Boogaard, B.K. 2021.
Epistemic injustice in agricultural development:
critical reflections on a livestock development project in rural Mozambique.
Knowledge Management for Development Journal 16(1): 28-54.
www.km4djournal.org/

Epistemic injustice in agricultural development: critical reflections on a livestock development project in rural Mozambique

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For decades, development projects have been intervening in Africa's agriculture with the aim to reduce poverty and hunger. It seems that mainstream agricultural development projects in Africa are characterized by Eurocentrism with a firm belief in economic and technological progress. However, Eurocentrism can lead to the exclusion, systematic and structural suppression of African ways of knowing and doing, which constitutes epistemic injustice. This paper addresses a question that has gained little attention so far: do agricultural development projects in Africa maintain, reinforce, or even cause epistemic injustice? To answer this question, the study draws on literature from African philosophy, Western philosophy and Western sociology. In addition, epistemic injustice was studied empirically by reflecting critically on a participatory livestock development project in rural Mozambique (2011-2013) through qualitative analysis of 27 project documents. The findings show that the answer to the main question is affirmative. This is deeply concerning, because it means that epistemic injustice towards Africa continues, but is covered under 'benign' concepts like 'reducing poverty' and 'reducing hunger'. The thesis defended here is that restoring epistemic justice is an essential part of social justice for Africa. The paper concludes with exploring several suggestions to mitigate epistemic injustice in agricultural development projects.

Keywords: Eurocentrism; international development; social justice; indigenous knowledge; development projects; agricultural development; African philosophy; livestock; goats; Mozambique; Africa; Sub-Saharan Africa

1. Introduction

For decades development projects have been intervening in Africa's agriculture with the aim to reduce poverty and hunger. It seems that mainstream agricultural development and research is characterized by Eurocentrism[1], in the sense that it is based on the ideology that Western scientific knowledge – with a firm belief in economic and technological progress – is needed to increase agricultural production in Africa (Boogaard, 2019; Edens, 2019). However, Eurocentrism in agricultural development can lead to exclusion, systematic and structural suppression of African ways of knowing and doing. The meaning and effect of this practice is

that agricultural development may actually cause epistemic injustice. Since colonization and beyond the political independence of Africa, primarily the West, but other countries as well have practiced exclusion, systematic and structural suppression of African ways of knowing and doing.[2] However, epistemic injustice has gained little attention in agricultural development projects so far and it is unclear if and how agricultural development projects may reinforce or even cause epistemic injustice. Therefore, this paper addresses a central question: do agricultural development projects in Africa maintain, reinforce, or even cause epistemic injustice? And if so, how? The focus of the current paper is on the epistemic relation between Africa and the West. Africa's epistemic relation with other parts of the world requires a separate assessment

The outline of the paper is as follows. In the next section, different forms of epistemic injustice are presented based on literature from African philosophy (e.g. Mogobe Ramose, Pascah Mungwini), Western philosophy (e.g. Miranda Fricker) and Western sociology (e.g. Boaventura de Sousa Santos). In the following section, the necessary background information of the case study - a participatory livestock development project in rural Mozambique (2011-2013) - is provided, followed by an explanation of the qualitative ex-post method of analysis to identify epistemic injustices in the case study. Subsequently, the qualitative empirical findings are presented with quotes from project documents, demonstrating various ways in which the case study created epistemic injustice. Thereafter, it is clarified how the case study does not stand on its own, but is part of a larger system of international agricultural development with problematic structural characteristics that maintain, cause, cover, or even worsen epistemic injustices. The paper concludes by exploring ways to mitigate epistemic injustice in agricultural development.

2. Different forms of epistemic injustice

Epistemic injustice has become an 'umbrella concept' with different meanings and interpretations (Fricker 2013, Dotson 2014). Hence, it requires clarification what forms of epistemic injustice are taken into account in the current study; i.e. what forms one might encounter in agricultural development projects. Fricker (2013) identifies two types of discriminatory epistemic injustice: testimonial and hermeneutical injustice. *Testimonial injustice* is about the relation between the speaker and the hearer and occurs "when prejudice causes a hearer to give a deflated level of credibility to a speaker's word" (Fricker, 2007: 1). The basic idea is that stereotypes and identity power are influencing – for better or worse – the level of credibility that is given to a person. If the stereotype works negatively, people are given less credibility than they should have received, which Fricker names "identity-prejudicial credibility deficit" (Fricker, 2007: 4). I will return to this type of injustice further on in the paper, but for now the important point is that the hearer does injustice to the speaker by not recognizing him/her as giver of knowledge. Prior to testimonial injustice,

hermeneutical injustice can occur, "when a gap in collective interpretive resources puts someone at an unfair disadvantage when it comes to making sense of their social experiences" (Fricker, 2007:1).

Dotson (2014) distinguishes first-, second-, and third-order epistemic exclusion. She uses the term *epistemic oppression* to refer to such "persistent epistemic exclusion that hinders one's contribution to knowledge production" (Dotson, 2014: 115). *First-order epistemic exclusion* is "an exclusion that results from the incompetent functioning of some aspect of shared epistemic resources with respect to some goal or value" (Dotson, 2014: 123). Fricker's testimonial injustice is an example of first-order epistemic inclusion as it results from "the creation of epistemically disadvantaged identities through unwarranted credibility deficits" (Dotson, 2014:126). *Second-order epistemic exclusion* "results from insufficient shared epistemic resources" (Dotson, 2014:126), which shows parallels with Fricker's hermeneutical injustice. *Third-order epistemic exclusion*, however, is different in the sense that it refers to the dominant epistemological system including the challenge to change it. As such, third-order epistemic injustice is "a compromise to epistemic agency caused by inadequate dominant, shared epistemic resources" (Dotson, 2014:129). Thus, whereas Fricker (2007) focuses mainly on the position of the individual hearer and the interaction between individuals, Dotson also addresses features of the epistemological system itself. One of the challenges we face when looking at epistemological systems is a certain blindness in the sense that one may be unable to detect "one's inability to understand certain things" (Medina, 2011, 28 in Dotson, 2014: 121). As Kaphagawani and Malherbe (2003: 268) put it: "the people brought up in a certain tradition can never see it. They are blind to it just because it is, for them, the only way things could possibly be."

