Competition Law	Prevent the misuse of IP rights and ensure that IP does not stifle market entry or exacerbate inequality.	See for example Section 21&24 of the Kenya Competition Act (2010) on Prohibition of Anti-competitive Practices and Unfair Trade Practices.

6.4.2 Legal Underpinnings for a Pro – Development framework

An alternative approach to IP governance revolves around two key considerations that require the adoption of pro-development legal frameworks.

(a) Utilisation of TRIPS flexibilities

(b) Establishment of *sui generis* IP regulations pursuant to Article 27(3)(b) of TRIPS.

Proposals for PVP have included normative solutions within UPOV, FAO, CBD in the design of *sui generis* regimes.[25] Considering that many African countries are LDCs, it's important to ensure that IP regulations on the continent are flexible enough to accommodate significant variations, particularly to promote priorities like agricultural development.[26] The flexibility should also extend to the interpretation of IP provisions in light of international legal obligations relating to human rights, sustainable development, and biodiversity.

The TRIPS Agreement offers opportunities for a pro-development approach in the formulation of IP legislation through provisions that allow for the flexibilities, extensively canvased in Chapter Three. To reiterate, flexibilities entail the allowance (policy space) for maneuver granted to States to calibrate their domestic IP regimes. According to WIPO, the

[25] Strba (2017) Supra.

[26] See African Group *'Proposal by the African Group for a WIPO work program on patents and health'* (SCP/24/4) WIPO Standing Committee on the Law of Patents, 24th Session, Geneva, 2016. Available at *https://www.wipo.int/edocs/mdocs/scp/en/scp_24/scp_24_4.pdf* (accessed 8 May 2024).

term envisages different options through which TRIPS obligations can be transposed into national law so that national interests are accommodated and yet TRIPS provisions and principles are complied with.[27] It implies that the legislative options made must be compatible with the TRIPS Agreement and, hence, fully legitimate.

A clear acknowledgment of the necessity for such flexibility for LDCs is evident in paragraph 6 of the TRIPS Agreement's Preamble and Article 66(1), which provide *ex – ante* flexibilities to members. The provisions recognise the need for differential application of IP regulations, particularly for LDCs, which enlarges the time to comply with TRIPS standards. Article 66(1) states:

> Recognising the special needs and requirements of least-developed country members, their economic, financial, and administrative constraints, and their need for flexibility to create a viable technological base, such members shall not be required to apply the provisions of this Agreement, other than Articles 3, 4, and 5, for a period of 10 years from the date of application as defined under paragraph 1 of Article 65. The Council for TRIPS shall, upon a duly motivated request by a least-developed country member, accord extensions of this period.

Article 66(1) accentuates the acknowledgment of diversity within IP systems and stresses the necessity of eschewing a one-size-fits-all approach to countries with varying socioeconomic capabilities, making it possible thus for countries to adopt pro-development IP laws.

The flexibility terminology encompasses not only the exemption granted to LDCs but also allows for potential variations on how the provisions of the TRIPS Agreement are understood and put into practice. Support for utilising TRIPS flexibilities is ingrained in Article 7 and 8 of the Agreement, Paragraph 4 of the Doha Declaration, and the WIPO Development Agenda, all of which endorse the adoption of flexibilities for diverse purposes.

While the content of Articles 7 and 8 was extensively covered in Chapter Three, it is necessary to emphasise the significance of the Articles within the pro-development IP framework. Articles 7 and 8 serve as the pillars that guide IP policies towards development objectives, particularly in developing countries. Together with the preamble of the TRIPS Agreement, they outline the contours of the objectives and principles guiding the agreement and should be considered when interpreting specific provisions within the context of the

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[27] WIPO *'Patent-related flexibilities in the multilateral legal framework and their legislative implementation at the national and regional levels'* (2011), Available at *https://www.wipo.int/edocs/mdocs/mdocs/en/cdip_5/cdip_5_4_rev-main1.pdf* (accessed 30 May 2024).

Agreement's overall goals. For instance, in the Canada – Pharmaceutical Patents case, the Panel emphasised the importance of both the objectives and limitations articulated in Articles 7 and 8.1 when interpreting Article 30 of the TRIPS Agreement.

The Panel further elaborated on the concept of 'balance' advocated by articles 7 and 8(1), particularly emphasising that the Agreement does not intend to obstruct WTO members from enacting measures to safeguard public interests, such as public health. It stated:

> Article 7 of the TRIPS Agreement reflects the intention of establishing and maintaining a balance between the societal objectives mentioned therein. Article 8(1), for its part, clarifies that the provisions of the TRIPS Agreement are not intended to prevent the adoption by Members of laws and regulations pursuing certain legitimate objectives.[28]

It specifically mentions measures 'necessary to protect public health and nutrition' and to 'promote the public interest in sectors of vital importance to their socio-economic and technological development,' (such as agriculture) provided that such measures are consistent with the provisions of the Agreement.

Paragraph 4 of the Doha Declaration states:

> "We agree that the TRIPS Agreement does not and should not prevent Members from taking measures to protect public health. Accordingly, while reiterating our commitment to the TRIPS Agreement, we affirm that the Agreement can and should be interpreted and implemented in a manner supportive of WTO Members' right to protect public health and, in particular, to promote access to medicines for all. In this connection, we reaffirm the right of WTO Members to use, to the full, the provisions in the TRIPS Agreement, which provide flexibility for this purpose."

The Declaration affirms the right of WTO Members to utilise TRIPS flexibilities not only for public health purposes, but also to advance other national interests.

Since the adoption of the Doha Declaration, the concept of flexibilities has been widely recognised in literature[29] and referenced in resolutions of United Nations (UN) agencies and bodies such as the World Health Organisation (WHO), the Human Rights Council (HRC), and the UN General Assembly, as well as reports from the UN Special Rapporteur on the Right to Health. For instance, a 2011 resolution adopted by the HRC and subsequent resolutions on the matter noted governments' right to use, to the fullest extent, the provisions of the TRIPS

[28] Para 7–26 Panel Report.
[29] See CM Correa & RM Hilty (2022) Supra.

Agreement, supported by the Doha Declaration, and the WTO General Council Decision of 30 August 2003 in relation to the HIV/AIDS epidemic.[30]

The WIPO Development Agenda[31] stresses the importance of incorporating development interests into IP regulation,[32] particularly through the recognition of S&D and the strategic use of TRIPS flexibilities to support development goals.[33] Paragraph 14 states that WIPO shall make available advice to developing countries and LDCs that will aid the understanding and use of flexibilities contained in the TRIPS Agreement.[34] The Development Agenda provides further basis for African countries to adopt reforms to IP laws and policies aimed at advancing regional development objectives, including the agriculture-related goals outlined in Agenda 2063.[35] Authors like Isiko Strba[36] have emphasised that WIPO's close interaction with African economic and political institutions makes it an important partner in shaping national and regional IP policies. Strba points out that WIPO's mandate to promote balanced IP use for development is reflected in its contemporary efforts to converge IP programs with emerging governance and sustainability challenges.

In many African countries where agricultural progress is a top priority, it's advisable to embrace pro-development legal frameworks to promote domestic innovation and economic development. It is trite that countries have historically applied weak IPR regimes at low levels of development and only opted for stronger IPRs when their economies advanced.[37] The experience of China serves as valuable lesson: China's non-strict adherence to TRIPS standards

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[30] See, for instance: *Doha Declaration on the TRIPS Agreement and Public Health*, WT/MIN(01)/DEC/2 (2001), Available at *https://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_trips_e.htm* (accessed 30 May 2024); Also see '*Human Rights Council Resolution 17/14'* (2011), Available at *https://ap.ohchr.org/documents/dpage_e.aspx?si=A/HRC/RES/17/14* (accessed 30 May 2024); United Nations *'Special Rapporteur on the Right to Health'* (2021), available at *https://www.ohchr.org/en/special-procedures/sr-health* (accessed 30 May 2024); World Health Organisation 'Access to medicines and vaccines: WHO activities in the context of the global strategy and plan of action on public health, innovation and intellectual property' (2016), available at *https://apps.who.int/iris/handle/10665/252764* (accessed 30 May 2024); World Trade Organisation *'General Council Decision of 30 August 2003'* (2003), available at *https://www.wto.org/english/tratop_e/trips_e/implem_para6_e.htm (*accessed 30 May 2024).

[31] WIPO *'The WIPO Development Agenda'* (2007) WO/GA/34/16.

[32] Ibid.

[33] Ibid para. 3 and 7.

[34] Ibid para. 14.

[35] J De Beer & S Bannerman 'Foresight into the future of WIPO's Development Agenda.' (2010) *1*(2) *World Intellectual Property Organization Journal*.

[36] S Isiko Strba 'Legal and institutional considerations for plant variety protection and food security in African development agendas: solutions from WIPO?' (2017)12(3) Journal *of Intellectual Property Law & Practice* 191-205.

[37] KE Maskus *Intellectual Property Rights in the Global Economy* Peterson Institute for International Economics (2000).

facilitated rapid technological development through practices such as reverse engineering and imitation, leading to the emergence of domestic technology giants and the positioning of China as a key player in global innovation and trade.[38] As countries worldwide seek to emulate China's success and pursue their own development agendas, the significance of adopting pro-development legal frameworks becomes increasingly evident.

6.5 Leveraging the TRIPS Flexibilities

The discussion below aims to guide countries on how to utilise the space for legal and policy maneuver in the implementation of the TRIPS Agreement to advance their agricultural sectors towards Agenda 2063. A pro- development approach ought to take advantage of the TRIPS flexibilities in the manner detailed below. The use of the flexibilities is expected to enable countries to promote innovation and the evolution of agricultural technologies calibrated to the specific conditions of each country. Once the flexibilities are utilised, countries may be able to acquire crucial agricultural technologies without prohibitive IP restrictions, modify existing technologies to meet local needs, and allow farmers to access seeds, fertilisers, and pesticides at affordable prices, among other benefits.

There are various ways to classify TRIPS flexibilities:[39]

(a) Whether they relate to transition periods or substantive issues;[40]
(b) IPR with which the flexibilities are associated;
(c) Purpose or goal being sought by the State;[41]
(d) Timing of the availability of the flexibility.

Flexibilities can be employed at various stages, including during the acquisition, definition, and enforcement of IP rights,[42] with some flexibilities overlapping across multiple categories.[43]

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[38] R O'Leary 'Flexibility and balance: Solutions to the international IP problem' (2017)16(2) *Journal of International Business and Law* 9.
[39] CB Ncube *Intellectual Property Policy, Law and Administration in Africa: Exploring Continental and Sub-Regional Co-operation* Routledge (2016).
[40] World Intellectual Property Organisation 'Patent-related flexibilities in the multilateral legal framework and their legislative implementation at the national and regional levels' (2010) Document CDIP/5/4 Rev para 35.
[41] CM Correa 'Multilateral agreements and policy opportunities' (2014) in *Intellectual Property Rights: Legal and Economic Challenges for Development* UK, Oxford 417–439.
[42] World Intellectual Property Organisation 'Patent-related flexibilities in the multilateral legal framework and their legislative implementation at the national and regional levels' (2010a) Document CDIP/5/4 Rev.
[43] Ncube (2016) Supra at 16.

As stated in Chapter Three, the flexibilities can be narrowed into two categories: *ex ante* and *ex post*.[44] Rules relating to the transition period, or defining the subject matter eligible for patent protection involve *ex ante* considerations, in that they ask questions arising before the grant of patent rights by a country. Once granted, however, the rights accorded to patent holders can be considered *ex post rules*.[45] Examples of *ex ante* patent flexibilities include transition periods, exclusions for reasons of *ordre public* or morality, and permissible exclusions for specifically-referenced subject matter. *Ex post* patent flexibilities encompass the exhaustion of patent rights and exceptions to rights conferred.

6.5.1 Utilise *Ex-ante* Flexibilities

6.5.1.1 Utilise Transition period

The transition period(s) has been discussed in section *3.6.1*. The flexibility allows LDCs the necessary time to concentrate on socioeconomic development and build the technical capacity required to harmonise their IP regimes with TRIPS standards. The transition period, recently extended to 2033,[46] offers LDCs a further chance to prepare for full TRIPS compliance. LDCs are urged to take advantage of the extension to strengthen their institutional frameworks, enhance their technical expertise, and develop strategies for integrating TRIPS standards in a manner that supports their long-term development goals.

6.5.1.2 Apply Patent-related flexibilities

Patent-related flexibilities, discussed extensively in section *3.6.2* cover a continuum of measures designed to address various aspects of IPR, including defining what constitutes an invention, establishing criteria for patentability, allowing parallel imports, granting compulsory licenses, providing research exceptions, etc.[47] Each of these measures serves specific purposes aimed at promoting innovation, facilitating access to products, and combating anti-competitive

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[44] See generally MA *Lemley 'Ex ante* versus *ex post* justifications for intellectual property' (2004) *The University of Chicago Law Review* 129–149 (criticising ex post justifications).
[45] X Pan *Flexibility of the TRIPS Agreement with Regard to Patent Protection* (unpublished Master's thesis, Lund University, 2002).
[46] World Trade Organisation (WTO) *'WTO members agree to extend TRIPS transition period for LDCs until 1 July 2034'* (2021) available at https://www.wto.org/english/news_e/news21_e/trip_30jun21_e.htm (accessed 8 June 2024).
[47] CM Correa 'Multilateral agreements and policy opportunities' (2014) in *Intellectual Property Rights: Legal and Economic Challenges for Development*, Cimoli M and others (eds) Oxford, UK: Oxford University Press 417–418, table 14.

practices.[48] For instance, when the scope of inventions is defined, patent systems can prevent the inappropriate appropriation of naturally occurring substances;[49] the determination of patentability requirements helps prevent patents on minor developments that could stifle legitimate competition;[50] parallel imports[51]and compulsory licenses[52] ensure access to essential products particularly in sectors like pharmaceuticals where affordability and accessibility are critical; while research exceptions enable follow-on innovation by allowing researchers to build upon existing patented inventions. [53]

6.5.1.2.1 Rigorous application of Article 27(1): A Legal Necessity

As stated before, the TRIPS Agreement leaves some room for WTO members whether developed or developing to implement the Agreement's provisions in various ways, to legislate in areas not subject to the minimum standards under the Agreement, and to develop legal interpretations of such provisions to determine the scope and content of the applicable obligations.[54]

Article 1(1) of the Agreement states:

> Members shall be free to determine the appropriate method of implementing the provisions of this Agreement within their own legal system and practice.

WTO Members can experiment with creative solutions to transpose into national law and practice the concepts that the TRIPS Agreement articulates but does not explicitly define. Examples of those flexibilities include concepts such as novelty[55] and inventiveness;[56] or 'situations of extreme urgency' for the purposes of compulsory licenses.[57] Of interest is what constitutes an invention, and the policy space available for defining the same.

Article 27, paragraph 1 of the TRIPS Agreement states as follows:

> Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of

[48] TRIPS Agreement, Article 31(k).
[49]Ibid Article 27(1).
[50] Ibid.
[51] Ibid Article 6.
[52] Ibid Article 31.
[53] Ibid Article 30.
[54] CM Correa & RM Hilty (2022) Supra.
[55] TRIPS Agreement, Article 27(1).
[56] Ibid Article 29.
[57] Ibid Article 31(b).

> industrial application. Subject to paragraph 4 of article 65, paragraph 8 of article 70 and paragraph 3 of this article, patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced.

As discussed in section *3.6.2.1,* there is substantial flexibility within the TRIPS Agreement for Member States to interpret and define terms such as 'invention' according to their domestic legislation, and they have leeway to bring them in line with their own objectives in IP protection. A narrower or general definition can be employed depending on individual national goals.[58] Further, countries should strategically exclude discoveries of things which already existed in nature but were not earlier known, from patent protection.[59]

6.5.1.2.2 *Odre* Public

Countries could carefully consider utilising the policy option in Article 27, paragraphs 2 and 3 of the TRIPS Agreement which allows Members to exclude certain inventions from patentability to protect *ordre* public or morality, human, animal, or plant life and health, or to prevent substantial harm to the environment. The fact that *'ordre* public ' or 'morality' are not defined leaves the interpretation of these articles to the members' discretion. Whether or not national interpretation and implementation would be consistent with the TRIPS Agreement can be examined in the light of the purposes and objectives of TRIPS, Articles 7 and 8.

