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Legal Prospects for Achieving Epistemic Data Justice for Rural Women in Tanzania and Kenya

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ABSTRACT

Integrating digital technologies in agriculture helps to address the gender gap in the economic sector; however, it also raises a challenge of epistemic data injustices. Epistemic data injustices in this context occur when the production and processing of rural women's data through agricultural technologies potentially results in disregarding their legitimate knowledge. Contemporary experiences show that legal regimes for data protection in Tanzania and Kenya can address the problem, although not fully and effectively. Against this backdrop, this article discusses how additional legal principles of the rule of law, best practice, and respect for human rights could complement and reshape the legal regimes to better oblige technology developers to address epistemic data injustices experienced by rural women more effectively. Using a decolonial theoretical lens, the article critically analyzes key data protection safeguards in Kenya and Tanzania and proposes complementary principles to enhance them. The author concludes that these additional legal principles offer new pathways toward achieving epistemic data justice for rural women in the context of digital agricultural technologies.

Keywords: Epistemic Data Justice, Gender, Africa, Rural Women, Human Rights, Data Protection, Digital Agricultural Technology

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I. INTRODUCTION

Of the over fifty-five million people living in Kenya, fifty percent of them are female. Seventy percent of them live in rural areas (InAble, 2022). In Tanzania, a State of over sixty-eight million people, sixty percent of the population live in the rural areas, and women make fifty percent of the population (Word Bank Group, 2024).

In both Kenya and Tanzania, agriculture is the backbone of the economies, with women playing a key role in the sector (Alila & Atieno, 2006). While the role of modern knowledge and skills in agricultural development is crucial, rural women in both Tanzania and Kenya continue to play essential roles as custodians of Indigenous knowledge within the agricultural sectors of these countries. The Food and Agriculture Organization (FAO) acknowledges that rural women possess extensive knowledge of plant varieties and crop development, which is vital for sustainable agricultural practices. This traditional expertise, seen in both Tanzania and Kenya, mirrors broader trends across the African continent, where the integration of Indigenous knowledge with modern technologies, such as artificial intelligence (AI) solutions in Ghana and Rwanda, is increasingly being explored for enhanced agricultural productivity (Gwandure & Lukhele-Olorunju, 2023). The expertise also aligns with goals outlined in the African Union's Agenda 2063 and the Comprehensive African Agricultural Development Programme (CAADP) for leveraging agriculture as a key driver of development (APET-CJED Secretariat, 2024).

To enhance the role of rural women in agricultural development in Tanzania and Kenya, there are emerging digital agricultural technologies which primarily target rural women in these States and other parts of Africa (Mayoux, Sandoval & UN Women, 2023). Apps like *iCow* in Kenya and *Agri-Tech* platforms in Tanzania help rural women access essential agricultural knowledge through their phones. For example, *M-Farm* in

Kenya allows women farmers to connect with buyers and access farm inputs using digital solutions. Similarly, *I-Farm* Kenya is an online platform that provides rural women with agricultural extension services and connects them to customers via a mobile app. Another example is the Livestock Information Management System in Tanzania, which also operates through a mobile app, supporting rural women in managing their livestock (UN Women, 2016). Likewise, some technologies are providing e-learning and training opportunities for rural women. For example, the *FarmDrive* platform helps train farmers on crop varieties, yields, and weather patterns. Additionally, *Wesonga* has identified several other agricultural use cases in East Africa, including technologies that offer crop microinsurance, weather information, and digitized farm-related payments. These technologies are also helping formalize agricultural value chains in the region (Wasonga, 2022). Other innovations are remote sensing as well and digital surveillance on farmlands through data provided by the rural women. Though varied in their application, the technologies have the desirable, and sometimes, observable impact of empowering rural women (Dagne, 2021), improving their productivity and contribution to economic development (UN Women, 2016).

These technologies involve use and analysis of the data of the rural women whom they target. Dagne (2021) notes that smart agriculture technologies, like those used for agricultural advisory and service provision, typically rely on software applications and platforms that use data for both defined and undefined purposes. This is evident in agricultural technologies targeting rural women. Emerging technologies such as *Digi-Farm* allow rural women to access services through mobile apps, similar to platforms like *I-Farm* Kenya and the Livestock Information Management System in Tanzania, mentioned in the United Nations' Women report of 2016 (UN Women, 2016). Other notable platforms include *AgriInfo*, which operates the *Jembe* platform in Tanzania, and *Hello-Tractor*, which functions in Kenya. Additionally, AI

is being used across Africa for applications such as weed management (APET-CJED Secretariat, 2024). These AI-powered agricultural technologies can collect personal information of rural women and uses predictive analysis of crop yields, seasons, and diseases (O'Neill, Marivate, & Glover, 2024), which are areas which have traditionally been a reserve of rural women's unique traditional knowledge (UN Women, 2016). Therefore, the output of such predictive analysis is a representation of the rural women whose data is aggregated. In some cases, the technologies use 'drones for precision agriculture' which the African Union High-Level Panel for Emerging Technologies has identified as an emerging technology of potential economic importance.

During the pre-production stages, these technologies are designed to allow rural women to log in with their data and access services through 'Internet of Things' solutions. The data collected may also be used for surveillance, including information such as names, farm details, and analytics to assess creditworthiness for farming loans. In the post-production stages, these technologies could use farmers' personal information to connect them with buyers and service providers, enabling data analytics and sharing of their information with third parties.

In both stages, the envisaged data processing operations is intricately connected with knowledge of the rural women whom they target. Kitchin (2024) notes, in general sense, that personal information about the world is crucial to creation of knowledge. That means, rural women's data represent information about the world and are therefore building blocks of rural women's knowledge and intelligence. In cases where knowledge is pre-determined in the design of the technologies, GPAI (2022) highlights that the ideologies behind technology design can shape how rural women perceive the world and contribute to their digital data. This complex relationship is also reflected in the High Court decision in Nubian Rights Forum & 2 others v. Attorney General & 6 others; Child Welfare Society & 9 Others (Interested Parties) [2020] eKLR. The case referenced the Indian

Supreme Court's ruling in Justice K.S. Puttaswamy (Retd.) and Another v. Union of India and Others, Writ Petition (Civil) No. 494 of 2012, which explored the link between information privacy and knowledge protection. The court noted that information processed through technology ultimately represents and reflects the individuals it concerns, in this case, rural women. Additionally, a report by InAble on digital accessibility in Kenya provides empirical evidence showing that the success of digital agricultural technologies depends on how they interact with the knowledge of stakeholders, including rural women (InAble, 2022). This interaction is vital to ensure that design of the technologies ensures justice which flows from recognizing knowledge of end-users and treating such knowledge fairly when it is confronted by or conflict with the so-called scientific knowledge embedded in agricultural technologies.

A challenge arises in the relationship between knowledge and information privacy within the context of agricultural technologies when their design allows for data collection, use, and analysis that overlook the unique knowledge of rural women. The June 2024 White Paper on 'AI and the Future of Work in Africa' specifically addresses how this issue can manifest. It highlights the risk that generative AI training data used to develop agricultural technologies may exclude indigenous knowledge, which is often socially sensitive (O'Neill, Marivate, & Glover, 2024).

The disregard or misrepresentation of the indigenous knowledge creates or exacerbate a tension between the lived knowledge of the rural women and scientific knowledge on crops, crops yield, weather patterns during the design of the technologies and their products such as digital extension services. As the lived knowledge of the rural women are their ways of seeing and understanding, such forms personal data about them represent their new ways of looking at issues (Ficker, 2007; Currie, 2021). The African High-Level Panel for Emerging Technologies has noted that automating agricultural processes with AI solutions could intensify existing tensions by failing to account for

local crop types and environmental conditions. Since rural women possess unique knowledge in these areas (UN Women, 2016), neglecting them in the automation process could result in the exclusion of their valuable expertise.

Ficker (2007) and Boaventura (2014) argue that overlooking the legitimate knowledge of rural women constitutes a form of epistemic data injustice. This happens when technology designs exclude data about how rural women understand and apply indigenous agricultural knowledge. Another form of epistemic data injustice arises when the limitations of a rural woman's knowledge are ignored, particularly by disregarding the social norms that shape it (Mahachi, 2023) or other lived realities (Center for Study of Violence and Reconciliation, 2023) which inform such limitations. In that case, the agricultural technologies which ignore the social norms which inform the limitations of the rural women's knowledge could lead to an indirect epistemic injustice.