When such epistemic injustices occur, there are at least three harms involved. First, "any epistemic injustice wrongs someone in their capacity as a subject of knowledge, and thus in a *capacity essential to human value*" (Fricker, 2007: 5, my emphasis). The capacity to reason is essential to humans, and it is deeply dehumanizing if this capacity is ignored (Ramose, 1999). Second, the speaker is denied an opportunity to participate meaningfully to knowledge production and the hearer may miss out on knowledge that the speaker has to offer. Third, if undermining of a speaker's knowledge and credibility occurs persistently, it will lead to loss of confidence in oneself and a loss of knowledge (Fricker, 2007). Such a loss of knowledge can lead to what Ramose (2019) as well as Santos (2014) call *epistemicide* – the death of the knowledge.

It is important to note that these forms of epistemic injustice do not occur in isolation: at the root of these injustices are longstanding structural unequal power relations, characterized by historical, social and political forms of Western domination, including slavery, colonialism, capitalism, and patriarchy (Santos 2014, Mungwini 2018, Ramose 2019). The epistemic relation between Africa and the West is characterized by scientific and spiritual racism of the

West towards Indigenous people of Africa (Ramose, 1999; Mungwini, 2018). The West has imposed – and continues to impose – Western knowledge on Africa, which is considered superior while silencing Indigenous epistemologies (Mungwini, 2018). The assumed superiority of Western knowledge and philosophy is what characterizes Eurocentric thinking (Kimmerle 2016). Eurocentric thinking is no longer tenable, for one reason because it goes together with persistent *epistemic blindness*. That means: by looking at Africa from a Eurocentric perspective, important parts of African cultures, philosophies, and epistemologies remain unnoticed, or in fact, are consciously ignored. As Ramose formulates it: "willful blindness and deafness" and "refusing to see the visible other and avoiding to listen to the voice of the other" (Ramose, 2014: 73).

Based on the above, one might find at least four forms of epistemic injustice in agricultural development projects:

- Project participants were ascribed a credibility deficit, as indication for *testimonial injustice.*
- Indigenous knowledge and ways of knowing have been destroyed throughout the project, as indication for *epistemicide.*
- Dominance of Eurocentric thinking in the project, as indication for *epistemic blindness.*
- Project data and information have been framed inadequately, as indication for *hermeneutical injustice.*

These forms should not be seen as separate; instead they are interrelated. For example, epistemic blindness – e.g. not recognizing other epistemologies due to Eurocentric thinking – can easily lead to destruction of such ignored epistemologies, i.e. epistemicide. These different forms of epistemic injustice have been used as entry points for the analysis of the case study.

3. Case study: goat production and marketing in Inhassoro district, Mozambique

In order to empirically study epistemic injustice in agricultural development, I reflected critically on a livestock development project in Mozambique (2011-2013) entitled "Small ruminant value chains as platforms for reducing poverty and increasing food security in dryland areas of India and Mozambique". This section provides the necessary background information of the case study, including its main aim and intervention types. The project was active from January 2011 to June 2013 (30 months) in two different contexts: India and Mozambique. Due to the focus of the current paper on African philosophies and epistemologies, the analysis is restricted to the project site in Mozambique.

In Mozambique, the project operated in Inhassoro district in Northern Inhambane province, where about 87% of the population lives in rural areas and the majority of agricultural products are produced on *machambas* (subsistence agricultural plots) (RP).[3] The main aim of the project was to "to transform goat production and marketing from the current ad hoc, risky, informal activity to a sound and profitable enterprise and model that taps into a growing market" (PB1). In order to reach this aim, the project employed value chain and innovation system approaches. This means that the project aimed to support participatory innovation processes by setting up an innovation platform (IP) with value chain stakeholders, such as goat keepers, traders, and community leaders (see Textbox 1). At innovation platform meetings, project participants and project team members identified key challenges and limitations in goat production and marketing, and subsequently collective actions were designed, planned, and implemented. The organization of goat markets was one of the key actions by the IP. In doing so, the project aimed to facilitate and stimulate more regular sales of goats, so that goat keepers could gain a more regular income from goat keeping. The lack of grazing areas for goats was another key challenge identified by the IP. Subsequently, the project supported the organization of communal grazing areas together with local government officials.

Textbox 1. Setting-up an innovation platform

Innovation platforms (IP) are "spaces facilitated by local innovation brokers where individuals and organizations can come together to address priority issues related to development of value chains." (PR4). The presented project brought different stakeholders of the value chain (VC) together to jointly assess challenges along the chain and search for solutions. Goat value chain stakeholders included goat keepers (i.e. producers), paravets, community leaders, goat traders, and local government officials. One of the underlying ideas was to connect goat keepers with goat traders, so that goat keepers have better access to markets and can sell goats more frequently throughout the year. The initiative of setting up an IP was taken by the research organization and the NGO: they selected and invited potential IP participants and they facilitated the first meetings. At the first IP meeting, a secretariat was chosen by the IP members with the idea that they should be running the IP without project support by the end of the project. In total, 9 IP meetings were held during the project.

Throughout the project "capacity building was one of the core elements to further improve the innovation process" (PR1). This means that project extension officers provided regular trainings to goat keepers and community animal health workers (paravets) on goat health, breeding, housing, and feeding (see textbox 2). By providing such trainings, the project thus also applied rather conventional extension methods – in addition to the more novel approach through an innovation platform.

Textbox 2. Training goat keepers and community animal health workers (paravets)

At the start of the project, the project team (NGO and research organization) took the initiative to provide two types of trainings: 1) for groups of goat keepers in the communities, 2) for community animal health workers (paravets). The content of the trainings was based on existing extension and training models of the NGO and provided by NGO extensions officers. In addition, the baseline study of the project provided insight in 'knowledge gaps' among goat keepers, resulting in trainings on 'improved' practices such as goat health, reproduction, housing, watering and feeding (PB2). Goat keepers' groups were formed in 18 project communities, resulting in a total of 523 goat keepers who participated in regular group trainings (PB3). In addition, 5 model farmers were selected to demonstrate improved practices, including the construction of an 'improved' (i.e. elevated) kraal (PB3). The training for paravets included 14 selected goat keepers, who received specific training to provide animal health services in the communities (PB3). It was aimed that at the end of the project there was one paravet per community who could conduct basic medical treatment of goats (like treatment against internal and external parasites and wound treatment). At the end of the project, the project team composed a specific training manual for the paravets, which they could use in the communities to continue informing and training goat keepers about 'improved' practices (TM). Commercialization of goat keeping was included in both training types – i.e. to direct goat keepers towards a more commercially oriented mind-set rather than their current mind-set of farming.