6.5.1.2.3 Practical Example of Applying Patentability Flexibilities

The EAC offers valuable guidance on leveraging the TRIPS Flexibilities, as outlined in its Regional IP Policy. [60] While these guidelines are tailored to the EAC and particularly target public health, they offer instructive principles applicable to various sectors, including agriculture. One key guideline involves the strict definition of the patentability criteria within national IP legislation and examination guidelines. Specifically, EAC Partner States are advised to:

(a) Strictly apply the novelty standard through considering a wide concept of prior art consisting of everything disclosed to the public whether by use, in written or oral form, including patent applications, information implied in any publication or

[58] Pan (2002) Supra.
[59] JH Reichman 'From free riders to fair followers: Global competition under the TRIPS Agreement' (2002) 29(1–2) *New York University Journal of International Law and Politics* 11–93.
[60] EAC *Regional Intellectual Property Policy on the Utilisation of Public Health-Related WTO-TRIPS Flexibilities and the Approximation of National Intellectual Property Legislation* (2013). Also see *East African Regional Intellectual Property (IP) Policy* (2023-2033).

derivable from a combination of publications which are published anywhere in the world and to which the general public can actually or theoretically access;

(b) Clearly define the inventive step standard by referring to a 'highly' skilled person;

(c) Strictly apply the industrial application requirement and limit the patentability of research tools to only those for which a specific use has been identified.

EAC partner States are to exclude from patentability:

(a) Natural substances including microorganisms, even if purified or otherwise isolated from nature;

(b) New medical uses of known substances, including microorganisms. EAC partner States seeking to consider new medical uses principally patentable as processes under the patentability criteria shall strictly apply the patentability requirements on a case-by-case basis; and

(c) Derivatives of medical products that do not show significantly enhanced therapeutic efficacy/significant superior properties.[61]

It is recommended that countries keen on advancing national development goals including in the agricultural sector design their IP laws adapting some of the patentability flexibilities and definitions above.

6.5.2 Utilise *Ex – Post* Flexibilities

6.5.2.1 Legislate on Exceptions and Limitations

Patent exceptions are an example of TRIPS flexibilities, existing under Article 30 (general exceptions), and Articles 31 and 31*bis* (compulsory licensing). The provisions allow third parties to use protected subject matter in certain circumstances regardless of any authorisation granted by right holders. Examples of permissible exceptions include research and experimentation, as well as early working, also known as the bolar exception. Inventors and manufacturers have scope under the research and experimentation exception to use patented inventions in an investigational manner in order to improve or create alternatives.[62]

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[61] Ibid.

[62] Musungu, Villanueva & Blasetti *World Trade Organisation Canada – Patent Protection of Pharmaceutical Products: Report of the Panel* Document WT/DS114/R. (2004). Available at: www.wto.org/english/tratop_e/dispu_e/7428d.pdf (accessed 8 June 2024).

The exceptions bear resemblance to Article XX of GATT, which also provides general exceptions to the principle of free trade. In the US—Gasoline case,[63] for example, the WTO AB acknowledged that Article XX outlines exceptions that allow member countries to enact measures that may otherwise be considered trade barriers, provided they serve certain legitimate purposes such as protecting human health or conserving natural resources, hence legitimising certain trade restrictions.

6.5.2.1.1 Research Exception – Article 30

Article 30 exceptions carve out from the exclusive rights of patent owners and allow third parties to use subject matter protected under Article 28 TRIPS in certain circumstances regardless of authorisation granted by the right holders.[64] The exceptions are designed to balance the economic interests of patent holders and societal interests in accessing patented products. Specifically, in agriculture, it is advisable for African countries to include research exemptions in their domestic laws to enable public sector agricultural research to continue unhindered by the threat of patent infringement.

6.5.2.1.2Articles 31 and 31*bis* Exceptions

Compulsory licensing was briefly discussed in section *2.3.1.1* and *3.6.2.4.3*. Compulsory licenses are typically granted by an administrative or judicial body to a third party to enable them to utilise an invention without the consent of the patent holder. While they are often associated with public health issues, scenarios such as national emergencies, situations of extreme urgency, public non-commercial use, and countering anti-competitive practices are conceivable. For instance, Section 23(1)(c)[65] of Egypt's Patent Law allows for the issuance of a non – voluntary license to support national efforts in vital sectors for economic, social, and technological development, provided that the rights of the patent holder are not unreasonably prejudiced and the legitimate interests of third parties are considered.

In the agricultural sector, compulsory licenses could be used to allow African countries to access patented agricultural technologies such as seeds, machinery, and crop treatments essential for improving agricultural productivity and addressing food security challenges

[63] WTO *United States – Standards for Reformulated and Conventional Gasoline: Report of the Appellate Body* (WT/DS2/AB/R) (1996), available at: *https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds2_e.htm (accessed 30 May 2024).*
[64] CM Correa & RM Hilty (2022) Supra.
[65] Intellectual Property Law No. 82, 2002.

without having to negotiate complex licensing agreements or pay exorbitant royalties, hence lowering the barriers to technology acquisition.

Article 31 of the TRIPS Agreement outlines the conditions under which compulsory licenses may be issued. These include the requirement to provide satisfactory remuneration to the patent holder, bearing in mind the economic value of the license. [66] Although outside the scope of this study, it is noteworthy that in the health sector, medicines manufactured under compulsory licenses are in general intended for supply within the domestic market (as per article 31(f)). However, due to perceived limitations in these flexibilities, WTO members introduced an amendment[67] allowing compulsory licensing for exports under specific, restricted conditions.[68]

6.5.2.1.2.1 Flexible Procedures for Compulsory Licensing Applications

To effectively utilise compulsory licensing, the procedures should be quick and user-friendly. The limited use of compulsory licences is often attributed to the complexities involved.[69] Instead of judicial processes which are both time-consuming and costly, expedited administrative procedures should be considered. The TRIPS Agreement mandates judicial processes only for independent administrative review concerning the legal validity of a license and the amount of remuneration.[70] The following formulation has previously been proposed,[71]and can be analysed for inclusion in national legislation:

(1) Examination of an application for a compulsory licence shall be conducted by the relevant authority or tribunal;

(2) The relevant authority or tribunal shall by notice summon the patent holder and applicant to hear their evidence and opinions, and shall stipulate time periods for the submission of evidence, opinions and other matter;

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[66] TRIPS Agreement, Article 31(h).

[67] Article 31*bis* allows for the issuance of compulsory licenses for the export of pharmaceutical products to countries with insufficient or no manufacturing capacity for these products.

[68] On the effect of the limitation, see CB Ncube *Intellectual Property Policy, Law and Administration in Africa: Exploring Continental and Sub-Regional Co-operation* (2016) 19.

[69] See O *Gurgula 'Compulsory licensing vs. the IP waiver: what is the best way to end the COVID-19 pandemic?'* (2021) Policy brief, 104. Gurgula argues that due to the its complexity and its cumbersome procedure, it has found limited use.

[70] TRIPS Agreement, Article 31(i) and (j).

[71] YA Vawda 'Compulsory licenses and government use: Challenges and opportunities in access to medicines and vaccines: Implementing flexibilities under intellectual property law' (2022) 73–104.

(3) Should the patent holder fail to respond to the notice within two months, he will be presumed to have no objection to the issuance of the compulsory licence.[72]

The aim is to ensure an efficient process for issuing the licences, one that minimises delays and reduces costs, while still providing a fair opportunity for the patent holder to present their case.

6.5.2.2 Apply Regional Patent Exhaustion Regime

Countries should adopt a favourable exhaustion regime to support the parallel importation of products. IP exhaustion refers to the point at which a patent holder's rights to control the resale or distribution of a product cease, typically after its first lawful sale.[73] Under this principle, goods lawfully sold in one market (market A) may be imported into another market (market B) and traded without the authorisation of the IPR holder, even in competition with the rights holder or licensee. [74] The legality of such parallel imports depends on how the exhaustion principle is applied in a given jurisdiction.

The TRIPS Agreement grants policy space to parties to provide for parallel importation in their national laws. Exhaustion of rights is left at the discretion of Member States. The footnote to Article 28(1)(a) indicates that the patent holder's right to control imports is subject to Article 6 and the use of this flexibility by the Member States is subject to Article. 3 (national treatment) and 4 (most favoured nation). Article 6 provides:

> For the purposes of dispute settlement under this Agreement, subject to the provisions of Articles 3 and 4, nothing in this Agreement shall be used to address the issue of the exhaustion of intellectual property rights.

Deference on exhaustion issues was reaffirmed in the Doha Declaration, which confirmed that WTO Members are free to determine their own regimes on exhaustion of IPRs in accordance with their domestic policy priorities.[75]

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[72] Ibid.
[73] I Calboli 'Intellectual property exhaustion and parallel imports of pharmaceuticals: A comparative and critical review' in Correa CM & Hilty RM (eds) *Access to Medicines and Vaccines* Springer, Cham (2022), available at: https://doi.org/10.1007/978-3-030- (accessed 15 May 2024).
[74] CB Ncube '*Intellectual Property Policy, Law and Administration in Africa: Exploring Continental and Sub-regional Co-operation*' (2016).
[75] Declaration on the TRIPS Agreement and Public Health, WTO Doc. WT/MIN (01)/Dec/2, 5(a) (14 Nov. 2001).

There are three main variations of the exhaustion principle: national, regional, and international.[76] Under national exhaustion IPRs are exhausted upon the first sale within a country's domestic market.[77] Regional exhaustion means IPRs are exhausted after the first authorised sale within a specific group of countries, but sales outside that region may still infringe the right holder's IP. [78] Under international exhaustion, IPRs are exhausted after the first authorised sale anywhere in the world, [79] which allows the purchaser or any subsequent owner to use or resell the product without infringing the patentee's rights, [80] as the item becomes the buyer's property. [81]

Many developed countries permit parallel imports, while several developing countries and LDCs prohibit them[82] despite the fact that flexible parallel trade policies could offer them important economic benefits. [83]

African countries with exhaustion regimes however take various approaches. While some countries apply international exhaustion,[84] others such as OAPI members operate a regional exhaustion regime. A few still, have national exhaustion regimes,[85] while some others have no provisions on exhaustion at all. Variations in exhaustion regimes however could impact agricultural trade, innovation, and technology transfer. The AfCFTA IP Protocol seeks to remedy this by providing for regional exhaustion to mitigate potential challenges.

According to Article 7(1), IPRs are exhausted when a product incorporating an IP right is introduced to the AfCFTA market by the right holder or with their consent. Exhaustion ensures that the patent owner's rights are exhausted following the first unrestricted sale within

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[76] S Ghosh 'The implementation of exhaustion policies: Lessons from national experiences' Univ. of Wisconsin Legal Studies Research Paper (2014) 1248.
[77] DT Keeling 'The exhaustion of rights' In *Intellectual Property Rights in EU Law Volume I: Free Movement and Competition Law* Oxford European Union Law *Library Oxford Academic (2012). Available at: https://doi.org/10.1093/acprof:oso/9780198259183.003.0007* (accessed 15 May 2024).
[78] Ghosh (2014) Supra at 19.
[79] *Quanta Computer, Inc. v. LG Electronics*, Inc. (2008) 553 U.S. 617 at 625. Also see *Intel Corp. v. ULSI Sys. Tech., Inc*. (1993) US Fed. Cir., 995 F.2d 1566, 1568; 27 USPQ2d 1136, 1138.
[80] *Bowman v. Monsanto* Co. (2013) 133 S. Ct., 1761 at 1764.
[81] See *Bloomer v. McQuewan*, 55 U.S. (14 How.) 539 (1853), where it was held that once patented items are sold, they become the personal property of the buyer, and the monopoly no longer applies. Similarly, in *Adams v. Burke*, 84 U.S. (17 Wall.) 453 (1873), the court ruled that a patentee cannot prevent a third-party purchaser from using a patented article.
[82] Calboli (2022) Supra.
[83] Ibid.
[84] Ghana, Namibia, South Africa, Zimbabwe, Botswana, Mauritius, Namibia, Kenya.
[85] Madagascar, Mozambique and the United Republic of Tanzania.

the African region,[86] to allow for free movement of goods. Specific conditions for the applicability of the exhaustion regime are detailed in the relevant Annex of the Protocol.[87]

To advance agriculture in Africa, regional exhaustion and parallel importation are a useful strategy to access IP products as it would reduce the costs of accessing useful biotechnology.[88] Importantly, because it allows for comparison shopping (when a patent holder offers their products at varying prices for different markets),[89] countries can be able to harness the benefits of price discrimination.[90]

6.5.2.3 Establish Strict Local Working Conditions

Similar to practices in countries like India,[91] African countries could consider adopting IP policies that mandate the local working of patents so as to advance local value chains.[92] Local working requirements, particularly those benefiting agriculture can support the adaptation of patented technologies to local conditions and hence improve productivity of the sector. Such policies should not be viewed as discriminatory under article 27(1) of the TRIPS Agreement,[93] as they are supportive of the public policy objectives outlined in the preamble and Articles 7 and 8 of the TRIPS Agreement[94] that emphasise the promotion of technological innovation for socio-economic development.

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[86] For a detailed discussion of the regional exhaustion concept, see C Ho *Access to Medicine in the Global Economy: International Agreements on Patents and Related Rights* Oxford University Press (2011). For a general discussion on exhaustion, see Roth JL 'Exhaustion cannot stifle innovation: A limitation on the first sale doctrine' (2015) 5 *UC Irvine Law Review* 1231.
[87] See Article 7(2).
[88] O Ivus Patent *Exhaustion in the United States and Canada* (2018).
[89]O Owoeye 'Access to medicines and parallel trade in patented pharmaceuticals' (2015)37(6) *European Intellectual Property Review* 359-368.
[90] I Linnosmaa, T Karhunen & I Vohlonen 'Parallel importation of pharmaceuticals in Finland: Effects on markets and expenditures' (2003) 1 *Pharmaceutical Development and Regulation* 67.
[91] Section 83, Indian Patents Act, 1970.
[92] Law IGLP 'Recognising the constitutive role of law in global value chains' (2016) 4(1) *London Review of International Law* 57–79.
[93] UF Ugwu *Harnessing the Multilateral Patent and Plant Variety Protection Regimes to Advance Food Security: Implications of the EU-ECOWAS Economic Partnership Agreement* South Centre, Geneva (2022).
[94] Ibid.

6.6 Implement *Sui Generis* PBR Regimes

6.6.1 The Current Framework for PBR Legislation in Africa

Despite the flexibility provided by Article 27(3)(b), actual implementation has shown that countries in the Global South, particularly in Africa, often replicate UPOV's structure and many have become its members.

The current PBR framework consists of some scattered national systems and two regional regimes, with approximately half of African countries having implemented a PBR regime.[95] The pre-existing template of UPOV pioneers a *sui generis* system for these countries, particularly the UPOV 1991 Act, which is adopted as the principal PVP system.[96] At regional level, two PBR regimes exist. The first operates under OAPI,[97] which serves 17 primarily Francophone countries and has had a PBR registration regime in place since 2006. The second regime operates under ARIPO, [98] which adopted the Arusha Protocol for the Protection of New Varieties of Plants in 2015.[99] Regional organisations like SADC,[100] and EAC[101] have also advanced PBR in Africa with initiatives closely structured in accordance with the UPOV 1991 Act.

The UPOV system that is widely adopted by these countries is highly criticised for *interalia* prioritising breeders' rights by favouring commercial breeders and private interests over the welfare of farmers and the public; promoting the genetic uniformity of crops; and

[95] African countries providing PBR protection include Egypt, Ethiopia, Kenya, Morocco, Rwanda, South Africa, Tanzania, Zanzibar, Tunisia, Zambia, Zimbabwe, Ghana, and the OAPI member states: Benin, Burkina Faso, Comoros, Equatorial Guinea, Cameroon, Chad, Gabon, Central African Republic, Congo, Guinea, Guinea-Bissau, Mali, Ivory Coast, Senegal, Mauritania, Niger, and Togo. OAPI registrations extend to all its member countries.

[96] Countries like India, Malaysia, and Thailand have developed alternative *sui generis* PVP systems which diverge from the UPOV Convention. Similarly, the PVP Acts of Zimbabwe, Zambia, and Uganda also differ from UPOV, as they incorporate unique requirements such as variety eligibility criteria, origin disclosure, ABS, PIC, and aspects of Farmers' Rights related to seed use from protected varieties. See D Robinson '*Exploring components and elements of sui generis systems for plant variety protection and traditional knowledge in Asia'* ICTSD Programme on IPRs and Sustainable Development (2007).

[97] See Agreement Revising the Bangui Agreement of March 1977, on the Creation of an African Intellectual Property Organisation, 1999. OAPI became a UPOV member in 2014, making it the second intergovernmental organisation to join UPOV, after the European Union.

[98] See the Arusha Protocol for the Protection of New Varieties of Plants within the Framework of the African Regional Intellectual Property Organisation, 2015.