There are already notable examples of both direct and indirect data injustices in Tanzania and Kenya. Ntoipo (2020) highlights that the traditional knowledge of women, particularly those from communities like the Maasai in Kenya and Tanzania, has historically been overlooked when developing innovative solutions. However, Ntoipo's analysis focuses mainly on new solutions without addressing whether these should include digital technologies, such as those mentioned by Wasonga (2022). Building on this, UN Women has expanded the discussion, recognizing that the exclusion of rural women's traditional knowledge also affects the development of agricultural technologies in Africa, including initiatives like I-Farm in Kenya and the Livestock Information Management System in Tanzania.

Besides the practical experiences, Court experiences reveal significant threats to the knowledge and involvement of rural women in the design of agricultural technologies. In the High Court Petition case of Nubian Rights Forum & 2 others v Attorney General & 6 others; Child Welfare Society & 9 Others (Interested Parties) [2020] eKLR, Dr. Orengo, who represented

the Petitioners, alerted the court to concerns about the negative impacts of these technologies on rural communities, which predominantly consist of women. Paragraph 37 of the judgment underscores that the Petitioner's case was supported by independent research, which demonstrated that rural women in Kenya's agricultural sectors are among the most vulnerable to the adverse effects of technological changes. This exclusion is particularly prevalent in the northern regions of Kenya, where rural women face heightened challenges (Paradigm Initiative, 2022).

These challenges posed to indigenous agricultural knowledge of rural women are counterproductive to the vision of an inclusive rural development set out in the African regional strategic documents (Adebayo, Adura, & Ishola, 2024). That is so because the mismatch is leading to slow adoption of the technologies and inability to overcome the gender divide in agriculture (Adebayo, Adura, & Ishola, 2024). The challenge of insufficient customization of agricultural technologies to the knowledge and limitations of rural women must be addressed as a matter of urgency.

Several solutions have been proposed to tackle this issue. UN Women (2016), for instance, has called for the development of 'well-informed' and effective technology laws that could address the 'root causes' of the marginalization of rural women's knowledge in the design and use of agricultural technologies. Citing empirical evidence from Tanzania, where there is an 8 percent gender gap in the use of agricultural technologies, UN Women has pointed out that the issue in both Tanzania and Kenya arises because 'technology developers do not always design technologies in keeping with women's interests and limitations', which are shaped by socialization or passed down through generations (UN Women, 2016). Similarly, studies conducted in East Africa have called on technology developers to integrate the traditional and unique knowledge of women to complement modern knowledge. The African Union High-Level Panel on Emerging Technologies further reinforced this perspective in a July 2024

blog post, urging designers to focus on 'Africa-centric, AI-powered agriculture' that aligns with the social contexts of the region (O'Neill, Marivate, & Glover, 2024).

Given the above discussion, the existing agricultural technology in Africa and tensions that their application causes to the lived knowledge of the rural women on issues and products which are covered by design of the technologies are present, existent, and factual. Evidence of scholarly works and reports highlighted above shows how digital agricultural technologies constitute present real threats of epistemic data injustice caused by excluding legitimate knowledge of the rural women, in some form.

This article aims to show that the production and processing of rural women's data through agricultural technologies raise a new legal issue—a disregard of rural women's legitimate knowledge. Another related aim is to discuss how this disregard often leads to epistemic data injustice. Finally, a need for better data governance for rural women in Tanzania and Kenya is deduced by re-imagining the law. The paper uses examples of digital smart agriculture platforms in Tanzania and Kenya to aid discussion on how technologies can contribute to epistemic data injustices, particularly affecting rural women in the agricultural sector, and to assess adequacy of laws to address these challenges.

To effectively achieve the stated aims, it is vital to clarify what is meant by 'epistemic data justice'. This phrase is used to describe the concept of data justice. The idea of data justice represents fairness in how rural women are made visible, represented, and treated as a result of the production of their data (Taylor, 2017). Epistemic data justice is a sub-type of data justice that focuses on fairness in how rural women are made visible, represented and treated through their way of knowing, seeing and understanding (Kwapong, 2008). To put this in context, epistemic data justice requires that rural women should be respectfully and fairly treated as creators of data arising from their knowledge and not just treated as mere objects of prediction in the con-

text of agricultural technologies. Where no fairness in visibility, representation, and treatment is ensured, the outcome would be an epistemic data injustice. Epistemic data justice can manifest in the forms of bias, marginalization, and discrimination arising from the disregard for the Indigenous knowledge systems of rural women.

As discussed above, epistemic data justice concerns the impact of agricultural technologies on knowledge. However, defining 'knowledge' and understanding how it is created, transformed, and replaced can be complex in the context of digital transformation. For example, the knowledge created by Indigenous women in rural communities may emerge from an inherently unjust societal framework. Additionally, Indigenous knowledge is often not easily quantifiable, documentable, or traceable. While knowledge can be difficult to concretize, its significance is unquestionable. This complexity underscores the article's focus on the importance of sensitivity to the cultural contexts and meanings that rural women attribute to knowledge.

It is vital to clarify that the author uses gender as a lens to focus on women as female persons (Shorthall, 2013). Additionally, factors such as access to technology, voice, power, status, control and relationships in society influence how women experience agricultural technologies and possible epistemic data injustices associated with them (Diwakar, Shepherd, & Chronic Poverty Advisory Network 2018). Based on the gender lens, the term ‘rural women' refers to female persons who are primarily residing in areas that States designate as rural. However, this term can sometimes be fluid, considering there is no scholarly consensus or practical settlement on the urban-rural continuum (Shortall, 2013). African regional legal instruments guiding digital transformation do not offer much help in clarifying this challenge of fluidity as Aspiration 50 of the Agenda 2063 and the Digital Transformation Strategy for Africa only refer to rural women in very generic terms. Considering the lack of specifics, women in several other marginalized spaces could still be categorized as

rural women (Shortall, 2013). Already, Aspiration 50 of Agenda 2063 (African Union Agenda 2063) and the Africa Digital Transformation Strategy (The Digital Transformation Strategy for Africa (2020-2030) recognize rural women as a target group for data governance in African States.

There are certain pre-existing conditions which exacerbate rural women's experiences with epistemic data injustices associated with agricultural technologies (Bon, Akkermans, & Gordijn, 2016). They include digital divide (Wafula-Kwake & Ocholla, 2007), gender divide in implementation of digital technologies (Kwapong, 2008), systems of entrenched patriarchy in some societies (de Bok, 2019), and negative attitude of rural women towards technology. Besides pre-existing conditions, contemporary usage of rural women's data may also disregard and potentially replace rural women's legitimate knowledge unfairly (Leslie et al., 2022).

As evidenced by scholarship and UN Women's analysis of I-Farm Kenya and Livestock Info Management System in Tanzania, the challenge of disregarding knowledge of rural women can manifest when the technology is used at pre-production and post-production phases. cuts across the whole technology lifecycle (de Bok, 2016; UN Women, 2016; Bon, Akkermans, & Gordijn, 2016). Considering nature and scope of epistemic data injustices, several scholars have so far noted that they should be addressed on a priority basis to avoid associated practical challenge of low uptake of agricultural technologies by rural women (Bon, Akkermans, & Gordijn, 2016; de Bok, 2016; de Bok 2019). UN Women (2016) also emphasize need to address potential low uptake which result when technology developers do not design technologies tailored to rural women's epistemic interests and limitations. From a human rights angle, this prioritization is more urgent considering epistemic data injustice could either manifest in or affect human rights guarantees to be enjoyed by rural women individually and collectively (UNDP), (Meera, 2012).

There are some existing regulatory approaches which have been proposed to redress epistemic data injustices which rural women could experience. These approaches include ethics of data governance, protection of intellectual property, especially the Indigenous knowledge of the rural women (Tsosie, 2012) and data solidarity. This article presents a way of assessing the problem through application of certain legal principles that complement data protection and intellectual property law. The choice of this approach is justified by the fact that issues regarding the disregard of rural women's knowledge have been raised in context of demands for data protection law and related rights-based approaches. To further delimit the scope, this article focuses on how legal principles could be used to address challenge of epistemic data injustice as it manifests at the design stage of digital technologies for rural women. This article uses Tanzania and Kenya as case studies to discuss how the problem manifests itself at design stage and how it should be addressed.