4. Methodology

The undertaking was an Agricultural Research for Development (AR4D) project which means that it contained a research as well as a development component with two organizations: an international research organization managed the overall project and an international NGO was responsible for implementation of the project. Thus the project was designed and led by the international research organisation, who wrote the project proposal and designed and planned most research activities and development interventions. The challenges that an international research organization faces when combining research with development objectives is a whole debate in itself (e.g. Leeuwis et al. 2018), which is not the focus of the current paper. Instead, for the methodology of the current paper it is relevant that due to the research component - that aimed at studying innovation processes - the project was heavily documented. Thus the project documentation entails rich qualitative data, which allowed for deeper reflection on project assumptions and ideologies and as such provided insights into epistemic injustice.

To search for epistemic injustice in the presented case study, I analyzed 27 open access project documents with a total of 497 pages. A code was assigned to each document so that

the findings can be traced back, e.g. "PR2" refers to "Peer Reviewed article nr. 2" (see Appendix I for an overview of all project documents with codes):

- 4 peer reviewed publications (PR 1-4)
- 2 conference papers (CP 1-2)
- 1 research report (RP)
- 9 reports of innovation platform meetings (IP 1-9)
- 3 reports of national steering committee meetings (NSC 1-3)
- 5 research and policy briefs (PB 1-5)
- 1 training manual (TM)
- 1 end of project report (ER)
- 1 master thesis (MT)

The current study is thus an ex-post analysis, conducted after the project ended. This can be seen as a limitation of the current study, because if the research had been designed specifically to study epistemic injustice, it would have most likely included additional and different empirical data. At the same time, it is concerning that the two organizations engaged in the project did not even consider the question of epistemic justice. In that sense, this makes the presented case study a realistic example of an agricultural development project in practice, in which epistemic justice seems not to have gained much attention. It means that the ex-post analysis is also a strength of the current study, because the project documentation gives valuable insights into the way agricultural development projects actually operate in practice, and as such it can give insight into ways the project might maintain or cause epistemic injustice. To put it differently, if epistemic justice had been the topic of study at the start of the project, the project most likely would have been designed and implemented quite differently – in the sense that such a project would aim to contribute to – rather than to violate – epistemic justice. Therefore, I will be questioning both the explicit and the implicit – probably unintended – intention and design of the project.

The analysis focused primarily on epistemic injustice done to people who keep goats (i.e. goat keepers), because most project interventions and trainings were targeted directly at goat keepers and changing their knowledge and practices. The method of analysis was qualitative: in the 27 project documents, I searched for indications towards epistemic injustice based on four forms of epistemic injustice as presented in the literature. I selected relevant quotes and texts from the documents and subsequently structured and grouped these in various forms of epistemic injustice. The empirical findings are underpinned with quotes from the project documents.

The purpose of the current study is not to identify whether individual team members in the project have or have not reinforced or caused epistemic injustice. However, it is important to

mention that I was partly responsible for the research component of the project, because I worked as post-doctoral researcher in the project (2011-2013). My involvement in the project requires clarification about my position in the project as well as the presented analysis. To start with, I lived two years in Vilanculos, Mozambique, which is the town where the office of the implementing NGO was located, about one-hour drive from the project communities in Inhassoro district. During the project period, I regularly (about once every two weeks) visited communities and met with project participants. I participated in 8 of the 9 innovation platform meetings, and was strongly involved in the design as well as implementation and monitoring of the innovation platform. As post-doctoral researcher, I wrote most of the reports on the innovation platform meetings, with the aim to analyze and publish about the innovation process. In fact, 17 out of the 27 project documents involved my writing - in collaboration with project team members. Since I conducted the analysis of the current paper, I thus analysed reports that partly have been written by myself several years ago. This double role can be an advantage in the sense that through the post-doctoral position I gained in-depth knowledge and experience about the project. On the other hand, my involvement might also have led to certain Western biases. In the current paper I aim conduct retroactive self-criticism as a way to look at and become more aware of such biases. Such self-reflexivity can contribute to the advancement of the field – in academia as well as practice – although this does not mean that the analysis and findings in the current paper are entirely unbiased.[4]

5. Key empirical findings

The analysis revealed five ways in which the presented project violated epistemic justice. Below, each way (A-E) is elaborated with quotes and explanations from the project documents. The code behind a quote or text refers to the specific project document (see Appendix I).

A. Imposing a Western market-based development ideology

The main aim of the project was "to transform goat production and marketing from the current ad hoc, risky, informal activity to a sound and profitable enterprise and model that taps into a growing market" (PB1). To put it shortly, improved goat production and commercialization was seen as "a tool to reduce poverty in communities" (ER). Hence, the project had a strong focus on commercialization of goat production and marketing through trainings and meetings. The underlying assumption was that goat keeping in its existing form was not a viable and profitable enterprise. Instead, goat keepers needed to produce more and healthier goats and sell more frequently. In one of the meetings, the project donor formulated it as follows:

> Goat keeping is not seen as a reliable source of income and *this mind-set may be difficult to change*. However, it's the project goal and continuous efforts should be made to achieve this. (NSC2, my emphasis)

This quote captures the essence of the project, which was frequently mentioned by project team members: it was assumed that goat keepers needed to *change their mind-set* and become more commercially oriented. It means that their current mind-set was not good (enough) and that another mind-set was better. The promoted mind-set of a more commercial attitude reflects a Western-based agricultural development ideology: commercialization of agriculture are seen as the best pathway for agricultural development in Africa. However, in terms of epistemic justice it is highly concerning when projects impose a mind-set on participants without due regard for their epistemologies. This does not only do injustice to participants as knowledge givers only if they were given a chance to contribute their knowledge (testimonial injustice, see point B below), but by imposing a mind-set, the project may have contributed to the destruction of Indigenous epistemologies.

Let us take a closer look at how the Western market-based ideology of agricultural commercialization in the presented project might be mismatching with Indigenous epistemologies. One of the main interventions initiated by the project during IP meetings was the organization of goat markets, so that goat keepers could sell their goats more frequently. The project aimed to convince people in the community to use a weighing scale when selling their goats – so that goats were sold at a fixed price per kg of live weight. The project assumed that "using weighing scales and determining a live weight price is critical for the success of the fairs" (NSC 2). The use of a weighing scale met resistance from the beginning, but the project tried to convince people in multiple ways that a fixed price was really necessary for commercialization and regular sales. For example, at the 3rd IP meeting the project organized a demonstration to define the price of a goat with and without weighing scale, so that participants could see that they would get a better price by using the weighing scale (IP3). Towards the end of the project it seemed that quite some people in the communities were not supportive of the use of the weighing scale, as mentioned in the 8th IP report: "the model farmer suggested selling without weighing scale, so that everybody can negotiate about the price" (IP8). Goat keepers thus preferred to continue using their own ways of negotiating with buyers rather than using a weighing scale. In their own negotiations the price varied according to different factors like: time of the year (ask a higher price at moments of festivities), whether a buyer comes from inside or outside the community (the latter has to pay a higher price), and whether sales occurred in times of emergency (generally goat keepers accepted a lower price for people in need). However, the project saw this way of selling goats as 'not organized' and 'informal', as mentioned in one of the project documents:

> The baseline study showed that about 64% of the goat keepers sold goats, though in an 'informal way'. The main buyers of goats were individual traders (43%) and other

> smallholder goat keepers (22%). Most sales (79%) took place at the trader's house and payment was made in cash at the time of the transaction. (PR1)

However, a sociological study in the same project (RP) showed that price agreements in communities go back to periods of crisis when the goat population depleted severely, like the civil war (1977 - 1992), floods, and cyclones:

> [After the civil war] there was hardly any – if no – livestock in the community and several methods were reported to increase the goat population in their community. […] After the floods and cyclone, communities had different ways to increase the number of goats in the community, such as lending goats for reproduction to others, buying new goats, selling goats to community members for low prices, and exchanging goats for work on the *machamba* (subsistence agricultural plot). Price agreements still exist in some communities. (RP)

The above quote shows that price agreements between community members go back to times of need – to help each other. Although the sociological study only touched upon the (complex) history of Mozambique, the above quote shows that trading and exchanging goats have been part of people lives for a long time. To label such existing trading networks and agreements as 'informal' and 'not organized' does not do justice to people's Indigenous knowledge on goats sales and trading. Instead, such terms emphasize inferiority by suggesting that sales should become formally organized and commercialized in an economic value chain, based on a Western development ideology. In this same line, the sociological study showed that values of mutual assistance and reciprocity continue to exist until today:

> …many respondents used goats to help family by offering one or more goats. As such, goats play an important role in mutual assistance in times of crisis within and between families and community members. For example, mutual assistance between and within families played a large role in the restocking process, particularly in the second decade after the civil war. (RP)

Mutual assistance is a core value of African philosophies, or to put it in Wiredu's words: "life is mutual aid" (Wiredu 2003: 345). However, by imposing Western-based market-led thinking these values of mutual assistance are under pressure. The above quotes might help to better understand the unwillingness or reluctance of participants to use the weighing scale and a fixed price for goats: it might be a form of resistance in the sense that people did not want to change their knowledge and related practices about how to sell goats. However, their knowledge on goat sales, prices and traders was considered not sufficiently market-oriented by the project. Instead, the project held the vision that people needed to commercialize their goat keeping in order to reduce poverty and hunger. This vision was based on Western-based market-led thinking, and was not open for discussion during the project. Towards the end of

the project, there was a cautious remark about the validity of the project assumptions on commercialization:

> In Mozambique, the value chain was very weak or almost non-existent; goats had multiple functions in the households and not everyone – especially women – may have been interested in the commercialization of goats. The IPs [innovation platforms] did not fully capture this. Under such conditions, alternatives such as a stronger focus on production or diversification of livelihood strategies need to be considered. (PR1)

This quote illustrates that the project most likely has been designed on rather naïve assumptions about commercialization. However, the quote does not address the underlying ideology of the project. That is; the project imposed a Western-based ideology of agricultural development on rural communities in Mozambique. This is highly problematic since unequal epistemic power relations are maintained or even reinforced in which Indigenous epistemologies and visions on development continued to be ignored. Moreover, the example showed that through epistemic injustice one easily misses out on important knowledge (Fricker 2007), which could have led to a different focus of the project and avoided naive project assumptions.

B. Labelling people as mainly knowledge beneficiaries

The previous point (A) showed that the Western-dominated project vision was problematic in terms of epistemic justice. Yet, it is closely related to another problematic assumption about how it viewed the main participants. The project focused mainly on goat keepers in rural communities of Inhassoro. In project documents this focus was formulated as follows: "the main target beneficiaries of the project are poor goat keepers" (PB2). Since the project largely envisioned material poverty reduction – i.e. gaining (increased) income – 'poor' in this quote refers to 'materially poor'. However, the project hardly provided material resources. Instead, the project had a clear position how this should be reached: it was assumed that if goat keepers gained Western scientific knowledge about goat keeping and commercialization, they would be able to move out of material poverty. Thus, although the project aimed explicitly to reduce material poverty, its interventions focused on assumed intellectual poverty. In combination with a history of material aid by donor organizations over the past decades – e.g. distribution of goats in the region -, it is understandable that the project goal and approach were confusing for the project participants. At the fifth IP meeting – i.e. almost one year after the first IP meeting –, there was a discussion about the expectations of project participants and what the project was actually providing. As one community leader explained during the meeting:

> In the beginning many people participated in the project because they expected to receive something, because of history in the community (receiving cattle and goats). But then they didn't receive anything and many people left the group. A small group

> was left, consisting of producers who were really motived to improve their goat keeping. This worked very well. He [a goat keeper] did not receive any goat, but his number of goats increased. Now he has about 60 goats and it keeps increasing. Subsequently, the other producers are gradually coming back. The few people who stayed only wanted support, they don't expect to receive other things. The others now are starting to understand that it is not about receiving things. (IP5)

The above discussion came up multiple times during project meetings and trainings: discussions diverted to the request for material incentives. Although the available project documents did not provide further arguments why people left the group and some later came back, and the incentive-structure of development projects is a whole debate in itself, it is striking that these discussions did not let the project organizations to reflect or reconsider the project approach and vision itself. Instead, the project message was repeated consistently towards project participants: the project provided knowledge, not material incentives. The concerning point with regard to epistemic justice is not to provide material incentives rather than knowledge – material incentives also include assumptions about knowledge – , but the problem is that the project implicitly assumed that people are intellectually poor. Thus participants were mainly seen as beneficiaries of knowledge on whom Western scientific knowledge was imposed, which further reinforced neglect of Indigenous knowledge. This does not mean that goat keepers cannot benefit or learn from Western scientific knowledge, but this finding implies that the commonly used terms 'beneficiaries' and 'poor' in mainstream development projects are problematic in terms of epistemic justice, because these terms can label project participants as mainly receivers of knowledge. Such labelling reinforces negative stereotypes and results in what Fricker (2007) calls testimonial injustice: project participants are confronted with a *credibility deficit* precisely because of being a project participant, which more specifically leads to an *identity-prejudicial credibility deficit*.