[99] For a wider view of PBR in Africa, see P Munyi, BD Jonge & B Visser 'Opportunities and threats to harmonisation of plant breeders' rights in Africa: ARIPO and SADC' (2016) 24(1) *African Journal of International and Comparative Law* 86–104.

[100] Southern African Development Community Protocol on Plant Variety Protection, 2017.

[101] Seed and Plant Varieties (SPV) Bill, 2018.

preventing peasants from reusing seeds.[102] It is also said UPOV 1991 suppresses and hinders implementation of international treaties including the ITPGRFA,[103] CBD[104] and Nagoya Protocol[105] in respect of farmers' rights and access and benefit sharing (ABS). The criticisms are thoroughly documented and critically analysed in PVP literature.[106]

A commonly cited advantage of UPOV is its potential to remove barriers to trade in plant varieties, and in so doing expanding both national and international markets.[107] It assumes that breeders are unlikely to introduce valuable varieties into a country without sufficient protection. It is argued the availability of high-performing varieties could provide farmers with greater opportunities to improve production, while also giving breeders access to valuable varieties for use in their own breeding programs.[108] It is also argued that a UPOV-style PVP system offers benefits at various societal levels, including economic, health, and environmental advantages.[109] Economic benefits are based on the idea that the availability of high-yielding varieties would lower consumer prices, while improved varieties could result in higher-value products that are easier to market.[110] Health benefits are anticipated from the availability of varieties with enhanced nutritional content, while environmental benefits are expected through the development of disease-resistant or stress-tolerant varieties.[111] However, some of these benefits are not always realised.

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[102] K Peschard, C Golay & L Araya *The right to seeds in Africa* (2023). For a discussion on how a UPOV 91-based PVP law could impact farmers' rights, access to genetic resources, and biodiversity conservation, see T Braunschweig '*Owning Seed, Accessing Food: A Human Rights Impact Assessment of UPOV 1991 Based on Case Studies in Kenya, Peru, and the Philippines'* Berne Declaration (2014).

[103] Article 9 mandates states to develop seed laws which do not restrict farmers' rights to save, use, exchange and sell farm-saved seed/propagating materials. Also see Braunschweig (2014) Supra.

[104] Convention on Biological Diversity, 1992.

[105] See Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation 2010. As an additional agreement to the CBD, its purpose is to establish a clear legal framework to fulfil one of the CBD's three objectives: the fair and equitable distribution of benefits derived from the use of genetic resources.

[106] See CM Correa, S Shashikant & F Meienberg *'Plant variety protection in developing countries: A tool for designing a sui generis plant variety protection system: An alternative to UPOV 1991*.' By: Association for Plant Breeding for the benefit of society (APBREBES) and its member organizations: Berne declaration, the development fund, SEARICE and third world network (2015); BD Jonge 'Plant variety protection in sub-Saharan Africa: Balancing commercial and smallholder farmers' interests' (2014) 7 *Journal of Politics and Law* 100; P Munyi, BD Jonge & B Visser 'Opportunities and threats to the harmonisation of plant breeders' rights in Africa: ARIPO and SADC' (2016) 24(1) *African Journal of International and Comparative Law* 86–104; and N Barron & E Couzens 'Intellectual property rights and plant variety protection in South Africa: An international perspective' (2004) 16 *Journal of Environmental Law* 19.

[107] R Jordens & P Button 'Effective system of plant variety protection in responding to challenges of a changing world: UPOV perspective' (2011)16 *Journal of Intellectual Property Rights* 74-83.

[108] Ibid.

[109] Ibid at 83.

[110] Ibid.

[111] Ibid.

More than 20 years since the introduction of OAPI's PVP system for instance, only a handful of PVP certificates have been awarded, highlighting the limited success of the system in encouraging private and foreign investment in plant breeding in member states.[112] From 2006 when Annex X came into force, to 31 December 2016, OAPI received 122 PVP applications.[113] Of these, only 117 resulted in issued PVP certificates, with just 51 still in force by the end of the period. A staggering 66 certificates, or over 50 per cent of the total lapsed due to non-payment of annual maintenance fees.[114]

Despite over two decades of implementation, the much hyped UPOV model upon which the OAPI system is based has yet to achieve its intended goal of stimulating private sector involvement in plant breeding. The system's current limitations, especially the low number of active certificates and the high rate of lapsed certificates reflect the challenges faced by OAPI member states in implementing PVP mechanisms.

Technical, legal and administrative inefficiencies account for the poor performance of the system,[115] including lack of sufficient infrastructure, expertise, and resources to implement the rigorous requirements for field testing for DUS, and granting PVP certificates. However, countries such as Kenya and South Africa which have more developed and functional PVP systems could provide valuable support and expertise to other African countries looking to establish PBR frameworks. Both countries have accumulated experience in PVP and could assist with technical training including DUS testing, among others.

Taking OAPI's challenges as an example, there is clearly no reason why African countries should be compelled to adopt the UPOV-like system given its failure to deliver tangible benefits, particularly in terms of private sector involvement. Instead, African countries should concentrate on developing alternative frameworks that are better suited to their unique economic, social, and developmental needs, avoiding the imposition of a system that may disproportionately benefit foreign entities while failing to address the pressing challenges faced by local farmers and agricultural communities.

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[112] M Coulibaly, RAB de la Perrière 'A Dysfunctional Plant Variety Protection System' (2019) available at https://www.apbrebes.org/files/seeds/APBREBES_OAPI_EN_def_0.pdf (accessed 28 September 2024).
[113] Ibid at 26.
[114] Ibid.
[115] Ibid at 29-30.

Policy-focused interventions aimed at countering UPOV-like systems put forward various legal options.[116] For example, the UK government's Commission on IPR recommended that developing countries should exercise the optional exclusion contained in Article 27(3)(b).[117] Civil society organisations have repeatedly encouraged the Global South to reject the UPOV model and instead draw inspiration from other multilateral treaties, with some undertaking a global campaign on food rights and farmers' rights.[118] In Africa, an Africa – centric model law was designed, and countries were asked to draw inspiration from it.[119]

There is generally strong advocacy for African countries to advance PBR frameworks that protect both breeders' and farmers' interests,[120] specifically policies that encourage innovation and commercial breeding while safeguarding farmers' rights to save, use, exchange, and sell farm-saved seeds. It is important to note that African technocrats have no apathy towards and are not opposed to PBRs; rather, they seek an approach that equilibrates both farmers and breeders' rights so that traditional farming practices and local seed systems are not undermined.

Through the AfCFTA IP Protocol[121] prescriptions for a *sui generis* regime, ABS, PIC and genetic resources have re-appeared in the continental IP legislature to ensure the norms seep into domestic law-making, the Africa Model law having been largely ignored. The Protocol extends its protection to all IP categories, including plant varieties.[122] It stipulates requirements similar to Article 27(3)(b) of TRIPS, mandating States to establish a PVP system, without however prescribing the exact type.[123] Article 8 of the Protocol obligates States to protect new plant varieties via a legal framework that encompasses farmers' rights, PBR, and ABS rules, thus allowing countries the flexibility to sculpt PBR regimes to their unique situations.

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[116] D Leskien & M Flitner *Intellectual Property Rights and Plant Genetic Resources – Options for a* Sui Generis *System* (1997) Rome: International Plant Genetic Resources Institute, Genetic Resources No. 6.
[117] Commission on Intellectual Property Rights *Integrating Intellectual Property Rights and Development Policy* Department for International Development, UK (2002). Also see D Rangnekar *'Access to genetic resources, gene-based inventions and agriculture'* Commission on Intellectual Property Rights (2002).
[118] See GAIA Foundation and GRAIN *Ten Reasons Not to Join UPOV* (1998), available at https://grain.org/en/article/1-ten-reasons-not-to-join-upov (accessed June 8, 2024).
[119] JA Ekpere The *OAU's Model Law: The Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources, an Explanatory Booklet* (2000).
[120] See, for example, GAIA/GRAIN (1998) Supra.
[121] The Protocol aims to promote a continent-wide coherent and harmonised IPR policy regime.
[122] AfCFTA IP Protocol, Article 2(2).
[123] See Article 8 and 40 AfCFTA IP Protocol.

Whilst, as seen, several countries in Africa have embraced the UPOV 1991 Act, those that are yet to develop one have an opportunity to fashion a unique *sui generis* PVP regime that detours from simply reinforcing, or perpetuating the current UPOV trend. The UPOV 1991 Act currently establishes the most stringent international standards for PVP.[124] Concerning farmers' rights, ABS, and PIC, it is essential for PVP legislation to be in consonance with Articles 8 and 20 of the AfCFTA IP Protocol. In general, the following considerations abide for a bespoke *sui generis* PBR regime:

(a) Optimise Article 27(3)(b) TRIPS and Article 8 of the AfCFTA IP Protocol;
(b) Foreground farmers rights and ABS;
(c) Promote Seed Diversity - Open Registers and Certification Systems;
(d) Promote Participatory Plant Breeding; and
(e) Enact limitations to PBR.

6.6.2 Considerations for a Bespoke PBR regime

6.6.2.1 Optimise Article 27(3)(b) TRIPS and Article 8 AfCFTA IP Protocol Flexibility

In addition to Article 27(3)(b) of the TRIPS Agreement, the AfCFTA IP Protocol permits member countries to establish a *sui generis* system for protecting plant varieties. Article 8(3) of the Protocol encourages State Parties to consider relevant African and international instruments that are consistent with their development goals when forming the Annex on PVP of the Protocol. Countries have design latitude, particularly as neither TRIPS nor the AfCFTA IP Protocol specify the elements of such a system. Additionally, TRIPS does not detail the subject matter, criteria, extent, or the duration of protection. Furthermore, neither the TRIPS Agreement nor the AfCFTA IP Protocol mandate membership in the UPOV system, therefore, countries are not obligated to adhere to it.

This segment presents alternatives for policymakers in African countries without PVP systems to circumvent the shortcomings of the UPOV 1991 Act in an attempt to develop legislation that promotes the growth of the agricultural sector, towards Agenda 2063. Moreover, even though countries with UPOV – like systems may not necessarily roll back, it is presumed that considerations for policy reversal are not entirely out of scope, since the

[124] Peschard, Golay & Araya Supra (2023).

AfCFTA IP Protocol has mandated the enactment of ABS measures which are seen to contradict the spirit of UPOV.[125]

Policy maneuver can be exercised in various ways, including manipulating the scope of protection, which determines the policy options available to legislators. It affects the rights of various users of plant varieties and seeds including competing breeders (researchers), seed merchants, and farmers.[126] The extent of protection also impacts traditional and cultural practices related to seeds and plants, whose norms and principles are outlined in the CBD and ITPGRFA.[127]

6.6.2.1.1Differentiated System

Countries that have not enacted PVP laws can opt to create differentiated PVP systems by providing various levels of protection for different crops based on their importance, economic value, and contribution to national agricultural objectives. One method to implement such a differentiated model is to limit the range of plant species and genera covered by the PVP law.[128] In this approach, not every plant variety can be protected; protected varieties would have to be evaluated against the agricultural needs and priorities of each country. Policy makers would thus concentrate on a specific genera or species, and target protection towards crops that are of particular significance to their agricultural sector and food security goals.

An approach of this kind would particularly be useful for countries like Kenya, where PBRs have been seen to benefit the horticultural sector but have had minimal effects on others. Given the continuous agitation by civil society for a balanced system, Kenya could prioritise the protection of certain crops while balancing farmers' rights to access and use traditional varieties. The complexity of this situation however is whether roll back is practically and legally possible, yet, if adopted, it would ensure that resources are allocated efficiently towards protecting varieties that are most relevant and valuable to the country's agricultural sector. A possible way out is provided by Article 8 and 18–20 of the AfCFTA IP Protocol.

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[125] AfCFTA IP Protocol, Article 8.
[126] D Rangnekar 'Geneva Rhetoric, National Reality: The Political Economy of Introducing Plant Breeders' Rights in Kenya' (2013) 19(3) *New Political Economy* 359–383.
[127] Ibid at 18.
[128] BD Jonge 'Possibilities for a differentiated PVP regime' in BD Jonge and P Munyi (eds) *Seed Systems and Intellectual Property Rights: An Inventory from Five Sub-Saharan African Countries* Wageningen University & Research (2016) at 49.

6.6.2.1.2 Definition of plant variety

The TRIPS Agreement does not provide a specific definition for plant variety and does not enumerate the plant species or botanical genera that qualify for protection. Countries can define a plant variety according to their own criteria and may opt for a regulatory framework that either limits or widens the range of protected genera or species, accommodating the distinct agricultural and economic settings of each country.[129] Since countries have diverse priorities and key crops, such adaptability would permit plant breeders to concentrate on creating varieties that hold the most relevance and value for their particular regions.

Further, a balanced *sui generis* PVP legislation should harmonise the interests of commercial breeders who develop new plant varieties, with the conservation of local breeders' practices especially those of farmers who sustain the cultivation of indigenous varieties.[130] It is essential to acknowledge that farmers play an important role in agricultural innovation by not only conserving traditional varieties but also by actively developing new ones, both of which deserve protection.

The Thailand PVP Act is a relevant example.[131] The Act establishes a framework for tailored protection that reflects the diverse origins and characteristics of plant varieties and ensures that commercial breeders, local farmers, and wild plant resources are all appropriately recognised and incentivised. It classifies plant varieties into two groups and assigns appropriate rights to each class: (1) new plant varieties, and (2) extant varieties, which encompass 'new',[132] 'domestic'[133], and 'wild'[134] plant varieties. The Act grants farmers the right to save and use seeds from their harvest, in line with the interests of farming communities. The protection criteria includes mandatory disclosure of origin and legal provenance.[135] Breeders must agree to profit-sharing if they use a general domestic or wild plant variety, or any part thereof in developing a new variety for commercial use.[136]

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[129] Mahop, Jonge & Munyi (2016) Supra at 46–9.
[130] BD Robinson ‘Towards a balanced “sui generis” plant variety regime: Guidelines to establish a national PVP law and an understanding of TRIPS-plus aspects of plant rights' UNDP (2008).
[131] Robinson (2007) Supra.
[132] Section 12(1) – (3).
[133] Section 43(1) and (2).
[134] Section 52.
[135] Section 35(2).
[136] P Lertdhamtewe 'Thailand’s sui generis system of plant variety protection' Quaker United Nations Office (QUNO) *Briefing paper* 3 (2014).

The Indian Protection of Plant Varieties and Farmers' Rights (PPVFR) Act, 2001, for its part makes a distinction between new and extant varieties[137] with the latter not required to meet the novelty criterion but must satisfy the DUS criteria. The criteria is applied flexibly to facilitate variety registration. The Act recognises the significance of traditional farming communities in varietal development by defining 'extant' varieties to include those cultivated and developed by farmers over time.[138] It grants PVP rights on new varieties (modelled on UPOV), extant varieties and essentially derived varieties. The definition of extant varieties is inclusive of farmers' varieties, varieties in the public domain and varieties about which there is common knowledge.[139] The rationale is for farmer-bred varieties to receive equal consideration and protection under the law, alongside commercially developed varieties.[140] Interestingly, extant varieties are said to constitute approximately 85 per cent of all registrations at India's national authority.[141]

The Indian PVP system also encompasses several facets of farmers 'rights. Farmers can register varieties with a simplified procedure regarding data requirements.[142] They have the rights to save, use, sow, re-sow, exchange, share, or sell farm produce, including seed of a protected variety, as long as the farmer does not sell branded seed of that variety.[143] Additionally, farmers are entitled to recognition and rewards if genetic resources conserved or improved by them are used in new varieties,[144] and they can claim compensation from breeders if a purchased variety fails to perform.[145] The Act also shields farmers from legal liability for innocent infringement of breeders' rights.[146] The government may deny registration for specific genera or species if commercial exploitation poses risks to human health or the

[137] Section 14 (b).
[138] Section 2(1) of the India Protection of Plant Varieties and Farmers' Rights Act, 2001 defines a farmers' variety as one that (i) has been traditionally cultivated and evolved by farmers in their fields, or (ii) is a wild relative or land race of a variety known to the farmers. Also see Section 2(j) for the definition of an extant variety.
[139] Section 15(1) – (3) Protection of Plant Varieties and Farmers' Rights Act, 2001.
[140] See Section 39 on Farmers' Rights, which integrates the protection of both breeders' and farmers' rights and is notable for its comprehensive articulation of farmers' rights. Also see MS Swaminathan *Farmers' rights and plant genetic resources* (1998).
[141] S Koonan 'India's sui generis system of plant variety protection' *Quaker United Nations Office* (2014).
[142] Section 39(1)(ii) Plant Varieties and Farmers' Rights (PPVFR) Act, 2001.
[143] Ibid Section 39(1)(iv).
[144] Ibid Section 39(1)(iii).
[145] Ibid Section 39(2).
[146] Ibid Section 42.

environment.[147] Furthermore, the Act mandates the disclosure of origin[148] and includes requirements for benefit-sharing.[149]

In addition to the foregoing, the TRIPS Agreement does not preclude countries from incorporating ABS requirements and measures to protect TK and genetic resources associated with plant varieties, into their PVP legislation. Both India[150] and Thailand[151] have integrated these stipulations into their respective laws.