Overall, this article this argues that legal frameworks aimed at addressing epistemic data injustices faced by rural women in agricultural technologies encounter significant challenges. Overcoming these barriers necessitates a paradigm shift in how data protection laws are interpreted and applied.

This article is structured into six main parts, each contributing to addressing the set objectives. Part I provides a general introduction. Part II evaluates an ideal epistemic data justice and its legal, theoretical, and conceptual basis in Kenya and Tanzania. Part III discusses strengths and shortcomings when using States' data protection regimes to anchor epistemic data justice for rural women at technology design. Part IV analyses the potential of using rule of law, respect for human rights and best practice as additional legal principles to complement the law and remedy identified shortcomings. Part V provides recommendations and conclusions drawn from the discussion on prospects and attendant limitations of the three additional principles. Part VI concludes the article.

II. IDEAL EPISTEMIC DATA JUSTICE FOR RURAL WOMEN

This part introduces epistemic data justice, as the conceptual framework for discussions. The first part delimits epistemic data justice as part of the general concept of data justice. The second part describes why data justice matters for rural women and should form basis for governance of design of agricultural technologies which target them.

A. Epistemic data justice in the data protection context

The general concept of data justice is related to data protection. Hence, it is vital to underscore that data protection is concerned with protecting personal information by principles stipulated in law. However, data justice is a term that is broader than data protection. Taylor (2017) defines data justice as the fairness in how people are visible, represented and discriminated against as an outcome of their production of digital data. This concept has been inspired by the experiences of new technologies that have necessitated discussions around social justice. Taylor's work recognizes that there is an intersection between data governance, data protection, and social justice aspirations and goals. Also, Leslie David et al. (2022) have discussed various pillars data justice leading them to coining the concept of epistemic data justice as flowing from knowledge—a pillar of data justice.

Epistemic data justice has four key elements which introduces new mantra to data governance. The first element is that data represents knowledge. It assumes that individuals or communities adopt unique viewpoints of the world both at present and per their history (Ficker, 2007; Currie, 2021). Such ways of seeing and understanding the world then form the data that may be collected and processed through digital technologies. Second, knowledge is situated, which means people's experiences dictate what they view as just (General Partnership on Artificial Intelligence, 2022). Per this element, technology developers are to map values, lived experiences, and situated knowledge of rural women likely to be impacted by the technology.

Third, knowledge is interdisciplinary. It essentially means that all academic disciplines and specialties of knowledge and rural people, including women, are at same level on how they frame things; and therefore, create knowledge (General Partnership on Artificial Intelligence, 2022). Fourth, knowledge is plural (General Partnership on Artificial Intelligence, 2022). This means that there are many sources of knowledge. Besides academic pieces, policy documents, papers, concepts, rural women also create legitimate knowledge in their lived contexts (Leslie, et al., 2022). To understand the impact of digital technologies on rural women, especially in local contexts, diverse forms of knowledge of rural women should be included by technology developers when they determine or assess risks.

The existing conditions and use cases discussed in the introduction often ignore one or more of the aspects of knowledge described above. In this way, they can have power to normalize epistemic data injustices when technology designers bake them into data systems of agricultural technologies. For this reason, laws regulating agricultural technologies should raise awareness among designers to address such epistemic data challenges. Given that colonial tendencies caused pre-existing conditions of injustice, decolonial approaches can be useful in awakening designers to realities of epistemic data injustice and the need to avert it. More so because decolonial approaches to legal reasoning are known to be useful in dismantling powers which normalize epistemic data injustices and associated dominant structures of knowing (Restrepo, 2018). Such a decolonial approach is therefore key to achieving an ideal state of epistemic data justice by prioritizing situated knowledge. Situated knowledge is both drawn from values and lived experiences of rural women. Furthermore, the approach can ensure that rural women are treated as data originators through their knowledge and not as subservient to some so-called fixed technical expertise or scientific knowledge about a technology (Santos, 2015).

Chisholm (1989) considers specifics on how designers can use the decolonial approach to afford epistemic data justice for rural women in practice. The author emphasizes that designers can use the approach to map and consider cultural perspectives, practical and lived experiences of rural women during project planning, problem formulation, and impact assessment. Therefore, suppose there is a technology that produces digital data about rural women during agricultural monitoring, epistemic data justice requires a technology designer to be aware of, and respect the lived knowledge of the rural women on issues and products which are covered by design of the technologies.. It would also require them to assess epistemic injustices that could be caused to rural women in their capacity as knowledge subjects. (Ficker, 2007). Then, in warranted cases where their knowledge is replaced, technology designers are to ensure replacement respects rural women as knowers without necessarily imposing unexamined viewpoints on them (Byskov, 2021).

B. Why epistemic data justice matters

For emphasis, epistemic data justice is concerned with relationship between data collection and processing that results from data-driven technologies and how they impact knowledge systems (Leslie et al., 2022). This sub-type of data justice concept explains that peoples' diverse forms of knowledge and understanding should be considered when determining purposes for the use of their data. It also explains that they should help maximize utility of data which aligns with affected communities' needs, interests, and concerns (Leslie et al., 2022).

Having addressed foundational and definitive issues above, this paper considers why epistemic data justice matters in contexts of agricultural technology targeting rural women in Tanzania and Kenya. This part builds prior discussion on the issue, explaining justification for epistemic data justice approach using certain lenses: legal frameworks, decolonial theoretical framework, gender.

The first lens is legal frameworks which recognize and adopt epistemic data justice framework. African Data Policy Framework 2022 addresses data justice issues in the context of data protection. It sets the objective of a broader data justice concept as realizing a rights-respecting data policy framework that can address epistemic injustices. The African Commission on Human and Peoples' Rights Resolution No. 473 (2021) has also emphasized that epistemic data justice plays a vital role in African data governance. Paragraph 2 of the Resolution further notes that epistemic data justice matters because it enables adjustment of digital technologies to fit African needs and values. This possibility of adjustment is also addressed by the African Union High-Level Panel on Emerging Technologies (APET) Working Paper Series 1, November 2021. The Series requires consideration of knowledge contexts of new and emerging technologies.

When this is applied in practice, epistemic data justice could require technology designers to respectfully map and consider origins and practice of belief systems of rural women who are to be impacted by the technology, including cases where such systems may be considered mystic, emotional, or primitive (Boaventura, 2014). The designers would need to take four key actions. Foremost is embracing the plurality and diversity of rural women's knowledge and appreciating that rural women may have unique ways of knowing, manifesting in how they see, understand, and exist in the world (Leslie et al., 2022). Second, is adopting policies and frameworks that enable potentially, and actually affected rural women, to contribute to knowledge creation and challenge dominant views in data science. Third, is taking steps to engage multiple disciplines to gain a broad range of insights and understanding of the epistemic problems faced by rural women that a technology in question is intended to address. Finally, taking steps to be positionally aware and amplify rural women's voices. Overall, taking these steps could lead technology developers to adopt collaborative ways of addressing concerns about negative impacts of technology on rural women's knowledge systems (Boaventura, 2014).

The second lens is decolonial theoretical framework, which recognizes the need to implement epistemic data justice. Decoloniality and critical legal studies inform the need to embrace plurality of personal knowledge (Mignolo, 2023) and raise awareness that knowledge production is not neutral, universal and objective as is projected by Western modernity (Quijano, 2000). Instead, it recognizes that Western thinking is limited and that rural women in developing States such as Tanzania and Kenya can also be agents who produce knowledge (Leslie et al., 2022). The author's compulsion to apply this context as justification for epistemic data justice is informed by APET's position that there are existing colonial tendencies in superimposition of Western culture in data science over Indigenous one. The use of the framework also justifies why epistemic data justice continues to be relevant in this digital age in Tanzania and Kenya. More so because 'colonial powers of superimposition', as APET calls them, have not ended. Restrepo (2018) posits that patterns of powers that have survived through past conquests and revolutions persist in today's regulatory approaches. Quijano (2000), who studied the trends of the coloniality of power, notes that objectivity of knowledge is still one of the cornerstones of the coloniality of power. Mignolo (2023) argues further that objectivity in knowledge mapping and assessment is key since subjectivity in knowledge continues to play out when capitalist structures use the subjectivity of knowledge and control to disregard the existing forms or ways of knowing.

Thirdly is a gender lens. In the earlier part of this paper, the author notes that the term women is used to refer to female persons. It has also been shown that women have some unique ways of 'knowing', which may be reflected in the data about them during the implementation of digital agriculture technologies. Epistemic data justice matters for this group of persons as it promises to right wrongs of structural inequalities and bias in voice and power which exist in the society and among technology designers.