C. Excluding Indigenous knowledge and epistemologies from trainings

Goat keepers' knowledge about goat keeping was assessed at the start of the project through a baseline study. The baseline study did not explicitly try to elicit Indigenous knowledge and ways of knowing with regard to goat keeping. Instead, the baseline information was used to confirm the project assumption that goat keepers "had limited knowledge and skills of improved goat husbandry practices and marketing" (PB4). The baseline thus reinforced the stereotype that goat keepers had limited knowledge and as such were beneficiaries of knowledge (as under point B). Based on this assumption, capacity building was a main focus of the project. NGO extension officers provided trainings to groups of goat keepers and 14 paravets, which focused mainly on 'improved' practices on animal health, reproduction, housing, and feeding (see textbox 2). Another important assumption underlying these trainings was the idea that there is something like 'improved' goat keeping. The point here is not that there cannot be any improvements in goat keeping. The point is that when starting

with such assumptions, it is suggested that Indigenous ways of doing and knowing are inferior.

In fact, the trainings were based on rather conventional ways of extension training, mainly with transfer of Western scientific-based knowledge – in this case mainly about animal health, based on veterinary sciences. The trainings did not include Indigenous knowledge – e.g. ethno-medicine about Indigenous ways of treating goats – or Indigenous worldviews, e.g. about people's spiritual relation with nature – including plants, trees, grasslands, and animals, while it is widely known that the spiritual realm is an important part of African cultures. It may be clear that Indigenous knowledge is not a homogenous, static concept, but it is heterogenous with a diversity in agricultural practices and views across the African continent that evolve over time. Yet, the trainings ignored indigenous knowledge and ways of knowing from the outset, and one can say that disregard of indigenous knowledge by the project constituted epistemic injustice, a form of wilful epistemic blindness.

These findings confirm what one might expect: epistemic injustice takes place through extension when this is designed by Western NGOs and research organizations and strongly based on a Western way of looking at the world without due regard for Indigenous epistemologies. At the same time, this finding does not necessarily imply that Western-based knowledge should be disregarded entirely from trainings. However, due to unequal pedagogical power relations, Western-based extension trainings entail the risk of committing epistemicide. This means, there is a risk that unequal historical power relations of oppressor and oppressed – i.e. Western dominance which goes back to slavery, colonialism, missionary activities, as well as development aid – are maintained and reinforced (Freire, 1970). Such unequal pedagogical power relations can convey the message can that Indigenous ways of doing and knowing things are inferior, which may lead to the destruction of Indigenous knowledge. A central question for the current study is then: did the project trainings actively contribute to destruction of Indigenous knowledge? In the project documents, there was practically no information on Indigenous knowledge in trainings. From this it cannot be concluded if the trainings directly led to epistemicide: it can only be concluded that Indigenous knowledge was not within the sight of the project.

D. Imposing Western concepts through project interventions

The organisation and facilitation of an Innovation Platform (IP) was a main intervention of the project (see textbox 1). In this section we take a closer look at how the IP was set-up and operated and if in its presented form contributed to epistemic injustice. To start with, the initiative to set-up an IP came from the project team, i.e. people from the international research organization and NGO. It was also the project team who conceptualized the vision and objective of the IP. At the first IP meeting, the concept, vision and objective of the IP were explained to project participants (IP1, PB4). A Mozambican project team member facilitated the first meetings in Xitsua with translations to Portuguese for non-Xitsua speaking

project staff (IP1). In Xitsua there is no word for 'Innovation Platform', so when talking in Xitsua the Portuguese words 'Plataforma de Inovação' were used. This language example illustrates that the concept of an IP was Western-based and did not exist in Xitsua epistemologies. The project thus imposed Western-designed concepts as well as their vision and objectives on the participants. Even more than the problems of translation, the imposition of the concept constituted epistemic injustice as we will see below.

The project team took the lead in organizing and facilitating the IP meetings. It was envisaged by the project that an IP secretariat (constituted of four elected IP members) should be able to manage and facilitate the IP meetings. As reported in one of the project documents:

> IP facilitation and management were *gradually handed over* to IP members, but this needed a lot of guidance. For these reasons, most of the decisions related to the design of the platform were influenced by former experiences of [the NGO] and [research organisation]. (PR1, my emphasis)

The use of the terms *gradually handed over* confirms the idea of a giver/receiver relation, in which the project team gives something to the IP members. In this case, the project gives knowledge to the IP members about how an IP should (continue) to function - also after the project ended. Again, the IP members were largely seen as knowledge receivers, rather than knowledge givers. Much of the project's time and resources was used to convey the idea of an IP to project participants. At the end of the project, a project team member mentioned that he "was impressed by the ideas of the persons he had met [in the community], there are really some "champions" that *have fully understood the project objectives.*" (ER, my emphasis) This quote confirms a key-assumption throughout the project: project participants should understand the pre-defined and Western-designed concepts and objectives of the project. This is a clear example of how a Western concept, such as an IP, has been imposed on people in rural Mozambique and thereby ignoring Indigenous epistemologies. For example, there may be other forms of decision making such as 'palaver', where people 'talk until they agree' (Wamba dia Wamba, 1992 in Kimmerle, 2004).

However, the question if the IP did or did not contribute to epistemic injustice, requires a more nuanced assessment. It is not only about the concept itself, but also about how the IP eventually influenced project interventions. In theory, IP's can offer space for different knowledge systems, and as such potentially be inclusive in terms African epistemologies. This raises the question to what extent the IP offered space to take indigenous epistemologies into account? With regard to commercialization of goat keeping and the organization of goat markets, the answer is negative: these interventions were largely pre-defined by the project (as discussed under point A). In fact, it seems that the IP was used as a vehicle to impose the project vision of goat commercialization. However, at one of the first meetings of the IP, project participants formulated a direct and primary need: there was a lack of pasture areas for

goats, and they requested support in the organization of communal grazing areas (IP 2). Although the project team had not anticipated this intervention, the team tried to respond to this request. Interestingly, the project team had limited knowledge about communal grazing areas and as such had to learn from goat keepers and community members and actively cooperate with the regional government. Subsequently, an M.Sc. student got involved in the project to conduct research on the carrying capacity of grazing areas as well as the social organization of goat keeper groups to collectively herd their goats (MT). As part of this study, the student identified grass and plants species that people fed to their goats, which resulted in a herbarium of plant species. As such, the study tried to understand goat keeper's feeding practices, rather than imposing a Western development concept. Thus, through this M.Sc. research the project included some of people's Indigenous knowledge on grass and plant species.

E. Framing research within Western categories and frameworks

The project included various studies e.g. on innovation platforms (PR1), on gender roles in goat production and marketing (PR3), on modelling of value chains (PR2), on outcome mapping as evaluation method (PR4), and on the socio-cultural context of goat keeping (RP). In the presented analysis, the latter study (RP) will be used as an example of epistemic injustice in research. The reasons to select this study are twofold: 1) The sociological study touched upon aspects of African epistemologies, 2) The sociological study allows for critical retroactive self-reflection, because the main researcher of the sociological study is also the author of the current paper (see endnote 4).