The AfCFTA IP Protocol has incorporated similar provisions under Articles 18 and 20, requiring breeders to fulfill three conditions before being granted rights to a new variety: (i) disclose the source of traditional knowledge or resources utilised in developing the new variety,[152] (ii) provide proof of free, prior and informed consent from the competent authorities under the relevant national regime,[153] and (iii) demonstrate proof of fair and equitable benefit sharing arising from the use of such resources or knowledge under the relevant national regime.[154] Like India and Thailand, African countries should consider the incorporation of TK and ABS provisions into their PVP laws as mandated by the AfCFTA IP Protocol since they support agricultural development, particularly in regions rich in biodiversity and traditional agricultural practices.

Thus, to curtail the rights of breeders, the provisions of Article 18(2) of the AfCFTA IP Protocol on ABS should be enforced as part of the objective to recognise and secure the full spectrum of farmers' rights and the rights of traditional communities as derived from the CBD[155] and ITPGRFA.

Africa can draw inspiration from India's approach to PVP. In India, PVP applications mandate comprehensive passport data including details of parental lines, geographical sources of genetic material within India, and contributions from farmers, communities, institutions, or

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[147] Ibid Section 29.
[148] Ibid Section 18(1) (j).
[149] Ibid Section 26.
[150] Ibid Section 40 and 41.
[151] Ibid Section 52.
[152] Article 18(2)*(a)* and 20(1)*(a)* AfCFTA IP Protocol.
[153] Ibid Article 18(2)*(b)* and 20(1)*(b).*
[154] Ibid Article 18(2)*(c)* and 20(1)*(c).*
[155] UPOV does not incorporate the principles of the CBD and the Nagoya Protocol, which require fair and equitable benefit-sharing for access to genetic resources, nor does it address the need for disclosure requirements in PVP applications to prevent misappropriation and ensure compliance with ABS regulations. For instance, the UPOV Secretariat requested Malaysia to remove its anti-biopiracy provisions from its PVP law (see *www.upov.int/edocs/mdocs/upov/en/c_extr/22/c_extr_22_2.pdf*, (accessed 18 May 2024).

organisations involved in breeding or developing the variety.[156] Following registration, authorities solicit claims for benefit sharing and determine the appropriate compensation owed.[157] India's style prioritises the recognition and contributions of farmers and communities to varietal development and ensures PVP systems remain effective in incentivising innovation and investment in plant breeding. Article 18(2) of the AfCFTA IP Protocol sets a similar ABS approach, potentially aiming for comparable outcomes. Mrinalini Kochupillai in her key work, *"Promoting Sustainable Innovations in Plant Varieties*"[158] has emphasised that the PVP system in India and anywhere in the world should not exclude any potential innovators from the process of innovation, and must ensure the co-existence of both formal and informal innovations.

It should be noted however that the AfCFTA IP Protocol's approach to include a pro-biodiversity agenda, in line with the CBD, renders it incompatible with UPOV.[159] Considering that close to half of African countries have already implemented the 1991 UPOV-style framework, it remains to be seen how these counties will roll back their policies to accommodate the requirement of Article 18(2) of the AfCFTA IP Protocol. The practicality of the implementation of this provision is problematic and may fall to countries that have not yet established PVP laws. At the same time, the situation makes uncertain the harmonisation objective of the AfCFTA IP Protocol.

6.6.2.1.3 Conditions for protection

A balanced *sui generis* law requires careful attention to the criteria of protection. The criteria should be clearly defined and interpreted to benefit breeders, as well as serve the public interest. Countries must decide the stringency of the criteria based on various agricultural factors within their borders. For instance, a more liberal criterion like 'identifiability' may be beneficial in situations where numerous small-scale breeders seek protection for their varieties.

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[156] Article18 of the Protection of Plant Varieties and Farmers' Rights Act, 2001.
[157] Ibid Article 26.
[158] M Kochupillai '*Promoting sustainable innovations in plant varieties'* Springer (2016)5
[159] See Article 9 of the ITPGRFA, Article 31 of the UN Declaration on the Rights of Indigenous Peoples, and Article 19 of the UN Declaration on the Rights of Peasants and Other People Working in Rural Areas. Under Article 19, peasants have the right to seeds, which includes: (a) protection of traditional knowledge relevant to plant genetic resources for food and agriculture; (b) equitable participation in benefit-sharing from the use of these resources; (c) involvement in decisions related to conservation and sustainable use; and (d) the right to save, use, exchange, and sell farm-saved seeds or propagating material.

As stated, the TRIPS Agreement does not provide conditions for protection with respect to a *sui generis* PVP system, leading most countries to adopt UPOV's well-established conditions of novelty,[160] distinctness,[161] uniformity,[162] and stability[163] (DUS). The suitability of these conditions for developing countries is extensively debated in scholarly works.[164] The novelty requirement is criticised for being narrow;[165] the distinctness criterion is seen to fail to give equal consideration to varieties that exist in the informal system and already protected varieties, and is said to have potential to limit farmers' rights, benefit sharing and future use;[166] the uniformity standard is said to contribute to the loss of genetic diversity, as less uniform plant populations may actually be beneficial for food security since they can better adapt to various environmental stresses including climate variability, as well as other biotic and abiotic stressors;[167] and the stability requirement is said to prolong the time before new varieties become available.[168]

Article 5(2) of the UPOV 1991 Act sets the four criteria above as the exclusive legal criteria for granting and assessing PBR. The obligation to meet the four criteria for new plant variety protection not only precludes the addition of criterion that would require applicants to document the legal origin of the plant genetic resources used to develop the variety for which they seek exclusive rights, but also makes it difficult for farmers' varieties to qualify for protection, potentially locking out many plant breeders in African countries.

Moreover, where a plant breeder accesses a farmers' variety in violation of local laws or farmers' private seed rights, the UPOV framework does not guarantee the legal acquisition of breeding material, nor does it provide legal certainty. The UPOV application process does not also accommodate the establishment of checkpoints mandated by Article 17 of the Nagoya Protocol, potentially hindering the effective implementation of both the CBD and the Nagoya Protocol.

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[160] Article 6 UPOV 1991 Act.
[161] Ibid Article 7.
[162] Ibid Article 8.
[163] Ibid Article 9.
[164] See for instance, Christinck (2015) Supra at 61 – 2.
[165] Article 6 of UPOV 1991 stipulates that a variety is considered new if it has not been sold or otherwise disposed of to others for exploitation, by or with the consent of the breeder. See Berne Declaration 'Owning Seeds, Accessing Food: A Human Rights Impact Assessment of UPOV 1991' (2014). The Declaration suggests that varieties present in farmers' fields might still be deemed novel, potentially leading to the misappropriation of farmers' varieties.
[166] Christinck (2015) Supra at 61.
[167] Ibid.
[168] Mahop, BD Jonge & Munyi (2016) Supra at 48.

For these reasons, some countries like Bangladesh have adopted alternative criteria. Regarding the distinctness requirement, it is recommended that developing countries raise the threshold for protection by requiring that a new variety demonstrates genuinely significant characteristics such as agronomic or nutritional traits.[169] The Plant Varieties Act of Bangladesh[170] for instance specifies that a new plant variety must fulfill specific and beneficial needs of the people of Bangladesh to qualify for commercial privilege.[171] This way, the legislation conforms PVP with wider national development goals.[172] Such alternative criteria reflects a nuanced approach to PVP that is in line with countries' specific agricultural, economic, and social realities.

Some authors propose the substitution of UPOV's uniformity and stability criteria with 'identifiability,' which involves describing a unique set of characteristics for a new plant variety.[173] The African Model Law establishes a system where farmer varieties can be protected without needing to meet the DUS requirements.[174] One possible approach could be to consider alternative constructions of 'uniformity,' such as 'identifiability' which would be consistent with farmers' breeding practices.[175] The proposed approach aims to provide protection for a wider range of plant varieties, particularly those that are more diverse and variable such as landraces and farmer varieties[176] considered crucial for food security due to their adaptability to local agro-ecological conditions and ability to respond to changing environmental factors. Malaysia for instance integrated 'identifiability' into its PVP law, providing a pragmatic method for implementing this approach.[177]

Under Malaysia's law, breeders' rights are conferred when a plant variety meets the traditional criteria of being new, distinct, uniform, and stable.[178] However, for varieties developed by farmers, local communities, or indigenous peoples, breeder' rights are awarded

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[169] CM Correa *'Options for the implementation of farmers' rights at the national level'* South Centre: Working Paper 8 (2000), available at *https://www.farmersrights.org/getfile.php/132069-1663062618/Dokumenter/Options_For_The_Implementation_Of_Farmers_Righ.pdf* (accessed June 8, 2024).
[170] Section 7 *The Plant Varieties Act, 1998* (Bangladesh).
[171] Ibid Section 10(1)(b).
[172] Ibid Section 7.
[173] Mahop, BD Jonge & Munyi (2016) Supra at 48.
[174] Article 25(2).
[175] NP Louwaars 'Sui generis rights: From opposing to complementary approaches' (1998) *Biotechnology and Development Monitor* 36, 13–16.
[176] See for example, Article 25, the OAU Model Law.
[177] Section 14(1)(a) – (e) of the Plant Varieties Act, 1998 (Bangladesh) states that a new plant variety shall be registered if it is new, distinct, uniform, stable, and identifiable.
[178] Mahop, De Jonge & Munyi (2016) Supra at 56.

if the plant variety is new, distinct, and identifiable. The Malaysia approach acknowledges the valuable contributions of traditional farming communities to plant breeding and conservation. It also ensures that a diverse array of plant varieties receive the necessary legal protection to encourage their continued cultivation and development.

6.6.2.2 Foreground Farmers Rights and Access and Benefit Sharing (ABS)

Plant varieties were developed over centuries through the exchange of seeds and the sharing of knowledge among farmers. Even today, this is the model of innovation and diffusion in agriculture that prevails in most developing countries.[179] It is based on principles of common ownership within a given community, and free access to materials and knowledge. However, with the development of commercial plant varieties by seed companies, a new model of production and diffusion based on IPR emerged. As a result of the obligations imposed by the TRIPS Agreement, WTO member countries are bound to provide for some form of IP on plant varieties.[180]

The idea of farmers' rights simply denotes the rights of farmers over their resources and knowledge.[181] Article 9(3) ITPGRFA defines farmers' rights as the ability to save, use, exchange, and sell farm-saved seed or propagating material within the framework of national law. The African Model Law expands this definition by allowing farmers to collectively save, use, multiply, and process farm-saved seed of protected varieties.[182]

The recognition of farmers' rights under international and domestic law is based on two rationales. The first is the notion of equity, based on the fact that some of the major inputs to modern agricultural biotechnology come from the enormous effort undertaken by farmers and farming communities in different parts of the world for several centuries.[183] It is argued that

[179] BD Jonge & P Munyi 'A differentiated approach to plant variety protection in Africa' (2016) 19(1-2) *The Journal of World Intellectual Property*28–52.
[180]CM Correa, S Shashikant & F Meienberg *Plant Variety Protection in Developing Countries: A Tool for Designing a Sui Generis Plant Variety Protection System: An Alternative to UPOV 1991* Association for Plant Breeding for the Benefit of Society (APBREBES) and its member organisations: Berne Declaration, The Development Fund, SEARICE and Third World Network (2015).
[181] S Koonan 'Farmers' rights in India: Assessing conceptual and implementation issues' (2012) 4(1) *Dehradun Law Review* 1.
[182] Article 26(f).
[183] Koonan (2014) Supra at 33.

while modern commercial breeders benefit from the legal system, the historical efforts of farmers go unrewarded.[184]

Secondly, farmers' rights are considered a tool to protect and conserve agricultural biodiversity. Agricultural biodiversity could be defined as that part of biodiversity that feeds and nurtures humanity.[185] It includes genetic resources for food and agriculture such as harvested crop varieties, livestock breeds, fish species and non-domesticated resources within field, forest and in the aquatic ecosystem.[186] A significant factor in conserving and enhancing agricultural biodiversity is the farming methods employed. Traditional farming practices, which characteristically embrace diversity allow farmers to enrich biodiversity through the selection and improvement of seeds. Consequently, farmers' rights can be seen as a strategic instrument to assist the conservation efforts of traditional farmers.[187]

PBR are criticised for protecting the interests of breeders and commercial seed trade, often at the expense of farmers' rights.[188] Existing multilateral and regional IP regulations have largely overlooked the rights of farmers who have historically preserved, exchanged, and freely accessed seeds and plant varieties.[189] The oversight undermines farmers' traditional practices and their ability to save, exchange, and sell farm-saved seeds. Moreover, PBR regimes can exacerbate the challenges faced by smallholder farmers by imposing financial burdens such as the purchase of expensive hybrid seeds and accompanying agro-chemical inputs. UPOV, which many African countries adhere to, does not recognise farmers' rights and conflicts with agreements like the ITPGRFA, CBD, and the Nagoya Protocol.

Both the Preamble and article 9(3) of the ITPGRFA refer to the rights that farmers have in relation to seeds and other propagating material, and recognise the importance of ancestral practices of saving seeds for further use or exchange, or even for sale to other farmers.[190] An

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[184] P Cullet, J Ebberson & P Okowa 'Environmental justice in the use, knowledge and exploitation of genetic resources' in *Environmental Law and Justice in Context* Cambridge University Press (2009).
[185] Koonan (2014) Supra at 33.
[186] AP Kameri-Mbote & Cullet P 'Agro-biodiversity and international law: A conceptual framework' (1999) 11(2) *Journal of Environmental Law* 257.
[187] Srinivasan CS 'Exploring the feasibility of farmers' rights' (2003) 21(4) *Development Policy Review* 419.
[188] World Bank Group & OECD *IP and Innovation in Agriculture: How is IP Related to Agricultural Innovation?* The Innovation Policy Platform (2013) available at https://www.innovationpolicyplatform.org/content/ip-and-innovation-agriculture (accessed 30 May 2024)
[189] BD Wright & PG Pardey '*The evolving rights to intellectual property protection in the agricultural biosciences*' (2006) 2(1-2) *International Journal of Technology and Globalisation* 12.
[190]EC Kamau & G Winter '*Common Pools of Genetic Resources: Equity and Innovation in International Biodiversity Law'* (2013).

effort to foreground these rights is evident in Article 26(3) of the African Model Law which states as follows:

> breeders' rights on a new variety shall be subject to restriction with the objective of protecting food security, health, biological diversity and any other requirements of the farming community for propagation material of a particular variety.

However, most countries have overlooked and not implemented the provisions of the Model law, instead opting for UPOV-like legislations.

UPOV, which is copied by countries also lacks provisions on access to genetic resources and benefit-sharing. Articles 18 and 20 of the AfCFTA IP protocol address this by requiring breeders to meet specific conditions regarding TK, consent, and benefit-sharing before obtaining rights to a new variety. As earlier stated, the conditions are inconsistent with UPOV rules and may perhaps only be considered by countries that are yet to implement PBR systems.

6.6.2.3 Promote Seed Diversity - Open Registers and Certification Systems

Farmers rights can further be entrenched through open seed registers and certification systems. An often-overlooked area in agricultural policy is the intersection between seed laws and PVP systems, particularly concerning the regulation of approved seed lists. In some countries, only seeds from registered varieties are legally permitted for production and sale in the market. Due to strict requirements regarding the characteristics (e.g. DUS) and performance (e.g., outperforming high-yielding varieties under standardised growing conditions) for varieties to be released, many farmers' varieties are confined to the informal sector. Their production, use, exchange, and trade remain unregulated, largely unsupported, and their importance underestimated.[191]

Seed laws are an important policy tool as they directly influence farmers' access to diverse crop varieties which affects farmer autonomy, agricultural biodiversity, food security, and agricultural innovation.[192] Countries need to develop a guided approach that implements a registration system suitable for farmers' varieties in full recognition of their intrinsic properties

[191] B De Jonge, B Dey & B Visser *'Developing a Registration System for Farmers'* Varieties' (2025) 222 Agricultural Systems 104183.
[192] See KA Kuhlmann et al. *'Laws and regulations enabling and restricting Africa's vegetable seed sector'* (2023) 21(1) International Journal of Agricultural Sustainability 2210005.

that often distinguish them from those that are developed in the formal seed sector, for inclusive seed sector development.[193]

The lack of a registration system for farmers' varieties is a huge development gap and a missed opportunity to recognise and reward the value of local varieties and the contributions of farmers and their organisations (e.g., community seed banks) to seed conservation, sustainable use, and improvement.[194]

Kenya's seed regulatory framework illustrates some of the challenges characteristic of highly formalised seed systems. The country's formal seed sector is subject to stringent regulations that often disadvantage smallholder farmers. For instance, the Kenyan seed law mandates the establishment of a National Variety List, which permits only officially approved varieties to be legally marketed.[195] Whereas, however, the principal aim of this system is to ensure quality control, it inadvertently restricts access to traditional, farmer-managed seed systems and limits the availability of diverse, locally adapted varieties.