C. Rural women as an interest group in epistemic data justice

Emphasizing the unique role of rural women in African digital development is crucial at this point—to underscore their importance as a specific interest group to justify the focus of this research.

Rural women in Africa have legitimate historical, personal, and cultural knowledge. Their unique ways of seeing and understanding are crucial in traditional medicine, agriculture, handicrafts, environmental protection, and food and energy conservation. Despite basic legal protection, rural women are still a special interest group in terms of how they experience epistemic data injustices. The focus on them in this research is therefore legally and pragmatically justified.

From a legal perspective, it is fundamental to recognize that gender and origin are protected statuses in the guarantees of rights that could be affected if rural women's knowledge is not protected and treated fairly in design. These rights include the guarantee of equality and freedom from discrimination and the protection of women's rights through affirmative action in accordance with Article 2 of the 1981 African Charter on Human and Peoples' Rights (African Charter) and Article 9 of the 2003 Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol). In the context of digital technologies, a Kenyan High Court has confirmed in *MWK & Another v. Attorney General & 4 Others KEHC 1496 (KLR) (2017)* that women may need greater protection of their digital rights than men.

Secondly, rural women have a significant role to play in economic development and in the framework for the protection of women's rights in Africa. On development, Article 19(a) of the Maputo Protocol recognizes that the inclusion of rural women in development is critical for sustainable development in national contexts. In the spirit of the AU Vision 2063 and the African Union's Digital Transformation Strategy, the 'national develop-

ment' referred to in Article 19(a) of the Maputo Protocol could also refer to data-driven development. Relatedly, the guarantee of sustainable development in Article 22 of the African Charter means that the knowledge legitimately held by rural women should be free from other forms of bias or economic domination by technology designers. Maputo Protocol also recognizes the role of rural women in economic development, establishing framework for their protection by guaranteeing the participation of rural women in (digital) development. Furthermore, Article 18(2)(c) of the Maputo Protocol implies that these guarantees should go hand in hand with the protection of Indigenous knowledge systems, which are predominant for rural women. Although the above two legal justifications are based on instruments that impose obligations only on States, the obligations are horizontal and extend to companies, entities, and agents involved in technology design. The application of the standards to companies is also confirmed by the framework for corporate responsibility to respect in pillar II of the United Nations General Principles on Business and Human Rights 2011, also adopted in Africa in accordance with preamble and paragraph 2 of the ACHPR Resolution 550 on Business and Human Rights 2023.

The third angle is a practical statistical context. Foremost, as noted in the Digital Transformation Strategy for Africa (2020), approximately seventy percent of the African population live in rural areas (UN Women, 2016). Moreover, women make up about half of the African population. This population contributes to economic development. As such, their ways of knowing agriculture, production, energy use, and environmental protection cannot be ignored, especially since some areas, such as agriculture, are the backbones of economies of some African States. Recognizing the knowledge of women to these areas could translate to participatory human development.

The fourth angle is the practical reality of gender inequality. Rural women, especially those who live in poorly connected rural areas in African States, face marginalization in the con-

text of technological development (Gillward & Patridge, 2022). This could exacerbate some pre-existing conditions of gender disparity in access to technology and attitudes towards digital technologies. When realities of digital inequalities intersect with existing societal structures of marginalization of rural women, they could create even deeper forms of discrimination, a form of epistemic data injustice. These rural women are therefore likely to be hard-hit when designers of technology ignore their knowledge systems. Using the contexts of rural women in Tanzania and Kenya to assess and imagine ways of tackling this potentially counterproductive phenomenon is therefore a worthwhile exercise.

Lastly is the recognition of unique position of rural women in societal development. Traditional gender roles have historically left rural women to principally perform childbearing, raising children, and maintaining the household (de Bok, 2016). These roles are crucial in human development. In such spaces, rural women find themselves in positions where they can be custodians and conveyers of knowledge, superstitions, and other beliefs that inform how children and society understand and express their ways of knowing. A study like this, which focuses on rural women, is therefore relevant to data governance, not only for them but also other groups who have such unique positions in the society.

D. Assessing adequacy of data protection obligation of technology designers

The paper relies on examples of platforms in Tanzania and Kenya which are described in the introduction section of this paper. The reference to the case studies does not, however, extend to an assessment of the technical adequacy of these platforms, as this is beyond the scope of this paper.

The following sub-sections discuss how traditional data protection safeguards in Tanzania and Kenya can be used to map,

assess, and mitigate the occurrence of such epistemic data injustices in the design of technologies. The safeguards discussed below are technical and organizational measures, data protection impact assessments, and automated data processing.

1. Technical and organizational measures

Smart agriculture platforms require rural women to use data-driven technologies and transmit their data over ICT networks, either independently or with the help of others (UN Women, 2016). Drawing from reports, practical experience, and courtroom cases, the threat to epistemic data justice should be recognized as a data protection risk that necessitates both technical and organizational measures. Only through such measures can data protection be ensured by default and by design. Therefore, since pre-existing conditions of rural women's realities and marginalization make them vulnerable, the data that they transmit including those about their knowledge should be categorized as sensitive and therefore requiring additional protection safeguards (Malgieri & Jędrzej, 2020).

In these circumstances, smart agriculture technology designers have a responsibility to consider knowledge as a risk factor and use it to inform their development of technical and organizational measures. Tanzanian and Kenyan data protection laws attempt to obligate technology designers to do so proactively.

Kenyan and Tanzanian data protection laws do not define data protection risk and risk assessment process. However, one can borrow a leaf from Recital 76 of the GDPR, which defines risk assessment as an objective process which involves identifying and evaluating risks related to the processing of personal information. Recital 77 of the GDPR guides that scope of risk assessment should cover origin, nature, likelihood, severity, and mitigation. However, identification of risks is a matter that is largely an issue of discretion of technology designers.

Regarding how other actors should carry on with the designed technology, section 41 of the Kenyan Data Protection Act 2019 also requires them to design and implement technical and organizational measures. Section 41(4) of the Act requires data controller or data processor to adopt appropriate and up-to-date measures which help to foresee and safeguard against internal and external risks to personal data in another person's control. Furthermore, section 42(1)(c) of the Act requires data controllers to consider unique risks during data processing. The Tanzanian data protection law is similar to the Kenyan approach. Section 46(2) of Tanzanian Data Protection Act specifically requires data controllers or processors to take technical and organizational measures which mitigate risks and damages that might occur to the data subjects.

When used to address challenge of epistemic data injustices against women, framework and method of technical and organizational measures promise to be a tool that designers of technologies can use to address epistemic data injustices. To address challenge of discretionary power which technology designers have, courts and the regulators must step up to monitor how developers of smart agriculture technologies mainstream rural women's knowledge in development of technologies for platforms such as AgriInfo and *Hello Tractor*. It can also be used to ensure that data controllers and processors who subsequently use the technologies can consider rural women's knowledge as a trigger for epistemic data injustice scenario in appropriate cases.

2. Data protection impact assessment

DPIA should be conducted at the outset of any processing operation, meaning that privacy risks must be considered during the design phase of technology. Designers are obligated to assess potential risks to individuals' rights at this stage. Given that the risk of excluding the legitimate rights of women is tied to privacy and related concerns, as shown in the background section of this paper, it is crucial for designers to conduct an impact assessment

on how the technology respects the indigenous knowledge of rural women or ensures it is fairly represented.

Some digital technologies targeting rural women are designed utilize sensitive personal data. This is rather straightforward because (rural) women are considered vulnerable data subjects and any information about them should be considered as sensitive personal data. (Malgieri & Jędrzej, 2020) Designing a technology system which is envisaged to process sensitive personal data is blacklist operation which must be subject to DPIA. Additionally, the threat of disregarding of unfairly replacing the knowledge of rural women could also impact other privacy-related rights such as right to recognition and freedom of belief. In such a case, DPIA may be conducted as the processing operation would likely result in high risk to the rights and freedoms of a data subject.

Therefore, designers of Digi-Farm, I-Farm Kenya, Livestock Info Management System, AgriInfo, and other AI-powered agricultural technologies would conduct it to map and identify all the risks of excluding legitimate knowledge of the rural women that would arise from processing of their personal data (Demetzou, 2019) (Kloza, et al., 2017). They would then conduct a risk rating and assessment with view to minimizing or mitigating risks of epistemic data justice as early as possible. Again, preparation of a DPIA report could be guided by templates and be documented for accountability purposes. Considering that the DPIA is to be done when the processing operation is envisaged, it is an obligation which can arise for all the technologies which target rural women even if the latter get to access the digital services without o before processing of their personal data.