The sociological research was an in-depth follow-up study of the baseline study and looked "at the different roles and functions of goats within the historical and socio-cultural context of Mozambique and more specifically in Inhassoro district" (RP). It aimed to understand goat keepers' reasoning and underlying motivations to keep goats, based on their knowledge and logic. In the light of African epistemologies, the sociological study touched upon topics like the concept of being in African communities, the spiritual realm, and the importance of mutual assistance in rural communities in Inhassoro district (as described under A). For example, the study showed that goats are often used to help others in need and that goats play an important role in spiritual rituals, such as honoring the ancestors. As such one can say that the study somehow tried to do justice to people's knowledge and practices with regard to goat keeping and marketing.

However, at the same time the study is entrenched with Western perspectives, in the sense that research questions, answers, theory, and literature were largely based on and interpreted through a Western lens. For example, the researcher identified 13 reasons why people keep goats. Through qualitative analysis, she grouped these reasons in four categories that describe the functionality of goats: goats as financial saving and insurance; goats as contributors to food security; goats as contributors to social capital; and goats as commercial production

commodities (RP). This categorization should help "to better understand the pathways through which goats can contribute to development outcomes like increased income and food security" (RP). It can be questioned if goat keepers would have grouped their reasons in these categories. In other words, one wonders if these categories and underlying development ideologies make sense within goat keepers' worldview and their epistemologies. In terms of epistemic justice, it means that although this study tried to recognize goat keepers' knowledge, logic, and underlying motivations, it was characterized by epistemic blindness: the researcher was unaware of Indigenous epistemologies, and as such research findings were too quickly framed within a Western framework.

6. Three root causes of epistemic injustice in agricultural development

The empirical findings showed that there were five ways in which the project perpetrated epistemic injustice, namely by:

A. Imposing a Western-based development ideology
B. Labelling participants as mainly knowledge beneficiaries
C. Excluding Indigenous knowledge and epistemologies from trainings
D. Imposing Western concepts through project interventions
E. Framing research within Western categories and frameworks

Based on these findings, the answer to the main research question – if agricultural development projects in Africa maintain, reinforce, or even cause epistemic injustice – is affirmative for the presented case study. In fact, the case study showed that even participatory approaches do not guarantee that people's epistemologies are included. Whether or not this affirmative answer also counts for other agricultural projects, depends on the kind of agricultural projects and the extent to which epistemic justice is in sight of the project designers and implementors. At the same time, epistemic injustice does not occur in isolation and the findings of the current case study may reflect more structural problems in agricultural development. Hence, it is important to place the project in a broader context and to address possible underlying and structural problems that cause, maintain, cover, or even worsen epistemic injustice in Africa's agricultural development. The findings indicate towards three of such underlying and structural problems, which I briefly address below: hegemony of the agricultural modernization paradigm; Eurocentrism in knowledge-based development; and the use of the Sustainable Development Goals (SDGs) (UN, 2017), like 'Zero hunger' and 'No poverty', as legitimization.

Hegemony of the agricultural modernization paradigm

The presented project imposed a Western-based development ideology that relates to a general view in agricultural development projects that farmers need to become more

commercially oriented and connect to markets. This development ideology is not unique for the project, as there are other projects that also aim to 'modernize' and 'commercialize' Mozambique's agriculture, such as agricultural corridors in Zambezi Valley (Gonçalves 2020). The agricultural modernization paradigm – based on specialization, scale enlargement, and industrialization of agriculture (van der Ploeg, 2000) – is often associated with large scale agribusiness projects and its related devastating consequences and injustices, such as environmental degradation, exploitation of human and environmental resources, and unequal trade policies. However, the ramification of this modernization paradigm also resonates in epistemic assumptions in small-scale participatory projects when these are based on a Western ideology of modernization of food systems with a firm belief in science, technology and capital, and governed by markets and technology (van der Ploeg, 2016). This dominant Western ideology of agricultural modernization and commercialization is problematic in terms of epistemic justice, because it has been – and continues to be – imposed on farmers across the globe. For example, by using terms like 'new' and 'improved', external agricultural products and practices purport to be superior by definition to the existing Indigenous practices and knowledge (van der Ploeg, 2016). Thus, the hegemony of the agricultural modernization paradigm contributes to – or even is a root cause of – epistemic injustice and epistemicide in agricultural development in rural communities in Sub-Saharan Africa.

Eurocentrism in knowledge-based development

The presented project mainly aimed to provide knowledge to people in the rural areas of Mozambique. In doing so, epistemological inequalities between knowledge giver (project team) and receiver (project participants) were reinforced by the implicit claim that "knowledge" from Europe did not require dialogue with any other epistemology. The findings show that epistemic injustice occurred directly through trainings that were based on Western knowledge transfer and, in many more 'subtle' ways, e.g. by using Western concepts and frameworks. It seems that all five ways of epistemic injustice (A-E) were characterized by Eurocentrism. The vision, conditions, definitions, borders, and some of the interventions of the project were pre-set by the project organizations meaning that it was largely Eurocentric in its design as well as implementation. The project does not stand on its own, but there is a general tendency in international development to limit material incentives and instead focus on the provision of knowledge – i.e. to move towards knowledge-based development (e.g. Lajul 2018). Although knowledge-based development does not have to be problematic, it becomes concerning when knowledge is essentially Eurocentric, suggesting other types of knowledge are inherently inferior. [5] As such, epistemic injustice is arguably at the heart of knowledge-based development.

Interestingly, the project was based on participatory methods, which raises the question to what extent participatory methods are open to include people's epistemologies. The innovation platform (IP) was promoted as a vehicle to give a voice to project participants in innovation processes. Although epistemic justice is not the main aim of an IP, in theory, an IP

can be a space for integration of a diversity of knowledges – thus it can include Indigenous epistemologies (Boogaard et al. 2013). However, the findings of the case study show that the extent to which an IP violates epistemic justice (or not) depends largely on the way it is implemented and the interventions it will lead to: when an IP is open to include people's perspectives and their knowledge from the start - like in the example of communal grazing areas - it might be the way to contribute to epistemic justice. On the other hand, when the concept of an IP in itself is imposed and when IP interventions continue to be based on underlying Western ideologies of development, which cannot be questioned or changed during the project - it can in fact reinforce or even worsen epistemic injustice. Thus, although the use of IPs suggests a strong participatory approach under the heading of inclusive development, IPs can also be used to continue imposing Western-based development ideologies and approaches on rural people in Africa. The latter is highly concerning; it shows that inclusive approaches maybe inclusive in terms of the people involved, while their epistemologies remain excluded. As such, one can say that epistemic justice should be a fundamental component of good quality participatory projects.