The closed list approach characteristic of such systems restricts the range of legally distributable and marketable seed varieties, and favours certified seeds approved through formal channels. Although this framework aims to prevent the dissemination of low-quality or untested seeds, it has been widely criticised for curbing agricultural biodiversity and limiting farmers' access to seeds tailored to local environmental conditions.[196] Smallholder farmers, in particular encounter difficulties in acquiring new or regionally adapted varieties not included in the official seed registry, which can suppress innovation, reduce resilience to climate variability, and ultimately constrain agricultural productivity.[197]

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[193] Ibid.

[194] R Vernooy et al. 'Policies, laws, and regulations in support of farmer-managed seed systems: still a long way to go. A review of 14 countries in Africa' (2023) 10(1) *African Journal of Agricultural Research* 123-140. Also see R Vernooy et al. 'On the margins: A review of policies and laws in support of farmer-managed seed systems in Africa' (2023).

[195] See Section 6 of the Seed and Plant Varieties Act, Cap 326 which allows the Minister to establish a reference collection of plant material. It essentially prohibits farmers from selling, sharing, or exchanging uncertified and unregistered seeds.

[196] H Dena '*Punitive Seed Laws Protect Big Corporations Over Kenya's Farmers'* Greenpeace (31 May 2022) available at https://www.greenpeace.org/africa/en/press/51419/punitive-seed-laws-protect-big-corporations-over-kenyas-farmers/ (accessed 05 October 2024).

[197] C Fowler& T Hodgkin 'Plant genetic resources for food and agriculture: assessing global availability' (2004) 29(1) *Annu. Rev. Environ. Resource* 143-179.

To mitigate these challenges, it is essential that seed laws, when implemented in conjunction with PVP systems avoid imposing rigid closed lists of approved varieties. Instead, a more flexible legal framework should be adopted that accommodates seeds developed through participatory breeding programs (PPBs) and informal seed networks.[198] Enacting legal provisions that support the use, exchange, and sale of a range of seeds would support farmer-centered innovation and promote agricultural biodiversity.[199] Another viable solution involves establishing an open register or flexible certification system that allows farmers to save, exchange, and sell seeds without being confined to an exclusive list of approved varieties,[200] for greater seed diversity.

6.6.2.4 Promote Participatory Plant Breeding

Addressing the complexities of African small-scale farming requires understanding the socio-economic and environmental factors that influence productivity. While challenges to achieving high yields and food self-sufficiency exist, they arise from historical, structural, and policy-related factors rather than solely from traditional farming methods or seed quality. Small-scale farmers have shown resilience by developing crop varieties with traits such as drought tolerance, pest resistance, and high nutritional value,[201]qualities essential for food security and sustainability, even if not always reflected in yield metrics.

To complement the efforts of local farmers, PPB could be vital to bridge the gap between TK and modern agricultural science. PPB involves the engagement of farmers directly in the selection and development of new crop varieties, which ensures that their preferences, experiences, and local knowledge form the traits of modern seeds. A collaborative model not only enhances the relevance and acceptance of new varieties but also encourages a sense of ownership and empowerment among farming communities.

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[198] K Kuhlmann & B Dey '*Using regulatory flexibility to address market informality in seed systems: A global study'* (2021) 11(2) Agronomy 377.
[199] See NP Louwaars 'Seed policy, legislation and law: Widening a narrow focus' (2002) 4(1-2) Journal of New Seeds 1-14.
[200] See B De Jonge, B Dey & B Visser '*Developing a Registration System for Farmers' Varieties'* (2025) 222 Agricultural Systems 104183.
[201] See IFAD/UNEP '*Smallholders, Food Security, and the Environment'* (2013). Available at https://www.ifad.org/documents/38714170/39135645/smallholders_report.pdf/133e8903-0204-4e7d-a780-bca847933f2e accessed (27 September 2024).

Furthermore, coercive policies mandating the use of "modern" seeds and agrochemicals can undermine farmer autonomy.[202] Instead, policies should encourage voluntary adoption through inclusive research and extension services that respect farmers' choices and traditional practices.

In addition to PPB's the increased gravitation toward open, collaborative, shared, communal and interdependent models of innovation[203] is worth mentioning, as an approach that countries can tap into, typified by the rise of the open software movement and cognate endeavours. Research by Chidi Oguamanam has transposed open innovation to plant genetic resources for food and agriculture; and draws attention to the customary seed sharing and exchange as the center-piece of the open nature of innovation in agriculture, especially in indigenous and local communities.[204]

6.6.2.5 Enact Limitations to Plant Breeders' Rights

6.6.2.5.1 Structuring Options for PVP Rights Limitations and Exceptions

Legislations such as the AU Model Law[205] and the India, Thailand and Bangladesh PVP Acts contain options which policymakers can leverage to define conditions under which PBRs may be limited or exceptions applied. Situations in which these rights may not apply are identified to comprise excluded varieties, private noncommercial use, acts of study, discovery, experimentation or research, innocent infringement, and compulsory licensing. The following legal and regulatory oversight options can be exercised:

a) **Refusal to Register**

Countries can exercise regulatory oversight to ensure that agricultural innovations are in tandem with public interests and values. In the case of India, Section 29 of the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001 highlights specific circumstances under which registration may be refused to prevent commercial exploitation of a variety if it poses risks to public health, environmental integrity, or societal well-being. Specifically, it states that registration may be refused if the prevention of the commercial exploitation of such variety is deemed necessary to safeguard public order or morality,

[202] See N Louwaars '*Seeds of Confusion: The Impact of Policies on Seed Systems'* (2007) Wageningen University and Research.
[203] Oguamanam (2003) Supra. '.
[204] Ibid.
[205] AU Model Law (2000). Although no country has fully adopted the African model law, aspects of it are incorporated into national PVP laws such as Uganda, Ethiopia and Zambia.

protect human, animal, and plant life and health, or to prevent substantial damage to the environment. Section 29 of the PPV&FR Act not only reflects a commitment to safeguarding public interests but also acknowledges the potential consequences of unchecked agricultural innovation on human, animal, and environmental health, and emphasises the need to balance innovation with ethical, social, and environmental concerns to promote equitable agricultural progress.

b) **Private, Non-Commercial Use**

The exception for private, non-commercial use under Section 39(1)(iv) of the India PPV&FR Act is another example that can serve as a vital mechanism to safeguard the rights of farmers. The provision states that a farmer shall be deemed to be entitled to save, use, sow, re-sow, exchange, share, or sell their farm produce including seed of a variety protected under this Act, provided that the farmer shall not be entitled to sell branded seed. The provision allows subsistence farmers to access and use seeds from protected varieties for their personal needs, as long as the use is non-commercial. The provision is consistent with the AU Model Law which emphasises the importance of preserving farmers' rights to use and exchange seeds in line with traditional agricultural practices.

c) **Research Exception**

The exemption for study, discovery, experimentation, and research is essential in advancing agricultural knowledge and innovation as it grants individuals and institutions the liberty to pursue these activities without the constraints of PBR, and thus allows for the investigation of new concepts, methods, and technologies in agriculture. [206] Fundamentally, it enables agricultural progress since it permits research in science and technology to meet the demands of the agricultural sector.

d) **Innocent Infringement**

Some countries allow for the exception for innocent infringement as a safeguard for farmers who unknowingly infringe on breeders' rights due to a lack of awareness.[207] In the case of India, this provision was enacted to address the practical realities faced by farmers who

[206]See, for example, Section 30 of the India PPVFR Act which permits certain uses of registered varieties for research and breeding purposes.
[207] Section 42 India PPVFR Act.

often operate in remote or rural areas with limited access to legal resources or information about IPR.

e) **Compulsory Licensing**

Finally, compulsory licensing can be leveraged to assert control over the exercise of breeders' rights in situations deemed essential for the public interest. As is the case for patents, governments would be able to impose specific conditions on the utilisation of protected plant varieties to address various societal needs and challenges. Compulsory licensing can be useful in combating anti-competitive behavior within the agricultural sector, which would allow for fair market prices and diversity in seed markets.

6.6.3 Flexibilities as to areas not covered by the TRIPS Agreement

The TRIPS Agreement does not cover certain areas of IP, either due to a lack of consensus when the Agreement was formulated, the emergence of new areas post-negotiation, or because the negotiators did not perceive any trade barriers in those areas.[208] Areas such as utility models, TK, and handicrafts which are of significance for developing countries fall outside the scope of the Agreement. Consequently, when legislating on these matters, countries are not obligated to adhere to the Agreement's principles and provisions. Utility models were extensively canvassed in Chapter Five, handicrafts are not addressed by this research, while TK is addressed here below.

6.6.3.1 Legislate on Traditional Knowledge, Traditional Cultural Expressions and Folklore

Many African countries are home to rich indigenous cultures, expressed through Traditional Knowledge and Traditional Cultural Expressions (TK/TCEs), whose utilisation should be appropriately compensated. The cultural assets are tied to the identity and development of communities and often define the lifestyles, well-being and development of their bearers.[209] They also benefit mankind as part of the common heritage of humanity.

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[208] WIPO *'Advice on flexibilities under the TRIPS Agreement'* available at *https://www.wipo.int/ip-development/en/policy_legislative_assistance/advice_trips.html* (accessed 27 March 2024).

[209] WIPO *Intellectual Property, Traditional Knowledge and Traditional Cultural Expressions/Folklore – A Guide for Countries in Transition* (2013), available at https://www.wipo.int/edocs/pubdocs/en/wipo_pub_transition_9.pdf (accessed 8 June 2024).

TK/TCEs play an important role in the creation of goods and services that hold considerable commercial value.[210] In various sectors including agriculture, pharmaceuticals, cosmetics, handicrafts, and tourism, TK/TCEs serve as the basis for the creation of unique and culturally significant products. For example, indigenous knowledge of medicinal plants often leads to the development of new pharmaceuticals, while traditional crafting techniques result in high-quality artisanal goods that attract global markets.

The value of TK/TCEs is particularly evident in regions like Southern Africa, where they are essential components of industries such as BioTrade (which deals with the sustainable use and commercialisation of biodiversity-related products). Ncube,[211] referencing the southern Africa project-the Access & Benefit Sharing (ABS) Compliant Bio-trade in South(ern) Africa (ABioSA) phase 1 project (2018–2021) underscored the tremendous economic impact of BioTrade on participating countries and emphasised the necessity for deliberate protection efforts. The study showed that entrepreneurs participating in the project witnessed a major rise in BioTrade turnover with local sales growing by 51 per cent and an impressive 178 per cent growth in export sales,[212] signaling the economic potential of exploiting TK/TCEs.

Despite their economic importance, however, there is dire need for enhanced protection mechanisms. Instances where TCEs are replicated by outsiders for commercial profit, and where patents are obtained for TK-based creations without the consent of the original holders/communities raise serious concerns, as such practices deprive the communities of the economic benefits derived from their own knowledge.

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[210] R Awopetu 'In defense of culture: Protecting traditional cultural expressions in intellectual property' (2019)69 *Emory Law Journal* 745..

[211] CB Ncube *'The protection of traditional knowledge, traditional cultural expressions, expressions of folklore and genetic resources within the African Continental Free Trade Area – Alignment with international and regional developments'* Southviews No. 263 (2024), available at *https://www.southcentre.int/wp-content/uploads/2024/05/SV263_240501.pdf* (accessed 25 May 2024).

[212] ABioSA *Building African Biotrade: ABioSA Project Highlights Summary Report* (Feb 2018 – Oct 2021). Available at *https://www.absbiotrade.info/fileadmin/Downloads/1.per cent20PROJECTS/ABioSA/Repository/ABIoSA_Summary_Report/ABioSA-summary-and-highlights_report-2022.pdf* (accessed 25 May 2024).

Whereas a number of African countries including South Africa,[213] Kenya,[214] Nigeria,[215] Namibia,[216] Zambia,[217] and Zimbabwe[218] have established domestic frameworks that recognise and protect TK and which often emphasise community consent and benefit-sharing mechanisms, many others do not have such protection. As a result, communities are unable to fully capitalise on the economic potential of their TK/TCEs. Closing these gaps would allow regions rich in cultural and biological diversity to harness their resources more effectively. Therefore, there is need for well-developed protection mechanisms to safeguard TK/TCEs and ensure that communities receive fair recognition and reward for their cultural contributions.[219]

Global efforts to protect TK/TCEs have been championed by international organisations such as UNESCO and WIPO. UNESCO emphasises safeguarding cultural heritage, while WIPO addresses the legal protection of IPR.[220] In contrast, the TRIPS Agreement does not explicitly address TK and TCEs.

At the regional level, ARIPO adopted the Swakopmund Protocol on the Protection of Traditional Knowledge and Expressions of Folklore, which entered into force in 2015 for some of its Member States.[221] The Swakopmund Protocol provides a framework for recognising and protecting TK, particularly in agriculture where indigenous knowledge systems underpin seed selection, pest management, and sustainable farming practices. The Protocol explicitly grants holders of TK the right to prevent unauthorised use and exploitation, which ensures that communities retain control over their innovations.[222] It addresses the recognition and protection of TK and emphases its role in safeguarding agricultural innovations that have been passed down through generations.[223] It also lays down the conditions under which TK can be accessed and used, including the establishment of a benefit-sharing framework. This is

[213] Intellectual Property Laws Amendment Act, 2013 (Act No. 28 of 2013).
[214] Protection of Traditional Knowledge and Cultural Expressions Act, 2016.
[215] Copyright Act (Amendment), 2017.
[216] Protection of Traditional Knowledge, Genetic Resources, and Expressions of Folklore Act, 2014
[217] Protection of Traditional Knowledge, Genetic Resources and Expressions of Folklore Act, 2016 (No. 16 of 2016).
[218] Traditional Knowledge and Expressions of Folklore Act, 2016.
[219] Ibid.
[220] LV See Aragon 'Copyrighting culture for the nation? Intangible property nationalism and the regional arts of Indonesia' (2012) 19 *International Journal of Cultural Property* 269-306; and L Schuler 'Modern age protection: Protecting indigenous knowledge through intellectual property law' (2013) 21 *Michigan State International Law Review* 759–791.
[221] See the Protection of Traditional Knowledge and Expressions of Folklore within the Framework of the African Regional Intellectual Property Organization (ARIPO), adopted by the Diplomatic Conference of ARIPO at Swakopmund (Namibia) on August 9 2010, ARIPO, Harare 2010.
[222] Article 4.
[223] Article 5 Protection of Traditional Knowledge.

particularly relevant in agriculture where knowledge of local plants, seeds, and farming methods can be commercialised.[224] It further provides for equitable benefit-sharing mechanisms which are essential for incentivising the documentation and use of TK in modern agricultural innovation.[225]

In May 2024, WIPO adopted a landmark treaty to enhance TK/TCEs protection, concluding more than two decades of negotiations. The new WIPO Treaty on Intellectual Property, Genetic Resources, and Associated Traditional Knowledge[226] creates an international obligation for patent applicants to disclose the source or origin of genetic resources and associated TK in their applications.[227] This represents an important step toward preventing the misappropriation of genetic resources and TK, particularly benefiting developing countries that have long called for such a framework. The treaty establishes minimum standards for disclosure and grants contracting parties flexibility on how they implement its provisions.[228] It also allows for future expansion of its scope to address emerging technologies and derivative products, which will ensure its continued relevance.[229]

The recently adopted AfCFTA IP Protocol also mandates State parties to protect TK,[230] TCEs and folklore,[231] and genetic resources.[232] It requires countries to implement measures to prevent their unauthorised use in all categories of IPR.[233] Applicants seeking IPR related to TK/TCEs and genetic resources must provide detailed information on: (i) the source of the traditional knowledge and cultural expressions used;[234] (ii) proof of PIC from relevant regulatory authorities;[235] and (iii) evidence of fair and equitable benefit sharing under national regulations.[236]

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[224] See Article 8.
[225] Article 9.
[226] Adopted by the Diplomatic Conference, May 2024.
[227] Article 3
[228] N Syam & CM Correa Understanding *the New WIPO Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge* South Centre Policy Brief (2024).
[229] Ibid.
[230] Article 18.1 AfCFTA IP Protocol.
[231] Ibid Article 19(1).
[232] Ibid Article 20(1).
[233] Ibid Article 18(3), 19(3) and 20(3).
[234] Ibid Article 18(2).
[235] Ibid Article 19(2) AfCFTA IP Protocol.
[236] Ibid Article 20(2).