This obligation relates to the duty to establish technical and organizational measures. For example, if rural women's knowledge is considered a risk factor when determining the technical and organizational measures, it can be used for risk mapping in the DPIA process. Through this link, therefore, it is possible to use DPIA as a tool of checking if rural women may face an ac-

centuated risk of epistemic discrimination with the new digital technologies that use their data.

Tanzanian and Kenyan data protection laws provide DPIA obligations that could be useful in mapping and mitigating risks of epistemic data injustices that rural women could face. Section 31 of the Kenyan Data Protection Act provides for DPIA as a form of compliance mechanism that can be used to ensure data protection by default and by design. Under this law, DPIA can be used to map, assess, and analyze risks that innovative technologies pose to privacy and related rights of the rural women. The Tanzanian Personal Data Protection (Personal Data Collection and Processing) Regulations 2023 also prescribes DPIA as a compliance measure. Similar to the approach under the Kenyan ODPC Guidance Note on DPIA, section 33(2)(e) directs that DPIA applies to 'blacklist operations', including processing of sensitive personal data.

When used to address the challenge of epistemic data injustices against women, the framework and method of DPIA in Kenya and Tanzania recognize processing of information of vulnerable groups as a blacklist operation which must be subjected to DPIA. This is the most precise indication of the potential of DPIA framework to map and address the origins and manifestations of epistemic data injustices that technology could impose on rural women. Furthermore, the framework and method are a valuable aid for mapping and assessing necessity and proportionality, epistemic data injustices and applying mitigation measures that address them before the technology is implemented.

3. Automated processing of personal data

These AI-powered agricultural technologies, which the African Union High-Level Panel for Emerging Technologies refer to in their 2024 blog, can collect personal information of rural women and uses predictive analysis of crop yields, seasons and diseases. These are areas which have traditionally been a reserve of rural women's unique traditional knowledge (UN Wom-

en, 2016). Therefore, the output of such predictive analysis is a representation of the rural women whose data is aggregated. Additionally, some of the solutions target analysis to conduct surveillance which support solutions for digital credit. To the extent that technology allows for use of communication electronics in gathering, storing, preparing, and distributing information, it could involve loads of automated processing of personal data of rural women who dominate rural farming.

The African High-Level Panel for Emerging Technologies has observed that automation of the agricultural processes through the AI solutions could potentially 'fail to carter for the local crop types and environmental conditions' (APET-CJED Secretariat, 2024). Considering that these two are the areas on which rural women have unique knowledge (UN Women, 2016), the failure to carter for them through automation could lead to exclusion of legitimate knowledge of the rural women. This phenomenon could lead to two main risks to epistemic data justice for rural women. First is risk of preventing rural women from exercising control over their data due to limited human intervention in decision-making. Second, is the risk of denial of right to a data driven development which protects Indigenous knowledge systems as guaranteed under Article 18(2)(c) and 19 of the Maputo Protocol. This is because technologies could cause systematic and extensive evaluation and profiling and may lead to either exclusion or wrongful inclusion of rural women. In cases where profiling results in disregard of rural women's knowledge, the risks manifest as epistemic data injustices arising from inaccurate representation of their epistemic realities.

Tanzanian and Kenyan data protection laws have set obligations relating to automated processes. Section 35 of Kenyan Data Protection Act grants rural women, who can be considered as data subjects, a qualified right not to be subjected to decisions based solely on automated processing that has legal effects concerning or significantly affecting a data subject. Such decisions can only withstand legal scrutiny when the data subject, in this

case a rural woman, is notified of the decision in writing and is allowed to request a reconsideration or the making of a new decision. This right to information provides an opportunity to respect women's knowledge systems, thereby ensuring that their knowledge is not overridden by the assumed benefits of technology.

Though section 36 of Tanzanian Data Protection Act does not prohibit automated decision-making, in qualified sense as the Kenyan data protection law does, it still extends almost similar protections in Kenya. Under sections 36(2)(a) and (b) of the Tanzanian Data Protection Act, a data subject can request a data controller to ensure that any decision that it takes that significantly affects the data subject is not made by automated means. Similarly, the Act extends guarantees of notification of a data subject in instances where automated processing is made.

Overall, the principles prohibiting automated data processing and providing for interventions for reconsideration could be useful tools for addressing challenge of epistemic data injustices which rural women face. Furthermore, right to notification embedded in compliance with the law on automated data processing stands out as an entry point for information. It could be a gateway for technology designers and data controllers to interact with information on rural women's knowledge including those which may be undocumented.

E. Assessment of prospects and gaps in the substance and implementation of the law

The architecture of law of Tanzania and Kenya could present some prospects for realizing ideal epistemic data justice for rural women. From the discussion above, there is a substantial promise of using rules of automated data processing in Kenya and Tanzania to enforce fair treatment of knowledge of rural women by the designers of smart agriculture technologies.

However, there could still be some two challenges in law and practice with respect to the compliance obligations. First,

substantive law on DPIA is hindered by a limited definition of a 'data subject' (Dagne, 2021). The definition under both Kenya and Tanzanian laws focuses on individuals. Therefore, enforcement of protections against epistemic data injustice may be limited to actions of individual persons. It may very well be that communities are covered by the laws through the target identifiable persons. However, that does not address the challenge of restricted basis for enforcement of DPIA obligation. Assuming a belief held by a community is affected by disregard for the knowledge, the laws tend to restrict the locus standi for bringing data complaints to individuals who are to demonstrate how they are affected. One possible way of overcoming this challenge is increasing capacity for *suo moto* regulatory investigations into the challenge or disregard for such knowledge. Secondly, substantive law on technical and organizational measures may be hindered by risk management which relies on discretion of designers of the technology in most cases. Such discretion opens rooms for bias and ignorance of the knowledge of rural women. There are other potential legal gaps related to the practice of law by technology designers. The main one is lack of express participatory approaches in the regulatory measures. For example, DPIA and risk management processes in Kenya and Tanzania do not provide mechanisms for participation of data subjects in impact assessment. Such a gap could reduce opportunity for the agricultural technology designers to consider how rural women know and perceive epistemic data injustices.

These legal gaps mean that the stated compliance obligations may not do enough to fully and effectively tackle nuances of epistemic data injustices which rural women could experience in Kenya and Tanzania. From a decolonial theoretical approach, such inability is a grave concern as it risks subjecting the law to pre-existing conditions which enhance epistemic data injustices (Restrepo, 2018).

III. ADDRESSING LEGAL GAPS IN REALIZING EPISTEMIC DATA JUSTICE

The previous part of this article demonstrates the scope of the legal problem especially how smart agricultural technologies can cause epistemic data injustice to rural women who use them. It also shows a promise of addressing the legal problem through existing data protection law obligations of technology designers. It has also shown an associated legal and practical challenges. In this section, this article proposes additional legal principles that could complement the data protection safeguard measures in tackling epistemic data injustices more effectively.

The discussions on proposed legal principles aim at arousing consciousness of institutions such as courts, and data regulators about potential of using decolonial theoretical approaches to enforce data protection safeguard measures alongside additional legal principles. Other uses, other than those touching on enforcement role of the stated institutions, are however not covered.

The discussions and assessment take a comparative approach. The author compares the promise of using the additional principles in Tanzania and Kenya when considering disputes where epistemic data injustices could arise or be pleaded. The choice of Tanzania and Kenya as case studies is guided by several related justifications. First, they have a primary obligation to protect the human rights impacted by the disregard for the knowledge of rural women. Secondly, Tanzania and Kenya are both Partner States to the East African Community and share a border. Therefore, they are capable of offering additional structures for improving epistemic data governance and inter-State learning through the harmonization mechanisms envisaged in the Treaty for the Establishment of the East African Community 1999 (EAC Treaty). Furthermore, unlike other EAC Partner States, Tanzania's legal system and affordance of personal data protection is predicated on a relatively old Constitution of 1977.

This makes it ideal for comparison with the protections afforded in Kenya, whose Constitution was adopted more recently in 2010 during fourth wave of constitutionalism in Africa (Fombad , 2014). The comparative analysis in this part is limited in scope. Therefore, choice of States for comparison is restricted to just Kenya and Tanzania.