SDGs are used as legitimization

Through the described interventions, the project aimed to contribute to increased incomes and food security for people in Inhassoro district. In doing so, the project was part of a broader ambition in international development: it aimed to contribute to SDGS, in this case SDG 1 'No poverty' and SDG 2 'Zero hunger". In general, the SDGs are considered 'benign' concepts, in the sense that they represent something intrinsically good: no one can be against less poverty and hunger in the world. But are these indeed 'benign' concepts? The case study is a clear example: the project was conducted in the name of benign concepts like 'increasing food security' and 'reducing poverty', while violating epistemic justice in at least five ways. As such, deep epistemological inequalities between Africa and the West are reinforced. Moreover, it seems that the SDGs are used as legitimization by Western development projects to continue intervening in Africa's agriculture, based on Western scientific knowledge. This is highly concerning, because it means that epistemic injustice continues, but is covered under 'benign' ambitions like no poverty and zero hunger. In doing so, the West imposes a claim on Africa's future that the agricultural modernization paradigm and capitalism is needed to feed a growing population. Such a future is "specified by institutionalized science through the analysis and combination of new technological possibilities and expected market tendencies" (van der Ploeg 2016: 6). In such a future there seem little space for indigenous practices and epistemologies.

Moreover, the unequal epistemological relation between Africa and the West is intrinsically and deeply intertwined with an unequal economic power relation. The problem of the current skewed international trade relations in the global economic order and Africa's unjustly acquired un-payable foreign debts find their roots in history of slavery and colonialism (Bujo, 1998). Unequal economic power relations exist until today and raise the question of where the

money for agricultural development projects comes from. In the presented project, the money came from Europe, in which the funding organization had a strong say in the expected outcomes of the project and how these should be reached. Thus, money and power are closely related in the sense that those who provide the money tend to define how the money is spent. As long as funding organizations continue to use the SDGs to legitimize Western-based knowledge interventions in Africa's agriculture, epistemological and economic relations between Africa and the West continue to be characterized by Western dominance.

7. Towards mitigation of epistemic injustice in agricultural development

A condition of injustice demands the restoration of justice (Ramose 2019). The thesis defended here is that restoring epistemic justice is an essential part of social justice for Africa (Ramose 2019, Mungwini 2018). It should be noted that the complexity of changing such a systemic, persistent, and historical injustice cannot be covered in one section here. Below I will therefore explore several ways to mitigate epistemic injustice in agricultural development – these should be seen as a start to engage in further dialogues and research.

To start with, it should be noted that the period from colonisation onwards "was a systematic, systemic and sustained epistemicide which failed, despite its intensity and vigour, to kill completely and totally the indigenous cultures of Africa" (Ramose 2014: 72). Thus, despite the ongoing epistemicide, indigenous knowledges are still present in today's Africa. Kaphagawani and Malherbe (2003) describe African epistemologies as "epistemic threads in the fabric of a culture" (Kaphagawani and Malherbe 2003: 264), which includes well-established general beliefs, concepts, theories; favoured ways of acquiring new knowledge; accumulated wisdom passed on to their youth – proverbs, traditions, myths and folk tales; the language of an ethnic group; customs and practices in religion and judicial procedure; and accepted authorities in matters of knowledge and beliefs. There is therefore a need to be more open to and aware of African epistemologies that have largely been ignored. This requires creating a distance from Eurocentric thinking (Santos, 2014). At the same time, it does not mean that one has to do away with Western epistemologies, but rather to recognize a *diversity of knowledges and epistemologies* (Ludwig and El-Hani, 2019). In practice, this means that development projects should be aware of indigenous epistemologies and actively include indigenous knowledge in participatory agricultural innovation processes. A good example of such a participatory approach is Prolinnova which promotes local innovation in ecological agriculture and natural resource management (Waters-Bayer et al, 2009).

In search for ways to move away from Eurocentric thinking various authors emphasize the importance of engaging in dialogues (e.g. Freire, 1970; Kimmerle, 2004; Fricker, 2007; Santos, 2014; Healy, 1998). There are parallels and differences between their approaches and they use slightly different headings: for example Kimmerle (2004) pleads for intercultural

dialogues, while Santos (2014) refers to intercultural translation, and Healy (2011) pleads for transformative dialogues. I will not discuss differences and parallels in detail here – see for example Schepen and Graness (2018) who compare Kimmerle's approach of intercultural philosophy with the works of Fricker and Santos – but one of the main parallels is that most of them emphasize the *importance of listening.* For example, Kimmerle refers to his methodology of listening which refers to a specific need of listening with an open attitude and the willingness to learn from the other, while "keeping understanding in a provisional state" (Kimmerle 2004: 70). Likewise, Fricker (2007) speaks of a virtuous hearer, who practices "a more pro-active and more socially aware kind of listening than is usually required in more straightforward communicative exchanges" and who recognizes the importance of "*reserving* judgement, so that the hearer keeps an open mind" (Fricker 2007: 171). In a similar line, Santos (2018) refers to the need for deep listening.

At the same time, we should not romanticize the potential of dialogue. Mungwini (2018) warns us that "dialogue can be utilised as a talisman or magic word with the result that the different parties desire unity more than truth or justice" (Mugnwini, 2018: 7). So there is a risk of feeling pressure to achieve harmony, while that is not the main aim of a dialogue. In fact, a dialogue should also include the possibility to fail (Kimmerle, 2004). Ludwig (2019) shows that there are tensions and fundamental differences between epistemologies, which require negotiations. Moreover, there are limitations as to what the individual hearer can do, because there may be structural unequal power balances. The latter requires particular attention in dialogues with a diversity of knowledges, as these tend to be characterized by unequal epistemic power relations from the outset.[6] Thus in an ideal situation, there would be equality between dialogue partners (Kimmerle, 2004), but in practice this is far from the reality due to historically unequal power relations. It is thus unrealistic to expect to completely eliminate unequal power relations in dialogues (Healy, 1998). However, we should be seriously committed to try to minimize the influence of such inequalities. A precondition while striving for less unequal power relations is increased awareness about the historical relation among different knowledges (Santos, 2014). As such, there is need for a deep awareness of the history that shaped the current epistemic relations between Africa and the West, including slavery, colonialism, and development aid. To put it in the negative, epistemic injustice and epistemicide will continue as long as there is an unawareness of the historical context in which one is operating. As Ramose formulates it: "a philosophy without memory cannot abolish epistemic and social injustice" (Ramose, 2019: 71). Such *historical awareness* takes account of African experiences, in the sense that "history is his-story, it is yet to be our story" (Ramose, 2019: 63). This does not only count for historical awareness in philosophy, but also in agricultural development.