State Parties have an obligation to negotiate and adopt an Annex on TK, TCEs and folklore, and genetic resources[237] as part of the Protocol which shall be binding on State Parties upon adoption.[238] The protocol does not dictate the exact nature of protection, which allows State Parties the flexibility to determine the specifics of their national regimes.[239]

In addition to the AfCFTA IP Protocol, the AU adopted Guidelines for the Coordinated Implementation of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation in Africa[240] which aim to facilitate the implementation of ABS mechanisms and promote coordination among African countries in adhering to the Nagoya Protocol under the CBD. The guidelines also allow AU Member States flexibility to customise their approach according to national circumstances, priorities, needs, and policies. However, they were not designed to enforce uniform ABS measures in all Member States.

6.6.4 Laws Extrinsic to IP

In addition to IP-specific regulations, extrinsic legal frameworks such as competition and human rights laws may also influence the effectiveness of IP regimes, more so in the agricultural and pharmaceutical sectors where restrictive IP protection can push up prices and limit access to essential goods.[241] If IP enforcement results in prohibitively high costs for medicines or agricultural inputs, it risks undermining a number of fundamental human rights. Legal frameworks should therefore balance IP protection with safeguards that ensure affordability and accessibility, in line with international human rights instruments such as ICESCR[242] and the African Charter on Human and Peoples' Rights.[243]

Competition law is equally essential in preventing the misuse of IPR. In the agricultural sector, patents on seeds and agrochemicals can restrict smallholder farmers' access to essential

[237] Ibid Article 41 and 42(1).
[238] Ibid Article 42(3).
[239] Ncube (2024) Supra.
[240] African Union *Strategic Guidelines for the Coordinated Implementation of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation in Africa* (ABS Strategic Guidelines, 2015).
[241] On the intersection between IP and human rights, see C Oguamanam 'Intellectual property: The promise and risk of human rights. Intellectual Property for the 21st Century: Interdisciplinary Perspectives on Intellectual Property Law' (2016) *Toronto: Irwin Law*, 2014.
[242] United Nations General Assembly International Covenant on Economic, Social and Cultural Rights (ICESCR), 1966.
[243] African Charter on Human and Peoples' Rights, 1981.

inputs, exacerbating food insecurity. Similarly, in the pharmaceutical industry, monopolistic pricing of life-saving medicines can place them out of reach for vulnerable populations. Many African countries have enacted competition laws to prevent anti-competitive practices and ensure that IP protection does not stifle market entry, harm consumers, or hinder wider development goals.[244]

6.7 Navigating Africa's Diversity— Need for Context-Sensitive Approaches and Flexible Harmonisation

While the proposed model (*under section 6.4*) may suggest a unified framework, it should be viewed more as a guide than a rigid prescription. Africa's diversity undoubtedly poses challenges to establishing a unified or harmonised IP legal framework. It is important to acknowledge that a uniform pan-African approach may not always be suitable and can result in unintended consequences. The legal, economic, and social differences among African countries must be carefully considered when developing IP policies, given the continent's diversity, from advanced economies like South Africa and Mauritius, to LDCs such as Uganda, Burkina Faso, Chad, and the Central African Republic.

While legal harmonisation can provide advantages such as simplifying trade, it may be counterproductive if applied uniformly to countries at varying stages of development. A one-size-fits-all approach could impose unintended costs on economies, particularly those of LDCs that may not have the infrastructure or resources to fully benefit from such harmonisation. For this and other reasons, some RECs have incorporated the idea of variable geometry in the implementation of commitments to enable phased or differentiated implementation.[245] African RECs are actually described more as flexible legal regimes given their accommodation of such adaptability.[246] RECs such as the EAC already embrace legal diversity through variable geometry, which enables phased or differentiated implementation of agreements. While legal harmonisation can provide advantages such as simplifying trade, it may be counterproductive if applied uniformly to countries at varying stages of development.

James C. Scott's argument in '*Seeing Like a State'* regarding the "law of unintended consequences"[247] is certainly relevant here. Large-scale, top-down efforts, whether in legal

[244] See for example, Kenya's Competition Act (2010); South Africa's Competition Act (1998); and the Federal Republic of Nigeria Federal Competition and Consumer Protection Act (2018).
[245] See Article 7 of the Treaty for the Establishment of the East African Community,1999.
[246] JT Gathii *African regional trade agreements as legal regimes.* Cambridge University Press (2011)6.
[247] J C Scott *'Seeing like a state: How certain schemes to improve the human condition have failed* '(2020) Yale University Press.

reform or economic policy can inadvertently marginalise local stakeholders and overlook the nuances of on-the-ground realities. A blanket approach to IP protection might, for instance, exacerbate disparities by promoting models that work for technologically advanced countries while creating barriers for innovation in poorer countries.

Regional cooperation, such as within frameworks like the ARIPO and OAPI, may in some cases present a more practical and context-sensitive way out, which accentuates the continued relevance of RECs both as the *acquis* for the AfCFTA, and as stand-alone organisations. RECs could for instance allow countries with similar developmental trajectories or economic structures to collaborate on IP protection and enforcement in ways that are more attuned to their specific needs, which could be useful for promoting innovation in sectors like agriculture, technology, and healthcare, where regionally tailored solutions can be more effective.

Moreover, while continental-level initiatives can definitely provide important benefits, this should not mean an overemphasis on harmonisation in areas where local adaptation is crucial. The balance between regional and continent-wide cooperation, and respecting national and local differences is key. Thus, there must be caution not to enforce a uniform IP system across highly diverse countries as this could undermine the intended results.

The AfCFTA can induce further regional cooperation by providing a continental platform for countries within regional blocs such as EAC or ECOWAS to harmonise IP laws that suit their specific economic needs. Regional collaboration on IP policies, combined with the free movement of goods and services under the AfCFTA can unlock key opportunities for agricultural and industrial innovation on the continent.

6.8 Conclusion

The proposed IP legal framework for African countries is a comprehensive approach that coalesces all elements of a tailored regime. As the discussion has shown, the framework leverages opportunities within TRIPS and the AfCFTA IP Protocol to achieve development outcomes. It also provides guidance on implementing IPR regimes that, although not covered by TRIPS, are essential for Africa's agricultural sector, effectively directing countries on the appropriate legal, and policy approaches towards Agenda 2063, in response to research sub – question 3 and 4.

CHAPTER 7

SUMMARY, RECOMMENDATIONS AND GENERAL CONCLUSION

7.1 Introduction

The central question guiding this thesis was: What is the role of IP, innovation, and trade in the actualisation of the agriculture related goals and aspirations of Agenda 2063, and what legal and policy mixes are required to realise the Agenda aspirations?

This chapter consolidates the findings and recommendations from the preceding chapters. It revisits the research premise and the research sub-questions explored throughout the study. In the concluding analysis, it answers the final research sub-question: In what way can the outcome of the research be utilised by relevant stakeholders? (Research Sub-question 5). The study emphasises the centrality of IP while also recognising the importance of innovation and trade in achieving the goals of Agenda 2063. It stresses that IP alone is not enough to meet the Agenda 2063 goals, hence the need for a comprehensive strategy that incorporates the integral and complementary roles of innovation and trade.

The specific questions explored were as follows:

(1) What is the relationship between innovation, IP, trade, agriculture, and Agenda 2063?
(2) What are the current obstacles to growth in the agricultural sector?
(3) How can the problematic agricultural sector possibly be repaired?
(4) What legal frameworks and policy measures are essential to achieve the agricultural objectives of Agenda 2063?
(5) In what way can the outcome of the research be utilised by relevant stakeholders?

The study concentrated on IP laws related to agricultural technologies, specifically patents and PBR, while also exploring the potential use of utility models and TK/TCEs. It employed a doctrinal approach, drawing on both primary and secondary data from existing literature.

In addressing the research questions, the study highlighted the inadequacy of current IPR frameworks in advancing agriculture in Africa. The shortcoming is attributed to the colonial legacies tied to the adoption of these rights and the inadequate capacity of countries during the negotiation of the TRIPS Agreement, which subsequently influenced the IP laws implemented in the countries. To mitigate these issues, the study proposed measures to address the rigidities in existing IP laws by leveraging the built-in flexibilities of the TRIPS Agreement which offer a route for countries to adapt their IP frameworks to better support agricultural development and innovation.

The thesis began by appraising the role of agriculture as a key driver of African economies, emphasising its massive social and economic footprint.[1] It showed that the agricultural sector employs 65–70 per cent of Africa's labour force, approximately two-thirds—and typically contributes 15–50 per cent to GDP.[2] Over 70 per cent of the continent's impoverished population resides in rural areas, where agriculture is their most important economic activity. However, the sector is beset by numerous challenges, including low productivity, exacerbated by the impacts of climate change, limited use of agricultural technologies and improved plant varieties.

Options for Africa to address these issues were discussed, which dwelt on utilising IP and innovation. Some studies however indicate that the ability of IP regulations to advance development varies based on the technological capacities of countries.[3] Consequently, the optimal method will differ based on the socio-economic development levels of each country.[4] To advance agriculture, it was shown that the IP system must provide countries with sufficient flexibility to meet their obligations without compromising a holistic consideration of local variables. Moreover, utilising the flexibilities will require an understanding of general international law in several areas, including human rights, sustainable development, and biodiversity, in interpreting IP provisions, as emphasised in section *6.3.2.*

[1] L Goedde, A Ooko-Ombaka & G Pais '*Winning in Africa's Agricultural Market'* McKinsey & Company (2019).
[2] J Nash, N Halewood & S Melhem *Unlocking Africa's Agricultural Potential: An Action Agenda for Transformation* World Bank (2013).
[3] YK Kim et al 'Appropriate intellectual property protection and economic growth in countries at different levels of development' (2012) 41 *Research Policy* 358 at 359.
[4] AS Taubman TRIPS jurisprudence in the balance: Between the realist defense of policy space and a shared utilitarian ethic 'in *Ethics and Law of Intellectual Property'* Routledge (2016) 89–120.

7.2 Recap of the Chapters

Chapter One explained in detail the research premise and structured the research, while Chapter Two clarified the concepts used in the study, that is IP, innovation and trade and laid the footing for subsequent discussions covering the two facets of IP that are relevant for agricultural technologies, namely patents and PBR. It scrutinised the causal relationship between innovation, IP, trade, and agriculture and developed a framework for analysing their interconnectedness. The framework provided understanding on how these elements interact to advance the agriculture related objectives of Agenda 2063.

In Chapter Three, an analysis was conducted to identify the obstacles hindering the growth of the agricultural sector. The examination served as the basis for proposing appropriate legal and policy measures within the Chapter itself, as well as in Chapter Four, Five and Six, and the recommendations in this concluding chapter. It outlined various areas where IPR could be leveraged to overcome these obstacles. For instance, it was deemed essential for countries to utilise the TRIPS flexibilities and to align the interpretation of IP substantive obligations with the principles outlined in Article 7 and 8 of the TRIPS Agreement.

The arguments presented in Chapter Three foreshadowed the subsequent discussions in Chapter Four and Five. While Chapter Three underscored the importance of countries utilising the TRIPS flexibilities to adapt their IP laws to their specific needs, Chapter Four showed that despite the significance of the flexibilities, they are insufficient by themselves to drive the agricultural innovation and development needed to achieve the ambitious objectives of Agenda 2063. Therefore, a comprehensive suite of measures including the implementation of utility models and sustained investments in R&D were deemed essential to realign incentives for technological progress in a manner beneficial to the continent. Chapter five outlined the legal, policy, and regulatory tools necessary to shift agriculture from its current state of stagnation. It explored the innovation, IP and trade related legal and policy issues that influence agricultural development to identify how they could interdependently support agricultural growth.

Chapter Six was dedicated to designing a framework for determining the optimal blend of IP laws and policies required to move agriculture forward. The framework aimed to provide guidance in identifying the most effective strategies for leveraging IP to support agricultural development. This final chapter summaries the key findings of the preceding chapters and provides recommendations and a general conclusion.

7.3 Summary of Findings and Recommendations

It is trite that agriculture is the cornerstone of African economies, employs a big portion of the labour force and contributes substantially to GDP. A constellation of factors affect the sector's growth and expansion including climate variability, reliance on rain-fed agriculture, inadequate storage facilities (leading to high post-harvest losses), low adoption of modern agricultural technologies (such as improved seeds, mechanisation, and digital tools), inadequate investment in agricultural research, multiple trade barriers, and bureaucratic red tape,[5] more specifically elaborated in section *1.2.3.1* and *3.4.1*.These factors were found to collectively constrain the development potential of the sector.

Despite these challenges, growth and productivity are achievable if measures to address the bottlenecks are implemented. This however is challenging because of weaknesses of the sector, but more particularly because of the inadequacy of existing IPR regimes in supporting sector growth.

The findings of this study and the specific recommendations are organised around six themes: (i) the relationship between the study's key elements—'IP, innovation, trade, and agriculture; (ii) the feasibility of IPR in advancing agriculture; (iii) the strengthening of Africa's endogenous technological capacity via utility models and an R&D strategy; (iv) Complementary legal and policy prescriptions; and (v) the adoption of a pro-development TRIPS-compliant IP framework as a way out. While presenting these themes, this chapter synthesises the main findings and recommendations from each chapter, addressing both the primary and subsidiary research questions. Each of these themes is surveyed below.

7.3.1 The Relationship between IP, innovation, trade and agriculture

The relationship between IP, innovation, trade and agriculture was thoroughly explored in Chapter Two which addressed research Sub-question 1. The inquiry included dynamics and considerations that encouraged linking these four aspects, as clarified in the analytical framework.

As discussed in section *2.4.1,* the key relationship lies in the role innovation plays in agriculture by driving advancements in areas such as crop breeding, machinery, and biotechnology. IPR protects such innovations, and provides incentives for R&D investment.

[5] See Chapters 1–3 for challenges in the agricultural sector.

Without protection, technological solutions to problems would be extremely limited. The relationship between trade and agriculture is also quintessential, as trade agreements and policies influence agricultural trade flows and can define market conditions for agricultural products.

The research underlined the importance of trade, more particularly the AfCFTA in achieving the goals set out in Agenda 2063, as it is linked with the strategic objectives of the Agenda. Section *2.5* particularly emphasised that the synergetic relationship between innovation, IP, trade and agriculture must be fully exploited, and the barriers in countries' IP and trade regimes that frustrate agricultural development eliminated such as inflexible IP laws and NTBs. For the AfCFTA to generate this value, it was deemed necessary under section *4.4.1* that R&D and innovation be enhanced, education skills shortages corrected and appropriate laws and policies enacted.

Ultimately, the research found that the relationship between IP, innovation, trade, and agriculture is shaped one by the other, and recommended that their governance and policy frameworks be coherent to harness the complementarities.

7.3.2 The feasibility of IPR in enabling agricultural Advancement

It has been argued that while patent protection considerably contributes to innovation and economic growth in developed countries, it does not necessarily have the same effect in developing countries. The absurdity is attributed to the fact that patent protection becomes beneficial within industrial activities only after a country has reached a certain threshold of indigenous innovative capacity and possesses extensive science and technology infrastructure.[6] Similarly, while PBRs are crucial for the commercial development of seeds, in many countries, the production and distribution of commercial seeds is limited. Instead, the informal seed system, which relies on the production and exchange of farmers' varieties, remains the main conduit for disseminating improved varieties. In fact, over 80 per cent of crops in developing countries are planted using seeds from the informal system. [7]

[6] YK Kim et al 'Appropriate intellectual property protection and economic growth in countries at different levels of development' (2012) *Research Policy* 358 at 359, citing Kim L *Imitation to Innovation: The Dynamics of Korea's Technological Learning* Harvard Business School Press, Boston (1997).
[7] BD Jonge & P Munyi 'A differentiated approach to plant variety protection in Africa' (2016) 19(1–2) *The Journal of World Intellectual Property*28–52.

In this regard, it is imperative for countries to tailor their domestic IPR laws to incorporate the flexibilities provided by the TRIPS Agreement to enable the development of endogenous technological capabilities while simultaneously facilitating access to essential technologies.