The next part discusses some legal principles that could complement the potential that already exists in the design of data protection compliance obligations of technology designers. Potential of each legal principle is assessed from perspectives of umpires of enforcement and implementation.

This part answers the question on how three additional legal principles could complement the data protection compliance obligations to fully and effectively address epistemic data that rural women experience with smart agricultural technologies in Tanzania and Kenya. The discussions are restricted to respect for human rights (Scassa, 2020), rule of law (Hariss, 2020), and application of good and relevant best practices. While three legal principles are just some among many that can work, they have been carefully chosen based on their prominence in contemporary developments in the data protection safeguards of Tanzania and Kenya. For each legal principle, the issue is discussed through the lens of African data protection instruments. The discussion then evaluates application of the approach in Tanzania and Kenya. Finally, it analyzes prospects and challenges of using principles in complementing existing data protection safeguards.

A. Application of the rule of law as a general principle of law

The rule of law is among the legal principles recognized in regional, sub-regional and national legal instruments applicable to Tanzania and Kenya.

At the African Union (AU) level, to which both are member States, the rule of law is a cardinal principle that governs AU's functioning and flows into the African human rights system. The

preamble of the Constitutive Act of the AU (2000) recognizes that member States are to promote and protect human and peoples' rights and ensure the rule of law. Article 4 of the Constitutive Act further stipulates that the African Union shall function by the principle of the rule of law. Per African Commission on Human and Peoples' Rights (ACHPR) Resolution 69, the principle of the rule of law is related to other principles of social justice, gender equality, and good governance, which are also recognized under Article 4 of the Constitutive Act. Even though African Charter on Human and Peoples' Rights 1981 does not mention rule of law expressly, ACHPR has adopted this principle in delivering its core mandate of protecting and promoting human and peoples' rights in the continent (Mujuzi, 2012). Paragraph 18 of ACHPR Resolution 163 sets rule of law as a principle that should guide the protection of vulnerable groups within society. As part of its communication procedure, the Commission has noted that the rule of law is the fulcrum around which equality before the law and, indeed, all human rights revolve. In fact, in the case *Zimbabwe Lawyers for Human Rights and the Institute for Human Rights and Development in Africa v. Zimbabwe, Communication 293/04, (2009)*, the ACHPR recognized this relationship, further noting that the principle operates as an alternative to rule of power, which manifests in arbitrariness and self-interest (Mujuzi, 2012).

At sub-regional level, the Treaty for the Establishment of the East African Community, 1999 (EAC Treaty) emphasizes adherence to the rule of law in several ways. First, Article 3(3)(b) of the Treaty prescribes it as a criterion for membership to the EAC. Secondly, Article 6(1)(d) prescribes rule of law as a fundamental principle that governs achievement of community objectives of widening and deepening cooperation amongst Tanzania and Kenya as EAC Partner States. Also, Article 7(2) of the EAC Treaty prescribes rule of law as an operational principle of EAC, whose compliance to is necessary for practical achievement of the objectives of the EAC. Furthermore, as prescribed under Article

123(3)(c) of the EAC Treaty, cooperation on judicial, political and security issues by EAC partner States is guided by and aimed at achieving rule of law.

At the domestic level, both Kenya and Tanzania recognize rule of law as a legal principle. In Tanzania, Article 130(1) of the Tanzanian Constitution grants the Commission for Human Rights and Good Governance powers to promote and conduct inquiries related to violating principles of good governance. Even though the Constitution does not directly address the rule of law, it could be implied in this Article since the rule of law is one of the many known principles and an essential ingredient of good governance (Makamba, 2003). Besides, some rights guaranteed in the Tanzanian Constitution speak to some aspects of the rule of law. For example, Article 13(1) of the Constitution declares that every person is equal before the law and is entitled to equal protection without any form of discrimination. Furthermore, Article 13(3) of the Constitution declares that personal and community's rights, duties, and interests shall be made by a court of law, or agencies established by the law (Makamba, 2003). On the part of Kenya, Article 10(2)(a) of the Constitution recognizes the rule of law as a national value and principle of governance.

Conceptually, rule of law is often understood as the opposite of rule of man. At design stages of agricultural technologies, the principle of rule of law can tackle potential abuses of discretion by designers particularly in deciding whether to consider legitimate knowledge of rural women as a risk factor. This approach facilitates the realization of epistemic data justice (Leng, 2020; Taylor, 2017). Besides, the rule of law principle can extend the scope of application to both State and business actions. This is important because rule of law is a principle which has applied to State actions (Leng, 2020). That notwithstanding, technology designers collaborating with State institutions could be bound under the rule of law when designing high-risk processing operations. In such cases, rule of law could obligate designers to take part in knowledge risk assessments and minimize abuse

of discretion. This promise has now been recognized in Kenyan contexts where the rule of law principle applies to the private sector actors.

Furthermore, contents of rule of law principle could complement data protection compliance by promoting respect for human rights, which helps tackle rights denial, discrimination and exclusion- impacts of or manifestations of the implication of epistemic data injustices. African Data Policy Framework recognizes this potential, formally recognizing epistemic data justice and endorsing the need to 'safeguard basic human rights in the digital environment through the rule of law'. Scholars such as Huq (2021) and Blinchy (2022) also note that rule of law principles of certainty, necessity, and transparency can ensure that the agricultural technologies that target rural women are not done in opaque fashion. The needed transparency can potentially make designers to proactively explain how algorithms work and genuinely disclose impacts that they have on the knowledge of the rural women.

Relevance of rule of law extends to promotion of social justice and other mutually reinforcing principles of law such as good governance, human dignity, and accountability. Taylor's (2017) work already appreciates this position. When applied to technology design stage, the principles of good governance and accountability could lead designers to research, publish and disseminate information about the impact of technologies on the knowledge of rural women. The principle of human dignity could also enjoin technology designers to consider and respect local epistemic contexts of dignity relevant to the targeted rural women.

Overall, principle of the rule of law could complement data protection compliance obligations in causing technology designers to address some epistemic data injustices that rural women experience more effectively. Judicial opinion *Nubian Rights Forum & 2 others v Attorney General & 6 others; Child Welfare Society & 9 Others (Interested Parties)* [2020] eKLR (*Nubian Rights Forum case*) affirms this concluding view. Though tech-

nology which was challenged by this case was not an agricultural one, the jurisprudence developed by court is relevant. As can be gleaned from paragraph 518 of court judgment, the Petitioner challenged the concerned technology citing its ability to exacerbate risks of excluding rural communities and marginalized groups such as women. The Court considered the issues at hand and found that the Constitutional principle of the rule of law should be viewed as obligating actors to consider the local contexts, including unique epistemic perspectives of rural women. Such a judicial view on consideration of local contexts could be a gateway to ensuring that rural women's knowledge is used to enrich and sometimes challenge the dominant techno-rational views that, as history has shown, are a significant cause of some forms of epistemic data injustices.

However, there is a possible challenge with the implementation of the principle. This challenge concerns the weak harmonization of the complementary potential of the principle of rule of law in both Tanzania and Kenya. The challenge could be attributed to some differential developments of the recognition and status of rule of at the various State levels. For example, the rule of law is not strongly protected as a national value and principle of governance in Tanzania as is the case in Kenya. Furthermore, the author is unaware of a legal precedent in Tanzania which can demonstrate the complementary role of the law approach as is the case with Kenyan *Nubian Rights Forum case*.

Nonetheless, the situation is not all gloomy as there is a potential for Kenya's decision to influence the contexts in Tanzania through judicial cross-pollination. This can happen through the opportunities for harmonization at the East African Community regional level. Moreover, the cited decision in the *Nubian Rights Forum case* was declaratory and only clarified the law as it ought to be.

B. Respect for human rights

At the regional level, the African Union Convention on Cyber Security and Personal Data Protection 2014 (Malabo Convention) affirms the State's commitment to comply with the African Charter standards and approaches for protecting human and people's rights. Furthermore, Personal Data Protection Guidelines for Africa 2018 recognize that respect of human rights is fundamental to ensuring effective data governance. The principle of respect for human rights in these instruments applies to Tanzania and Kenya which are State parties to the International Covenant on Civil and Political Rights (ICCPR) and have ratified the African Charter.