In addition, there may be a more complex form of epistemic injustice at work in agricultural development – that is third-order-epistemic exclusion as described by Dotson (2014). Recall that third-order epistemic exclusion refers to the dominant epistemological system and the

challenge to change it (Dotson, 2014). Such injustice occurs for example when people with non-dominant epistemologies are "still required to utilize insufficient, dominant, shared epistemic resources" (Dotson, 2014:129). A clear example of this is when Indigenous knowledge has to be expressed through Western languages, concepts, and frameworks. In this same line, we saw that the sociological research of presented case study remained firmly rooted in Western frameworks and concepts. Dotson (2014) emphasizes that it is profoundly difficult to overcome third-order epistemic exclusion, because it requires a change of the dominant epistemological systems, which are characterized by high epistemic resilience.

The above-described difficulties, however, should not withhold us from looking at one of the potential sources of epistemic injustice: institutions where Eurocentric knowledge is produced such as schools, universities and research centers (Santos, 2018) exist across the globe. When restricting academic curricula to Western epistemologies, universities reinforce or even reproduce epistemic blindness. Such blindness does great injustice to epistemologies of the South and moreover "fails to prepare graduate students for contributing meaningfully to society" (Mungwini, 2018: 5). We thus need increased *epistemic awareness* in educational institutes, which means that universities look critically at which epistemologies are in- and excluded in their curricula (Dei, 2009). For example, agricultural academic curricula can become less Eurocentric by including African philosophies (Boogaard, 2019). Universities across the globe thus have a crucial role to play in mitigating epistemic injustice in agricultural development: curricula should not only include dominant Western epistemologies, but also be open to other epistemologies.

Finally, it is important to note that although it is very difficult to change dominant epistemological systems, this does not mean that epistemologies do not change. Epistemologies are not static and epistemological revisions have taken place and continue to take place over time, often steered by intellectual exploration or cross-culturation – or a combination of the two (Kaphagawani and Malherbe, 2003:268). Kaphagawani and Malherbe (2003) point to the important role of epistemic authorities, whose thinking "moves the epistemological traditions of their culture forward" and where "a society rich in such individuals will have a vital and progressive epistemology with a tradition of evaluation and renewal" (Kaphagawani and Malherbe (2003: 269). Contemporary African philosophers are such thinkers. Although there are strong differences between approaches and viewpoints among contemporary African philosophers, they share a profound knowledge of their culture, while at the same time their thinking moves the epistemological traditions of their culture forward. Hence, African philosophers are highly needed in the quest for epistemic justice in agricultural development. Their contributions can make agricultural development less Eurocentric, challenge dominant Western epistemologies, and rethink agricultural development in Africa.

Acknowledgements

I am deeply grateful to Mogobe Ramose (Sefako Makgatho Health Sciences University, Department of Clinical Psychology, in Ga-Rankuwa, South Africa) for his careful reading and thoughtful comments on an earlier version of this paper. In addition, I wish to thank David Ludwig and Laurens Klerkx (Knowledge, Technology and Innovation Group at Wageningen University, the Netherlands) as well as two anonymous reviewers for their valuable feedback on the manuscript.

Endnotes

1. Eurocentrism refers to the view that the West understands itself as superior with regard to all other times and cultures, and as such defines what philosophy and science - and in this case agricultural development - is (adapted from Kimmerle 2016).
2. The focus of the current paper is on the epistemic relation between Africa and the West. Africa's epistemic relation with other parts of the world requires a separate assessment.
3. The code between parentheses refers to a project document. Appendix I provides an overview of the project documentation with codes.
4. I have a European cultural and educational background. Before I went to Mozambique, I had not learnt about other than Western epistemologies. The findings of the current paper show that I took part in a project that was entrenched in Western development thinking and doing. It means that I perpetrated epistemic injustice on rural people in Mozambique in my position as post-doctoral researcher in the project. It was only after meeting intercultural philosopher Heinz Kimmerle in 2013 (after the project), that I started to learn about African philosophies and became aware about epistemic injustice and my epistemic blindness. With the current paper, I tried to do more justice to African philosophies and epistemologies in agricultural development. No doubt, my epistemic blindness has not dissolved completely. There remains an inherent risk of maintaining a certain epistemic blindness towards African epistemologies in the presented analysis, given my Western educational and cultural background. The current paper should therefore be seen as a start and a wish to continue learning.
5. Eurocentrism is not the only imposed view on Mozambique at this moment. For example China, particularly in relation to infrastructure, has its own view of how to 'modernize' Mozambique, including agriculture.
6. Epistemic power refers to "relations of privilege and underprivileged afforded via different social positions, relevant resources and/or epistemological systems with respect to knowledge production. It is often bound up with social, political and economic power" (Dotson, 2014: 125).

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Appendix I

List of 27 open access project documents with codes:

- 4 Peer Reviewed publications (PR 1-4)
- 2 Conference Papers (CP 1-2)
- 1 Research Report (RP)
- 9 reports of Innovation Platform meetings (IP 1-9)
- 3 reports of National Steering Committee meetings (NSC 1-3)
- 5 research and Policy Briefs (PB 1-5)
- 1 Training Manual (TM)
- 1 End of project Report (ER)
- 1 Master Thesis (MT)

PR 1: Swaans, K., Boogaard, B.K., Bendapudi, R., Taye, H., Hendrickx, S., and Klerkx, L. (2014) "Operationalizing inclusive innovation: lessons from innovation platforms in livestock value chains in India and Mozambique" *Innovation and Development*, 4:2, 239-257. https://doi.org/10.1080/2157930X.2014.925246

PR 2: Hamza, K.H., Rich, K.M, Baker, D., and Hendrickx, S. (2014) "Commercializing Smallholder Value Chains for Goats in Mozambique: A System Dynamics Approach" *Proceedings in Food System Dynamics*, 117 – 134. https://doi.org/10.18461/pfsd.2014.1411

PR 3: Boogaard, B.K., Waithanji, E., Poole, J., Cadilhon, J. (2015) "Smallholder goat production and marketing: a gendered baseline study from Inhassoro District Mozambique", *NJAS - Wageningen Journal of Life Sciences* 74–75 (2015) 51–63. https://doi.org/10.1016/j.njas.2015.09.002

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