Chapter Three proposed utilising the flexibilities, such as the exceptions outlined in Articles 30 and 31 to mitigate the negative impacts of patents on access to agricultural technologies and societal development. Given that the use of these flexibilities can be contentious, the chapter argued that interpretative sources such as articles 7 and 8 of the TRIPS Agreement, the Doha Declaration, Australia-TPP (No. 1[8] and No. 2[9]), and the VCLT can be employed to equilibrate IPR with the public interest. Section *3.6.3* encouraged the implementation of *sui generis* PBR legislation as part of a holistic strategy to effectively address these issues. In so doing, it tackled the second, third and fourth research sub-questions that examined the current obstacles to the growth of the agricultural sector upon which appropriate legal and policy prescriptions could be proposed to repair it.

The following recommendations are proposed for leveraging the TRIPS flexibilities to address IPR imbalances to facilitate agricultural growth. The recommendations stem from conclusions drawn about the inappropriateness of existing IP frameworks, discussed in *5.3*.

7.3.2.1 Procedural Flexibilities —Transition Periods

When the TRIPS Agreement entered into force in January 1995, LDCs were given until January 1, 2006 to bring their legislation into conformity with the agreement, provided they complied with national treatment and MFN obligations. Pursuant to Article 66(1), upon presentation of a duly motivated request, the TRIPS Council is obligated to provide extensions of the transition period "in view of the special needs and requirements of LDC Members, their economic, financial and administrative constraints, and their need for flexibility to create a viable technological base."[10] The first extension was granted in 2002 under paragraph 7 of the Doha Declaration on the TRIPS Agreement and Public Health, specifically concerning

[8] Panel Report, *Australia–Certain Measures Concerning Trademarks, Geographical Indications and other Plain Packaging Requirements Applicable to Tobacco Products and Packaging*, WTO Docs WT/DS435/R, WT/DS441/R, WT/DS458/R, WT/DS467/R (28 June 2018) ('Australia-TPP No. 1').
[9] Appellate Body Report, *Australia–Certain Measures Concerning Trademarks, Geographical Indications and other Plain Packaging Requirements Applicable to Tobacco Products and Packaging*, WTO Docs WT/DS435/R, WT/DS441/R (9 June 2020) ('Australia-TPP No. 2').
[10] Article 66.

pharmaceutical patents and regulatory data requirements.[11] A general extension of the LDC transition period was adopted by the TRIPS Council in 2005, extending the deadline to July 1, 2013.[12] The transition period has been extended multiple times, most recently until July 1, 2033. Countries could actively pursue further extensions as necessary to advance their development (agricultural) agendas.

There is sufficient basis as seen in Chapter 3 and 6 to justify the delay particularly by LDCs to implement certain TRIPS obligations as part of their strategy to build a sustainable technological base. The article 66 policy space should be utilised to empower countries to concentrate on developing their domestic technological and institutional capabilities as they have no immediate pressure to fully comply with TRIPS requirements.

However, considering that more than two decades have elapsed since TRIPS was enacted, it is defeatist to simply extend the transition period without a comprehensive evaluation of past progress. It is necessary for LDCs to conduct a thorough introspection to assess achievements and identify actions needed to fully maximise the benefits of Article 66, to ensure that they are on a steady path toward technological advancement. Countries must not motivate for continued delays without seeking improvement or progress.

7.3.2.2 Recommendations for Leveraging Substantive flexibilities

Based on the discussion in section *3.6*, it is advisable for countries to strategically utilise the TRIPS flexibilities to achieve their development goals in conformity with articles 7 and 8 which provide essential interpretative guidance for applying the TRIPS provisions.

Establish Bespoke Standards for Patentability

As argued in section *3.6.2.1* and *6.5.1.2.1*, countries should leverage article 27(1) of the TRIPS Agreement to establish their own standards for patentability. This includes defining the criteria for novelty, inventive step, and industrial applicability, in accordance with their development objectives. Given the absence of specific definitions within TRIPS, any

[11] WTO Document IP/C/40 (Decision of the TRIPS Council of 27 June 2002, extending the transition period under Article 66(1) for Least Developed Country Members). Also see WTO Document WT/L/478 (The Doha Declaration on the TRIPS Agreement and Public Health, 14 November 2001); WTO Document IP/C/64 (Decision of the TRIPS Council of 11 June 2013, extending the transition period under Article 66(1) for Least Developed Country Members until 1 July 2021).

[12] WTO Document IP/C/64 (Decision of the TRIPS Council of 11 June 2013, extending the transition period under Article 66.1 for Least Developed Country Members until 1 July 2021).

definitions or interpretations developed by countries can be brought in line with the purpose sought. For example, strict criteria can be implemented to prevent overly broad patent claims, and patent examination processes can be designed to factor in local conditions and priorities.

(a) **Implement Exclusions from Patentability**

Related to the above, section *3.6.2.2* discussed the need for countries to utilise Article 27(3) of the TRIPS Agreement to exclude specific subject matter from patentability so as to retain greater control over crucial agricultural technologies.[13] For example, excluding "essentially biological processes" for plant production as permitted by Article 27(3)(b) can help protect traditional agricultural practices and biodiversity. Countries should also consider implementing recommendations from the Commission on Intellectual Property Rights[14] including excluding diagnostic, therapeutic, and surgical methods, as well as plant and animal varieties and genetic materials from patent protection to promote local innovation and mitigate monopolistic practices.

(b) **Compulsory Licensing**

In line with the observations in section *6.5.2.1.2*, it is recommended that governments proactively adopt and implement legislation that facilitates the issuance of compulsory licenses. The compulsory licensing and government use flexibility is one of the most powerful tools available under the TRIPS Agreement, as amplified by the Doha Declaration. So far, many countries have shown an apparent reluctance to utilise them, except in a relatively small number of cases.[15] Yet, the consistent prioritisation of IPR enforcement by developed countries and multinational corporations over promoting access has led to technologies becoming inaccessible[16] due to monopoly pricing. Compulsory licenses and government use provisions therefore appear as useful tools as they act as

[13] Article 27.3(b)) allows governments to exclude some kinds of inventions from patenting, i.e. plants, animals and "essentially" biological processes (but micro-organisms, and non-biological and microbiological processes have to be eligible for patents). However, plant varieties have to be eligible for protection either through patent protection or a system created specifically for the purpose ("sui generis"), or a combination of the two.

[14] Commission on Intellectual Property Rights *Integrating Intellectual Property Rights and Development Policy: Report of the Commission on Intellectual Property Rights* London (2002).

[15] Examples of African countries that have used this flexibility include Eritrea, Ghana, Mozambique, Zambia, and Zimbabwe. See M Khor Compulsory *License and "Government Use" to Promote Access to Medicines: Some Examples* (Third World Network, 2014) at 24.

[16] YA Vawda 'Compulsory licenses and Government Use: challenges and opportunities. *Access to Medicines and Vaccines: Implementing Flexibilities Under Intellectual Property Law*' (2022) 73-104.

crucial safeguards against abusive practices by IPR holders, and as mechanisms to ensure the public's right to access technologies at affordable prices. Legal frameworks for compulsory licensing should be structured to facilitate swift, fair, and predictable licensing procedures to enable accessibility so as to address legitimate public needs.

It is emphasised that whilst ordinarily a preserve of the health sector, compulsory licenses have potential to be extended to other sectors including agriculture to ensure the availability of vital agricultural innovations such as patented seeds or crop treatments which can be accessed without the hindrance of prohibitive licensing agreements or exorbitant royalties. Their use should be guided by provisions of the Doha Declaration, with the grounds for their issuance left to the discretion of individual governments.

(c) **Formulate Research and Experimental Use Exceptions**

Countries are encouraged to integrate robust research exceptions into their IP laws, leveraging the provisions outlined in Article 30 of the TRIPS Agreement and discussed in detail in section *6.5.2.1.1*.

(d) **Implement Exhaustion Regime**

Countries should implement the regional patent exhaustion regime specified in Article 7(1) and (2) of the AfCFTA IP Protocol which provides opportunity to enhance technology diffusion and access to agricultural biotechnology. Section *6.5.2.2* showed that TRIPS left the option to legislate on this matter to Member States, while the AfCFTA IP Protocol has directed on a regional exhaustion approach whose application will allow for the parallel importation of agricultural products which will enable farmers to acquire seeds, machinery, and other patented technologies at competitive prices.

(e) **Strengthen Patent Disclosure Requirements**

The discussion in Chapter Three further explored the aspect of disclosure as a regulatory legal and policy measure that would enable the productive sector to master imported technologies, adapt them to local conditions, improve them, and finally use them as a base for creating innovations locally. Its importance was canvassed in section *3.6.2.3.* To ensure thus that patented technologies are effectively transferred and utilised, it is recommended that countries adopt stringent disclosure requirements over and above the minimum standards set by Article 29(1) of the TRIPS Agreement. This could involve demanding

detailed descriptions of the processes used to create patented products to ensure that the disclosed information is adequate for local scientists and engineers to replicate and build upon the technology.

7.3.2.3 Recommendations for Leveraging Flexibilities Under PBR

The thesis has provided various regulatory options for Africa, including sui generis interventions. Alternative IP frameworks that adopt farmer-centric provisions such as limitations on PBRs and exemptions for private, non-commercial use are expected to empower local communities to preserve agricultural biodiversity and promote sustainable farming practices, as seen in countries like India and Thailand. It is submitted that countries consider introducing bespoke PBR regimes that reflect these nuances, as shown in section *3.6.3* and *6.6.2*.

The following approaches are particularly beneficial:

(a) **Establish Differentiated Protection Systems**

Section *6.6.2.1.1* encouraged countries to consider creating bespoke PVP systems. The legal basis for this approach lies in Article 27(3)(b) of the TRIPS Agreement and Article 8 of the AfCFTA Protocol. A differentiated system should offer various levels of protection tailored to different crops based on their economic value, agricultural significance, and contribution to national food security; to allow policymakers to concentrate on protecting crops that are vital for the agricultural sector. For instance, protection can be initially limited to a few critical species, gradually expanding as resources and capacities grow. This would enable countries to prioritise their most important crops, with potential to expand coverage over time.

(b) **Define Plant Varieties according to Local Needs**

Following on from the previous point, countries are urged to customise the definitions of plant varieties and their protection criteria to suit their distinct agricultural and economic needs. It is crucial to ensure that both commercially developed varieties and those traditionally cultivated are adequately acknowledged and safeguarded. Thailand's PVP Act differentiates between new plant varieties and existing ones and establishes a framework for variable levels of protection, which could inspire other countries in a similar direction.

(c) Incorporate Farmers' Rights and Benefit Sharing

There are precedents within and outside of Africa for deviations from the archetypal UPOV approach, as seen in section *6.6.2.1.2.* PVP laws should be harmonised with the needs of local farmers and breeders, and countries should integrate farmers' rights and benefit-sharing provisions into their legislation. India's PVP system is an exemplar of bespoke rules, as it includes simplified procedures for farmers to register their varieties, the right to save and use seeds, and compensation mechanisms for failed commercial varieties.[17] Similarly, Thailand's PVP Act mandates benefit-sharing agreements for the use of local plant varieties.[18] Needless to mention, the process of compliance with the AfCFTA IP Protocol could naturally align PBR laws with Article 8 and Articles 18-20, which require protection mechanisms that support both commercial breeders and smallholder farmers, under its ABS,[19] genetic resources[20] and TK/TCE[21] provisions.

Implementing these measures would go a long way in ensuring that traditional farming practices are preserved, and that farmers benefit from the commercial use of their contributions.

(d) Explore Alternative Criteria for Protection

Rather than strictly adhering to UPOV's criteria of novelty, distinctness, uniformity, and stability, African countries could consider adopting alternative criteria that better suits their agricultural environments. For example, the criterion of 'identifiability,' which emphasises describing unique characteristics of plant varieties can be a more inclusive and adaptable standard. Malaysia's approach, which allows for the protection of varieties developed by local communities based on distinct and identifiable traits offers a practical model to the extent that it supports the protection of a wider range of plant varieties, including those that contribute to food security and biodiversity.

[17] See Section 39 and 41.
[18] See Section 46.
[19] 18(2)(c), 19(2)(c) and 20(1)(c).
[20] Article 20.
[21] Article 18 and 19.

(e) **Match PVP Laws with National Development Priorities**

Countries may consider bringing PBRs in line with broader national agricultural and developmental priorities, including setting protection criteria that mandates new varieties to address specific national needs such as nutritional improvements or resilience to local environmental conditions. Bangladesh's plant varieties Act discussed in section *3.6.4* which requires new plant varieties to meet the specific needs of the local population exemplifies how PBRs can support national development objectives.

(f) **Legislate on TK/TCEs and Utility Models**

Finally, protection mechanisms for areas not covered by the TRIPS Agreement must be pursued, as they make solid the legislative freedom countries have in advancing their development agenda. Countries can explore legislation for utility models and TK/TCEs to enable localised solutions to agricultural challenges.

Whilst not covered by TRIPS, TK/TCEs and ABS measures have garnered attention from international organisations such as WIPO and UNESCO, as well as within the African continental legislative framework. The AfCFTA IP Protocol mandates the incorporation of ABS and TK/TCEs into national laws to ensure that the utilisation of genetic resources and TK is ethically compensated and legally documented. Section *6.6.3.1* touched on this mandate. The protocol's requirements for disclosing the source of genetic material, obtaining PIC, and ensuring equitable benefit-sharing echo successful national models like India's PVP legislation which provides a rigorous framework for protecting biodiversity to support local agricultural development. Within the mandate of Article 8 of the AfCFTA IP Protocol thus lies an opportunity for countries to redesign PBR legislations that have been eschewed by farmers.

The possibility, however, that developed countries may challenge the utilisation of some of the measures prescribed above must be borne in mind. To address this concern, Chapter Three recommends relying on interpretative sources that guide the application of these flexibilities. section *3.5.4* provides a detailed discussion on Articles 7 and 8 of the TRIPS Agreement, as well as the Doha Declaration, Australia—TPP (No. 1 and No. 2), and the VCLT. The sources offer guidance on how to navigate the challenges that may surround the implementation of the TRIPS flexibilities and give scope for countries to assert their rights while balancing international obligations with development priorities.

7.3.3 Strengthening Africa's endogenous technological base

The key issue for developing countries is not whether IP protection is strong or weak, but whether countries have legislation commensurate with their level of development, technological capabilities, and provides the appropriate form of IP protection. This nuance is often overlooked in the design of IP laws in African countries. To effectively promote agricultural innovation and advance toward the goals of Agenda 2063, it is essential for countries to adopt a comprehensive approach that goes beyond mere TRIPS compliance. The approach should consider how compliance can be achieved while taking advantage of the diverse flexibilities offered by TRIPS, and simultaneously integrating supplementary development instruments like utility models.

Chapter Four outlined the critical role of utility models and a Pan- African R&D strategy in building the endogenous technological base and promoting agricultural technological progress in Africa. It also explored additional strategies aimed at strengthening Africa's IP systems such as expanding the role for the IP office under the AfCFTA IP Protocol to incorporate considerations for agricultural technological development. The discussion, presented in two main parts answered research sub-questions 3 and 4, that is, how can the problematic agricultural sector possibly be repaired, and what legal frameworks and policy measures are essential to achieve the agricultural objectives of Agenda 2063?

Part I of the chapter found that utility models can be of particular importance for developing countries, since they protect minor innovations that predominate the innovative process of such countries. It was argued that if well deployed, utility models, can help stimulate innovation, address IP gaps, and support the developmental objectives of the continent as outlined in Agenda 2063.

The chapter provided an in-depth exploration of this second-tier right and differentiated it from patents by highlighting its capacity to accommodate adaptations and enhancements of existing technologies and products. It discussed international rules concerning utility models, noting the absence of specific norms within TRIPS and its limited mention in the Paris Convention and PCT. However, it stressed the flexibility countries have in adopting utility model regimes tailored to their socio-economic conditions, which can be done without violating international regulations. Article 13 of the AfCFTA IP Protocol was highlighted for

affirming the rights of African countries to augment their current IP frameworks with utility model systems to strategically support their development priorities.

China, along with South Korea are prime exemplars of the importance of utility model regimes in facilitating technological development, economic progress and catch-up. Both countries extensively used utility models as a foundation for more patentable inventions, as technological capacities advanced. The examples underlined the versatility and effectiveness of utility models in boosting domestic innovation capacity, particularly in situations where technological capabilities are still evolving. Even in technologically advanced countries such as Japan and Germany, utility models continue to promote innovation, which demonstrates their enduring relevance.