At the State level, Kenyan Constitution gives primary consideration to principles of respect for human rights. Under Article 20, the obligation to respect human rights should be implemented to the greatest extent possible. Article 20(3)(b) further guides that rights protected should be interpreted in a manner that favors enforcement of rights. Furthermore, Article 24 of the Constitution provides additional safeguards to ensure that human rights are not limited arbitrarily. Under Article 24(1) of the Constitution, such limitations can only be made by law and must be reasonable and justifiable in an open and democratic State based on equality, human dignity, and freedom.

The Tanzanian Constitution also anchors the principle of respect for human rights. Article 29(1) of the Constitution entitles every person to equally enjoy and benefit from the right to privacy. Akin to Kenya, Tanzania has a limitation clause guided by a criteria set under Article 30 of the Constitution. Experiences from cases such as *Samwel Kibundali Mgaya v Republic* (2022) TZCA 342 have shown that sometimes Tanzanian courts can live to the promise of effectively balancing the protection of the constitutional rights in light of competing purposes.

The regional and state level standards for respect for human rights contain prohibitions that can variously complement

select data protection safeguards in addressing epistemic data injustices that rural women experience. The standards can do so in several ways. First is in relation to the substance of the rights protections in Articles 16 and 18 of ICCPR, as read with General Comment No. 22. Article 16 of the ICCPR provides that everyone has a right to recognition everywhere as a person before the law. Then there is the protection in Article 18 of ICCPR which guarantees rural women's the enjoyment of freedom both to have, adopt and manifest an epistemic belief of their own choice, individually of in community with others.

The substantive approach may be relevant because technology designers who do not consider epistemic risk that the technology poses to the rural women may risk violating or contributing to violation of a variety of the rights of the rural women. For example, failure to consider the legitimate knowledge of rural women during design may lead to exclusionary impacts which may infringe on rural women's right to recognition that is guaranteed under Article 16 of ICCPR. The Article provides that everyone has a right to recognition everywhere as a person before the law. Any form of disregard of the legitimate knowledge of rural women of their unfair replacement which leads to misrecognition of the women's knowledge is an affront to the rights guarantee under this Article. It could also violate Article 18 of ICCPR which guarantees the right to freedom of thought and to adopt a belief of ones' choice as an individual or part of the community.

In Tanzanian and Kenyan Constitutions, the protection of rights to recognition and the protection of the right to hold and manifest belief appear in respective constitutional Bill of Rights, meaning they enjoy the constitutional status of protection. As such, any act that occasions epistemic data injustice impacts be it the assessment of impacts, automated data systems or development of safeguard measures, would be unconstitutional, and invalid. The case of *Republic v. Joe Mucheru, Cabinet Secretary Ministry of Information Communication and Technology & 2 others; Katiba Institute & another (Exparte); Immaculate Ka-*

sait, Data Commissioner (Interested Party), 2021, KEHC 122) (*Joe Mucheru case*) best describes how this constitutionality test could be vital in complementing existing compliance mechanisms in addressing epistemic data injustices. In this case, a judicial review court in Kenya noted obligations in the data protection law flow from human rights obligation in the Constitution. The judicial review court's dictum is clearly relevant to establishing an obligation to consider rural women's knowledge in data protection risk management, as shown by the case's historical development. *Joe Mucheru case* was filed after government failed to comply with an order that the Court had made earlier in *Nubian Rights Forum case*. The court applied the principle of respect of rights in the manner shown in the *Joe Mucheru case*, showing the potential to apply the principle as a useful complement, which can stand alone independent of any compliance mechanism to address epistemic data injustices that rural women experience.

The other approach is seeing the principle of respect for human rights as basis for social justice, the core of epistemic data justice (Taylor, 2017). This fact is expressly recognized in Article 19(1) of the Kenyan Constitution for example. The potential of social justice in complementing the data protections safeguards in addressing risks of epistemic data injustices has been discussed in the prior section on rule of law.

Furthermore, the principle of respect for human rights is an enabler for consideration of unique factors which inform considerations of unique knowledge of rural women. Considering rural women's historical focus as vulnerable persons, Jurado (1998) has noted that gender and gender differences must matter in protecting personal information of women. This ongoing development has been adopted in Kenya in *M W K v another v Attorney General & 3 others* [2017] eKLR. In this case, the court considered jurisprudence on vulnerability of women during digital production and processing of their data. The court noted that vulnerable groups such as women require more data protection owing to their perceived vulnerability. This is a significant de-

velopment even though there is yet to be a decision specifically addressing the epistemic data injustices that rural women experience.

Overall, emerging experiences and judicial attitudes show that respect for human rights is a legal principle which can complement the data protection safeguard measures to better address epistemic data injustices challenges which rural women experience. The relevance is bolstered in Kenyan context whose Data Protection Act 2019 recognizes the rights contexts of the legislation in the long title. Notably, such bold position is not adopted in Tanzanian Data Protection Act as neither its long title nor any of its parts thereof expressly states that the law has been enacted to give effect to respect for rights. The lack of explicit recognition of a human rights context may limit the interpretation needed to leverage the decolonial theory and the complementary role of the principle of respect for human rights.

C. Application of good and relevant comparative best practice

For designers technologies used for automated processing, DPIA and technical and organizational measures only set a minimum threshold. A 'true and effective' data protection relies on additional or other possible complementary standards set both by data protection law and best practice (Kloza, et al., 2017). As such, tackling the present challenges of epistemic data injustices which rural women face, in the context of the inadequacies in the law, calls for use of best practice to fill the gap.

However, most of these best practices on data protection safeguards and some general ones are drawn from foreign States, associations, and industry standards. From decolonial approaches, therefore, not all the so-called best practices may be good and relevant for addressing the epistemic data injustices. This is because the foreign and western nature of such standards implies that 'best practice' might disregard the knowledge systems acquired through lived realities of the rural women in Tanzania

and Kenya (Makulilo, 2021). Another example is the domination of self-regulatory codes which could preserve interests that cause and sustain structures of epistemic data injustices for rural women (Draude, Hornung, & Klumbytė, 2022).

To be an effective complement, therefore, best practice must be good and relevant to realities of the rural women who are likely to be impacted by epistemic data injustices. African data protection instruments take this very balanced approach emphasizing the need to adopt only best practices which resonate with lived realities of the African people. For example, section 5.5.1 of the African Data Policy Framework 2022 recommends that reference to and application of best practices emerging from international standards should be borne out of reflection on the contextual factors impacting the African continent. On its part, the Digital Transformation Strategy for Africa 2020-2030 stipulates that best practices should only be applied in Africa if they align with the home-grown principle that requires technologies be developed with epistemic realities of the people in mind.

At State levels, best practice plays a critical role. In Kenya, Guidance Notes developed by Office of the Data Protection Commissioner (ODPC) now allow some leeway for applying international standards and best practice. An example is ODPC Guidance Note on Data Protection Impact Assessment 2022 which requires consultation of international standards and best practices on DPIA practices as complementary mechanism. In Tanzania, such comparable guidance is lacking. However, it is possible to conceptualize the application of best practice, in some form, through international dimension of data protection law viewed through regulations that guide transborder flow of personal data under section 31(2) of Tanzanian Personal Data Protection Act 2022.

Regional and State level standards for good and relevant best practices contain qualities that could play several complementary roles. Personal Data Protection Guidelines for Africa 2018 notes that best practices can increase consensus building

and collaborative solutions during technical and organizational measures, automated processing, and impact assessment. Also, best practice guidance on data protection safeguard measures could reinforce meaningful consultations. Assuming the best practice approach allow technology designers targeting Kenya and Tanzania to refer to Rwandan Guidelines on DPIA, designers conducting DPIA would be required to conduct meaningful consultations with potential data subjects and their representatives. To further put it into context, during impact assessments concerning innovative technologies, designers of Jembe and Hello Tractor platforms, for examples, could convene and hold consultations which help them map concerns of epistemic data injustices and the nuanced issues regarding the conditions that cause such injustices among rural women.

Furthermore, best practice approach could influence technology designers to deliberately choose or consider local contexts and lived realities of rural women targeted by technology (Mignolo, 2023). *Nubian Rights Forum case* demonstrates this position on pragmatic approaches. In this case, the Petitioners relied on comparative best practice to challenge rollout of digital identity technology affecting rural women and to demand adequate safeguards. Petitioners further relied on international best practice which required Kenyan government to take additional steps to provide further data protection safeguards as was the best practice in some other States. Respondents challenged the use of best practices from United Kingdom, Estonia, India, and Malaysia, terming them as being out of touch with realities in Kenya (para 251). Paragraphs 37 and 518 of the court judgement in the case outlined the contestations on best practice and their relevance to the realities of rural communities and marginalized groups, which include rural women.

The Petitioners emphasized the importance of best practices in ensuring that data protection laws adequately safeguard marginalized individuals and communities. The Respondents argued that courts should apply only those best practices that effective-

ly address the complex realities of marginalization, highlighting the need to consider epistemic data injustices in this context. Furthermore, Petitioner's case showed a complementary role of best practice in independent oversight authority and enhancing accountability. Though the court did not have to pronounce itself on the matter, its decision to allow the Petition partly shows how forceful 'good and relevant comparative best practices' can be in addressing epistemic data injustices that rural women face.

From a comparative perspective, it is necessary to enhance Tanzania's regulatory framework to effectively utilize best practices. These laws and regulations, the Personal Data Protection Act of 2022 and the Personal Data Protection (Personal Data Collection and Processing) Regulations of 2023, do not adequately address best practices concerning the protection against epistemic injustices faced by rural women. Additionally, unlike Kenya's Office of the Data Protection Commissioner, the Tanzanian Personal Data Protection Commission has yet to develop supplementary data protection guidelines to address various compliance issues. These guidelines could offer valuable direction on best practices for data protection safeguards and obligations for technology designers. Finally, Tanzanian courts have yet to adopt an epistemic data justice approach despite its potential to mitigate the epistemic data injustices experienced by rural women, as seen in the *Nubian Rights Forum case*.

IV. CONCLUDING OBSERVATIONS

The following are six concluding observations on the challenge of disregard or unfair replacement of legitimate knowledge of rural women, regulation measures for addressing the challenge and residual issues. These observations provide a comprehensive overview of the issues at stake and offer valuable insights for further discussion and action.

First, rural women are a 'knowledge bank' in Africa, although they exist in different spaces of marginalization. From a

legal and practical perspective, knowledge of rural women should be an essential component of governance of digital data produced about them. Second, rural women in Africa have vulnerabilities that arise during, and because of the use of their knowledge, including Indigenous knowledge. These vulnerabilities could arise from the two-way relationship between knowledge and personal data, production, and processing. On the one hand, personal information about the world is crucial to creation of knowledge. On the other hand, rural women's data represent information about the world and are therefore building blocks of rural women's knowledge and intelligence (Kitchin, 2014). In cases where knowledge is pre-determined, it could guide how rural women make sense of the world and contribute to their digital data based on their diverse socio-cultural backgrounds and life experiences (GPAI, 2022). These backgrounds and unique life experiences shape how rural women think and know. Because of this relationship, the entire spectrum of technology design needs to appreciate how data-driven technologies impact or are impacted by knowledge systems of rural women.

Third, the content of privacy protections is inadequate to capture or mitigate these epistemic data injustices experienced by rural women in Tanzania and Kenya. Such inadequate legislation could diminish rural women's ways of knowing and have far-reaching implications for the rights and fundamental freedoms of affected groups, which are intricately linked to the protection of knowledge, including Indigenous knowledge.

Fourth, although epistemic data justice has yet to be formally recognized as a justiciable concept, it can inspire additional legal principles which complement data protection law to better address epistemic data injustices experienced by rural women. These legal principles are rule of law, human rights, and use of good and relevant comparative best practices. Approaches drawn from these principles could, in diverse ways, complement data protection safeguards to address some of the epistemic data injustices experienced by rural women in Tanzania and Kenya.

Therefore, the potential of these approaches should be maximized through action by data protection regulators, courts, and tribunals.

Fifth, there is potential for interstate learning between Tanzania and Kenya on effectively addressing epistemic data injustices experienced by rural women. Along themes of comparative study, Kenya and Tanzania are at various levels of (lack of) protection of rural women from epistemic data injustices. They are also at various levels of implementation of the additional legal principles. Given this phenomenon, there are numerous opportunities for Tanzania and Kenya to learn from each other on how to better focus and sometimes refocus rules that address epistemic data injustices for rural women. For example, in terms of adopting good and relevant best practices, Tanzania's Personal Data Protection Commission can learn from Kenya's ODPC in affirming the place of good and relevant best practices. There is also an opportunity for the courts in these States to learn from each other about the approaches already taken. One way this might be possible is through cross-fertilization of jurisprudence that can occur through cases that come before the East African Court of Justice (EACJ), where judges from Kenya and Tanzania often sit. This proposal is inspired by the fact that digital rights cases brought against States of Tanzania, such as EACJ case of *Media Council of Tanzania and Others v Attorney General of the United Republic of Tanzania*, East African Court of Justice Reference No. 2 of 2017, used a rule of law jurisprudence of the Kenyan courts as set out in *Coalition for Reform and Democracy (CORD) & 2 Others v Republic of Kenya & 10 Others* [2015] eKLR.

Sixth, there is significant potential to enhance the role of complementary legal principles through regional cooperation arrangements. Both Kenya and Tanzania are partner States in EAC, a regional economic bloc in Africa. As some approaches discussed in this article are protected under the EAC Treaty, it would be ideal to use these insights in context of the regional

human rights framework. One example is use of EAC's rule of law principle as a basis for convergence and cross-fertilization of legal and judicial opportunities to improve epistemic data justice for rural women. Such convergence could help unlock potential of the complementary role of the rule of law principle discussed in this article.

However, the reform and lessons learned will have to contend with some conceptual challenges and limitations. One of these is nebulous nature of the concept of rural women and the inherent challenges in applying additional complementary principles. There may also be difficulties in implementing approaches due to complexity of mapping Indigenous knowledge and potential increase in compliance costs. Despite potential limitations, doing nothing is not an option. This article has shown that these limitations could be overcome by ensuring that the proposed approaches work in an ecosystem with other approaches from an intellectual property, ethical and solidarity perspective. Furthermore, the diverse levels of legal and judicial capacity in Tanzania and Kenya have been presented as an opportunity for inter-State learning.

A. Recommendations

Based on above discussions, comparative analyses, and conclusion, the following recommendations commend themselves:

i). Technology developers and other entities applying, interpreting, and implementing the data protection laws in Tanzania and Kenya should proceed with the understanding that laws are inadequate to anchor an ideal of epistemic data justice for rural women. As such, they should naturally apply complementary legal principles of rule of law, human rights, and best practice.

ii). Technology designers and users should make conscious efforts to ensure that best practice which they apply are

both good and relevant to epistemic contexts and interests of rural women.

iii). Technology designers should develop policies and practices that can guide mapping and use of rural women's knowledge. These policies should be able to mediate technical and socially situated knowledge (Leslie et al., 2022). Policies must also ensure that experts with knowledge are held accountable to align with broader values, diverse perspectives, insights and understanding of rural women.

iv). Data protection regulators should promote public education on intersection between data protection law and epistemic data justice in context of rural women in Africa. Such educational initiatives should target rural women, civil society organizations that advocate for their rights, and other members of the public. The education should also emphasize how legal principles complement the safeguards provided by data protection laws to address epistemic data injustices experienced by rural women.

v). Considering the appropriate lessons to be learnt on how best to use the three legal principles of rule of law, human rights and best practice, data protection regulators and courts in Kenya and Tanzania can learn from each other's jurisprudence, findings, and decisions to optimize realization of epistemic data justice for rural women.

vi). African regional human rights institutions, such as ACHPR, should continuously focus on epistemic data justice and consolidate its place in realizing better data governance for rural women in Kenya, Tanzania, and other African States.

V. CONCLUSION

This paper has demonstrated that legal frameworks designed to address epistemic data injustices faced by rural women in agricultural technologies face significant challenges. It has also highlighted the need for a paradigm shift in the interpretation and application of data protection laws. The discussion emphasized the importance of recognizing how rural women's knowledge, both individually and within their communities, is connected to the processing of personal data in agricultural contexts, where their indigenous knowledge is crucial. While legal frameworks can offer safeguards for epistemic data justice in the design of agricultural technologies, they still face challenges, including a lack of collaborative approaches and gaps in legal texts. This paper argues that incorporating principles of the rule of law, human rights, and best practices can strengthen these legal regimes and provide a more effective foundation for technology designers in advancing epistemic data justice for rural women in Kenya and Tanzania. Given the varying levels of implementation in both countries, there are significant opportunities for inter-state learning to ensure full and effective realization of epistemic data justice for rural women.

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