Part II of the chapter dealt with the subject of R&D to determine what needs to be done to leverage R&D as the glue that sticks innovation and IP towards Agenda 2063. The importance of R&D and innovation in explaining economic growth is already well documented.[22] Innovation in agriculture helps farming to become more efficient, environmentally friendly, less labour-intensive, and high-yielding. Any technological innovation that aids progression in these areas requires investment in R&D (the knowledge production part of innovation). Against the backdrop of reduced or stagnant national funding for R&D and declining international R&D funding sources, Chapter Four proposed new funding approaches considering that many African governments struggle to prioritise R&D investment and only marginally fund it.[23]

Based on these observations, two key recommendations are proposed. First, latecomer countries with a low technological base should adopt less stringent IPR systems in the early stages of their catch-up process, complemented by utility models. This will enable local firms to build technological capabilities through imitation and reverse engineering of existing inventions. The underlying premise is that IPRs can have varying impacts on countries at different stages of economic development. [24] For instance, prior to the mid-1980s, Korea extensively relied on reverse engineering, technology importation, and imitation to address its

[22]B Becker 'Public R&D policies and private R&D investment: A survey of the empirical evidence' (2015) 29(5) *Journal of Economic Surveys* 917–-942.
[23] Lewis J, Schneegans S & Straza T *UNESCO Science Report: The Race Against Time for Smarter Development* UNESCO Publishing (2021).
[24] See C Fink & KE Maskus Intellectual *property and development: lessons from recent economic research* World Bank Publications (2005) Also see CIPR Supra (2002).

technological needs.[25] Local inventors typically modified or adapted existing or imported technologies, and secured utility model protection for their incremental innovations. By the late 1990s, Korea had risen as one of the world's leading patenting countries.[26]

IPR protection should gradually progress from less strict to stronger IP protection, with utility models playing a crucial role in this transition. There is after all, an abundance of literature to show that governments strengthen their IPR systems as their economies become wealthier and attain technological sophistication,[27] as exemplified by China's experience and the review of its utility model system discussed in section *4.4.4.1.* This emphasises the notion that different IPRs are more suitable for countries at varying stages of economic development.[28]

The second recommendation is to develop a Pan-African R&D strategy to address Africa's specific R&D challenges. Africa requires consistent, sufficient, and sustainable R&D funding, particularly in the agricultural sector to promote innovation, generate IP, enhance product competitiveness, and achieve Agenda 2063's agriculture-related goals. Therefore, Chapter Four proposed a continental R&D strategy as an innovative vehicle to channel R&D efforts on the continent. The proposed R&D strategy is essential to elevate agricultural performance, with accelerated R&D efforts leading to the creation of competitive agricultural products, many of which will embody IP, thereby boosting regional and global agricultural trade and leading to sector growth.

Finally, an enhanced role for the IP Office of the AfCFTA IP Protocol was proposed, under section *4.6*. The IP office established under Article 31 (1) of the AfCFTA IP Protocol (pending operationalisation) and currently includes the AfCFTA Secretariat, Africa CDC, and the AMA[29] should be expanded to include an additional department focused on agriculture. The department would integrate agricultural issues into the IP office's work programme, and provide dedicated support for the sector's growth through IP. One of the key roles should include promoting R&D (agricultural) and technological development and/ implement the R&D Strategy.

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[25]L Kim *Imitation to Innovation: The Dynamics of Korea's Technological Learning* Harvard Business School (1997).
[26] Ibid.
[27]KE Maskus 'Intellectual property rights and economic development' (2000) 32 *Case W. Res. J. Int'l L.* 471.
[28] RE Evenson & LE Westphal 'Technological change and technology strategy' in Behrman J & Srinivasan TN (eds) *Handbook of Development Economics* (1995)3 at 2209–2299, 2244–45; cf SJ Lacroix 'The political economy of intellectual property rights in developing countries' in Woumasset JA & Barr S (eds) *The Economics of Cooperation: East Asian Development and the Case for Pro-Market Intervention* (1992) 79, 84.
[29] Article 31 (2) AfCFTA IP Protocol.

7.3.4 Legal and Policy Prescriptions

To answer research sub-question 4 on the legal frameworks and policy measures essential to achieve the agricultural objectives of Agenda 2063, a critical aspect explored in Chapter Five of the discussion was the historical foundation of national IP systems in Africa to help understand the current IP patchwork in countries. The analysis brought bare a complex evolution shaped by colonial legacies, international agreements, and a lack of attention to local economic priorities. The legacy of colonial-era legislation contributed to a fragmented IP environment on the continent that has hampered innovation diffusion, technology transfer, and led to the inconsistent legal protection of IPR, impeding the pace and trajectory of development (agricultural).

The role of the Abuja Treaty in promoting economic integration and the importance of continental initiatives like CAADP and STI policies demonstrated Africa's commitment to agricultural advancement, even though it was clear that these instruments do not make a deliberate attempt to link IP, agriculture and trade in a unified strategy. The AfCFTA IP Protocol can be the beginning of an effort to address Africa's unique needs in agriculture. The following findings and recommendations were pertinent to this chapter.

(a) Policy Coherence

Agricultural policy, exemplified by initiatives such as CAADP at the continental level, provides a framework for agricultural development. However, challenges such as lack of policy coherence, limited resources, and insufficient political commitment hinder its effect. Section *5.5* emphasised that harmonising agricultural policies with the policies of other sectors such as IP, innovation, trade, investment, and competition is key to achieving common objectives and maximising positive outcomes. Policy coordination was put forward as a tool to unlock agriculture's full potential as a driver of development. The whole-of-government approach was emphasised to ensure collective action toward national and continental development agendas.

The policies impacting agriculture were discussed to highlight the necessity for deliberate efforts to ensure their mutualistic support. Chapter Five's discussion on the significance of IP policy showed that although not the main catalyst for agricultural development, IP policy energises innovation and progress within the sector. However, challenges such as the lack of clear IP policy guidelines, non-integration of IP into national

development plans, and weak institutions administering IP have limited its impact. The need for designing IP policies that promote agricultural development while ensuring public access to new technologies was reiterated, as has been emphasised throughout the thesis.

Trade, investment, and competition policies were found to impact agricultural outcomes, influencing production, commerce, and market dynamics. Within the trade sphere, it was observed that tariffs, quotas, and non-tariff barriers dictate market penetration for agricultural commodities, with current initiatives under the AfCFTA aiming to dismantle such barriers. It is recommended that continuous assessment and refinement be made of these policies to ensure coherence with broader agricultural development objectives, and indeed, to ensure the synergies are achieved.

It was found that the lack of coordination among different policy spheres undermines efforts to address complex challenges. Inter-policy coherence was recommended for effective policymaking and implementation, particularly in sectors like agriculture where multiple policies intersect.

(b) **The Whole-of-Government Approach**

The Whole-of-Government Approach or Joined Up Government, more elaborately discussed in section *5.6* is recommended to coordinate efforts across various government departments and agencies to address the multifaceted challenges faced by the agricultural sector. The rationale underlying the approach is the fact that agricultural development of necessity involves the policies of a range of MDAs responsible for trade, industrialisation, investment, competition, science and technology among others. Thus, a critical factor for agricultural transformation is policy alignment. IP, innovation, trade and agricultural policies should be brought in line with the goals, objectives, and strategies of cognate departments.[30]

The challenge for policymakers is to map these policy networks and identify areas for stronger integration, determine where policy can be coordinated more effectively between MDAs for greater impact, determine how existing mechanisms for coordination can be recruited in support of the proposed implementation approach (section *7.4*), and determine policy gaps that require customised measures.

[30] D'Este P, Iammarino S, Savona M & Von Tunzelmann N 'What hampers innovation? Evidence from UK' (2008) 44 *Sci. Technol. Policy Res* 168.

7.3.5 A Pro-development TRIPS-Compliant IP Framework

Based on the discussions in the preceding chapters, Chapter Six presented a TRIPS-compliant pro-development legal framework that countries could consider adopting in line with their development objectives; one that utilises the TRIPS flexibilities and the *sui generis* policy space permitted by Article 27(3)(b) of TRIPS. It also provided perspectives into considerations for constructing the ideal IP legal framework, emphasising legality, effectiveness, efficiency, subsidiarity, and proportionality as fundamental principles.

Key elements of the structure of the legal and policy framework were outlined, including an overview of the country's socioeconomic profile, an IP audit, and alignment with national development agendas. The chapter underscored the importance of engaging with the main policy issues such as maximising TRIPS flexibilities, promoting technology transfer, and nurturing local R&D, particularly in the agricultural sector. Section *6.3.2* emphasised the need to harmonise domestic IP laws with international commitments, including treaties such as the CBD, Nagoya Protocol, ITPGRFA, AfCFTA IP Protocol and non-IP treaties such as UNDRIP and UDHR.

Overall, the framework advocates for a judicious approach to TRIPS flexibilities, strategically adapted to Africa's agricultural needs. The main aspects of a tailored framework were introduced in Chapter Three, and exhaustively discussed in Chapter Six. Section *6.4.1* provides a summary of the aforesaid framework.

7.4 Proposed Implementation Approach

The effective realisation of the recommendations in this thesis requires a well-defined implementation framework that assigns roles and responsibilities to key stakeholders to ensure a coordinated approach to leveraging the key levers in the study (IP, innovation and trade) for the actualisation of the agricultural related goals of Agenda 2063. The proposed framework involves national governments, regional bodies, international organisations, the private sector, and civil society, each with specific responsibilities as listed in the table below:

Table 2— **Implementation Approach**

Key Focus Area	Key Actions	Lead Actors
Policy Alignment	Review national and regional IP policies to integrate TRIPS flexibilities and support agricultural innovation.	National Governments,
Legislative & Institutional Strengthening	Establish or enhance national IP offices and research institutions.	National Governments, AfCFTA IP Office.
Capacity Building	Train policymakers, farmers, and researchers on IP systems in agriculture.	National Governments WIPO, FAO, Civil Society.
Regional Harmonisation	Develop and implement an annex to the AfCFTA Secretariat to lead the harmonisation process, including the establishment of an AfCFTA IP office with an enhanced role.	AfCFTA Secretariat.
Technology Transfer & Innovation Support	Facilitate knowledge-sharing and commercialisation of agricultural technologies.	Private Sector, R&D Institutions, Governments.
Monitoring & Evaluation	Track progress and refine policies based on impact assessments.	National Governments, AfCFTA IP Office, FAO.
Public-Private Partnerships (PPPs)	Strengthen collaboration between governments and private actors to support investment in agricultural innovation.	National Governments, Private Sector.

7.5 General Recommendations

The general recommendations provided in this final chapter directly address sub-question 5 by outlining how the research outcomes can be utilised by relevant actors. The recommendations are drawn from the thorough exploration of key issues discussed in Chapters 3, 4, 5, and 6, and are further refined in this final chapter. The findings indicate that a range of measures can be implemented to create a supportive IP regime that fully harnesses the potential of the agricultural sector, with the following reform measures being especially relevant.

(1) **Legislative Changes**: – Legislative reforms within the patent and PBR frameworks should be considered to make them appropriately amenable to the development priorities of countries. Two key possibilities arise here: Developing patent laws that utilise the legislative space for maneuver under TRIPS; and the Legal reform and/ or policy reversal (roll back) of UPOV–like legislation, where feasible. The approach to the first has extensively been discussed under section *3.6.3* and *6.6*. Regarding the second, it is recommended that countries 'move forward by stepping back.' This is because the adoption by countries of UPOV-like PVP systems

compromises the inherent flexibility of Article 27(3)(b) of TRIPS and conflicts with provisions of the AfCFTA IP Protocol which allow for ABS,[31] discussed in section *6.6.2.2* and *6.6.3.1*.

National laws modeled after the UPOV Convention can have detrimental impacts on smallholder farmers and, over time, may hinder the achievement of key policy goals such as poverty alleviation in many countries. Therefore, it is essential for countries to develop legal frameworks that align with their national interests and objectives before committing to UPOV obligations. For countries that are bound by the convention, any attempts at legal reform or policy reversal should be carefully guided by domestic legal processes, as well as existing bilateral and multilateral agreements. However, it is anticipated that rolling back such commitments may prove exceedingly challenging for these countries, given the legal and political complexities involved.

Along with protecting farmers from the detrimental effects of UPOV like PVP laws, national laws should be designed in such a way that farmers make use of them and benefit from the PBR regime. Countries should thus take a step backwards and consider developing their own context-specific *sui generis* PVP legislation which would better protect the informal indigenous seed systems and farming practices that have supported the continent for decades.

(2) **Develop a Continental R&D Strategy: –** While AU Member States are at very different levels of agricultural transformation, they still have collective agricultural needs, vulnerabilities and long-term objectives. In some cases, however, because they are at different phases of agricultural transformation, their needs may not easily align and even if a few countries were to align their positions and needs, their ability to engage in the highly technical and granular aspects of R&D and innovation is inevitably limited when they do not have the level of technology, human resources and the experience to engage at various platforms. For this reason, countries have to work together to ensure that advances are made collectively on agricultural issues of common concern. Hence, a continental R&D Strategy is proposed to unite resources and capacities and coordinate efforts in Member States, ensuring that R&D initiatives are in congruence with Africa's agricultural and developmental agenda.

[31] See Article 8, 18,19 and 20 of the AfCFTA IP Protocol.

(3) **Establish Inter-Institutional Patent Information Center: –** To strengthen the innovation framework and enlarge technological capacities, it is recommended that countries establish national inter-institutional patent information centers. The centers would effectively harness patent information as outlined in section *3.6.2.3*, and serve as repositories for global patent data. Similar to WIPO's patent scope, the centers would provide support and guidance to users and researchers, with services such as patent searches, access to patent databases, training, and customised patent analysis reports. The AfCFTA Protocol's IP office could also play a role in this initiative. While the ideal location ought to be within national IP offices, the centers could also be based in research institutions, universities, or libraries.

The center should operate as an inter-institutional hub, bringing together various sectors and institutions that can leverage patent knowledge or externally developed innovations. It should be equipped with advanced patent analytics tools and software to analyse and visualise patent data to enable the identification of trends, patterns, and technological advancements within specific industries or technology fields. Such capability will support informed decision-making and strategic planning. Furthermore, the center's role would be instrumental in incorporating patent information into national innovation policies, strategies, and research agendas, hence promoting a more integrated and innovation-driven approach to development.

7.6 General Conclusion

This work explored strategies for strengthening Africa's agricultural sector to achieve the goals set out in Agenda 2063, guided by clearly defined research questions. It demonstrated that the sector's development depends on interventions beyond agriculture itself, such as well-developed and supportive IP, innovation and trade regimes. It established the vital connection between IP, innovation, and trade in advancing the agriculture-related goals of Agenda 2063, and emphasised that these levers, working together, are essential for the sector's successful transformation.

An argument was made that for the sector to meaningfully contribute to Agenda 2063, an enhanced IP legal framework is necessary—one that integrates both *ex-ante* and *ex-post* applications of the TRIPS flexibilities as permitted under the Agreement, coupled with other targeted interventions. The aggregate of the analysis pointed to the need for a bespoke IP framework.

The thesis then proposed an adaptive framework, which offered a range of legal and policy options. Three overarching adaptation strategies were recommended: (1) reforming the IPR legal framework to better serve Africa's agricultural needs, (2) developing a Pan - African R&D strategy to enhance innovation, and (3) adopting a whole-of-government approach to ensure cohesive and coordinated policy implementation. Each strategy was introduced as a versatile solution, without adhering to a fixed sequence.

However, after proposing the legal framework and addressing potential criticisms in section *3.6.2.4.2*, its practical application must be evaluated to fully endorse its adoption. To begin with, codifying clearly defined rights including the aforesaid flexibilities into a legal framework that is compatible with international obligations bolsters the proposed framework's viability. The framework is not only practical but also enables countries to operate within their legitimate rights. Moreover, codification provides structure and consistency, reduces ambiguity, and aids enforcement.

The nature of the strategies described above, particularly the proposed IPR legal framework, the R&D Strategy, and the Whole-of-Government Approach which fuses policy coherence and governance contribute to this thesis being unique in its academic focus. The proposed strategies provide an integrated perspective on how agriculture can be advanced in Africa, towards Agenda 2063, an area that has not been given the attention of sustained academic study. The contributions of this thesis stem from its methodological approach to formulating and addressing the research questions, as well as the insights drawn from its conclusions. The research is particularly relevant as the AU seeks to build an IP narrative that suits and reflects the circumstances in Africa.

Finally, the present and future challenges facing many of Africa's priority sectors necessitate a deeper examination of potential solutions. The proposed route for developing the agricultural sector can be adapted to other sectors as well. In this regard, further exploratory and doctrinal studies with a similar regulatory legal and policy framework are needed to establish an agenda for future research.

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