



Seeds2B

Report on Capacity Building and Licensing Needs Assessment in Malawi, Mali, Senegal, and Uganda

Katrin Kuhlmann, Adron Nalinya Naggayi and Camille Renou

May 2022

This Report is part of a series of research and policy publications co-developed in collaboration by the Syngenta Foundation for Sustainable Agriculture (SFSA) and New Markets Lab (NML) under the Seeds2B Initiative and Partnership for Seed Technology Transfer in Africa (PASTTA). This work is made possible by the generous support of the American people through the United States Agency for International Development (USAID) and the U.S. Feed the Future initiative. The contents are the responsibility of the New Markets Lab and Syngenta Foundation for Sustainable Agriculture under the Seeds2B program and do not necessarily reflect the views of USAID or the United States Government.



USAID
FROM THE AMERICAN PEOPLE

syngenta foundation
for sustainable
agriculture

 **NML**
New Markets Lab

Table of Contents

ACRONYMS AND ABBREVIATIONS	3
EXECUTIVE SUMMARY	4
I. INTRODUCTION	6
II. CAPACITY BUILDING ACTIVITIES FOR LICENSING AGREEMENTS IN MALAWI AND UGANDA	7
III. KEY FINDINGS FROM STAKEHOLDER CONSULTATIONS IN MALI AND SENEGAL	8
A. APPROACH TO CONSULTATIONS	9
B. KEY FINDINGS MALI AND SENEGAL	10
C. LIMITED KNOWLEDGE OF PVP AND PBR FRAMEWORK AND CHALLENGES IN IMPLEMENTATION	11
D. MISCONCEPTIONS AND LIMITED INFORMATION ABOUT LICENSING AND LICENSING AGREEMENTS.....	13
E. LIMITED INFORMATION ON THE KEY ELEMENTS OF A LICENSING AGREEMENT	14
1. <i>Exclusive Versus Non-exclusive Licenses</i>	15
2. <i>Royalty Determination</i>	16
3. <i>Conflict Resolution</i>	17
F. LACK OF AN IP POLICY OR STRATEGY FOR PUBLIC RESEARCH INSTITUTIONS	17
G. LIMITED CAPACITY AND WEAK PRIVATE SECTOR	18
H. ADDITIONAL CHALLENGES RAISED BY STAKEHOLDERS	19
IV. PROPOSED NEXT STEPS TO ADDRESS CHALLENGES TO LICENSING IN MALI AND SENEGAL	20
A. CAPACITY BUILDING ACTIVITIES FOR THE PUBLIC SECTOR.....	20
B. DEVELOPMENT OF AN INSTITUTIONAL IP POLICY OR STRATEGY FOR PUBLIC RESEARCH INSTITUTIONS.....	21
C. PROMOTION OF PUBLIC-PRIVATE DIALOGUE	21
D. STRENGTHENING THE ENABLING ENVIRONMENT.....	23
ANNEX 1: LIST OF STAKEHOLDERS CONSULTED IN MALI	24
ANNEX II: LIST OF STAKEHOLDERS CONSULTED IN SENEGAL	25

Acronyms and Abbreviations

AATF	African Agricultural Technology Foundation
AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
ARIPO	African Regional Intellectual Property Organization
CGIAR	Consortium of International Agricultural Research Centers
CIMMYT	International Maize and Wheat Improvement Center (CIMMYT)
CIRAD	Center for International Cooperation in Research
COVID-19	Coronavirus disease
DARS	Department of Agricultural Research Services
DISEM	Division de Semences
DNA	Direction Nationale de l'Agriculture
EAC	East African Community
EGS	Early generation seed
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
IER	Rural Economy Institute
IFC	International Finance Corporation
IITA	International Institute of Tropical Agriculture
IP	Intellectual Property
ISRA	Senegalese Institute of Agricultural Research
ISTA	International Seed Trade Association
KALRO	Kenya Agricultural and Livestock Research Organization
LABOSEM	Laboratoire National de Semences
MAER	Ministère de l'Agriculture et de l'Équipement Rural
MFI	Microfinance institutions
MTA	Material Transfer Agreement
NACGRAB	National Centre for Genetic Resources and Biotechnology
NARO	National Agricultural Research Organization
NARS	National Agricultural Research Organizations
NML	New Markets Lab
OAPI	Organisation Africaine de la Propriété Intellectuelle
PASTTA	Partnership for Seed Technology Transfer in Africa
PBR	Plant breeder's rights
PVP	Plant variety protection
SFSA	Syngenta Foundation for Sustainable Agriculture
SMTA	Standard Material Transfer Agreement
SNS	Service National de Semences
SOPROSA	Société de Production de Semences Améliorées
UPOV	International Union for the Protection of New Varieties of Plants
WADB	West African Development Bank
WTO	World Trade Organization

Executive Summary

This Report on Capacity Building and Licensing Needs Assessment in Malawi, Mali, Senegal, and Uganda (Report) was developed by the New Markets Lab (NML), in collaboration with the Syngenta Foundation for Sustainable Agriculture (SFSA), under the Partnership for Seed Technology Transfer in Africa (PASTTA) project. PASTTA promotes new, improved varieties of a wide range of strategic crops, particularly publicly-bred varieties, and builds links to enable availability of these varieties to farmers in Kenya, Malawi, Mali, Senegal and Uganda. This Report covers capacity building and training workshops on licensing agreements for the propagation and dissemination of plant varieties held in Kenya (2018), Senegal (November 2019), Mali (February 2020), and Uganda May 2021 (licensing workshops) and related capacity building activities. A similar workshop was planned for 2021 in Malawi in collaboration with the African Agricultural Technology Foundation (AATF) but was rescheduled to 2022 due to COVID-19 concerns and in order to better correspond with the Government of Malawi's plans with respect to pending PVP regulations. In particular, this report contains findings on consultations conducted in Mali and Senegal in 2021 to follow up on training workshops in previous years and assess ongoing capacity building needs regarding licensing and recommended next steps under PASTTA.

All licensing workshops led by NML in collaboration with SFSA under PASTTA included stakeholders from both the public and private sectors in the respective countries. The workshops addressed key elements of the seed regulatory system and the relevant national, regional, and international legal frameworks; highlighted the background, rationales and implications of licensing agreements (including those not based on plant breeder's rights (PBR) and PBR-based models); and presented the key elements of a licensing agreement and the implications for each on either the licensor or licensee's part. At all of the licensing workshops, NML also guided participants in a simulated licensing agreement negotiation session to enable them to apply key licensing elements in practice, using a case study based on licensing approaches applied by the Kenya Agricultural and Livestock Research Organization (KALRO) as summarized in Box 1.

In 2021, NML conducted stakeholder consultations in Mali and Senegal to assess the status of implementation of licensing agreements and follow up on previous PASTTA workshops. These consultations identified gaps and challenges to licensing in the two countries and gathered inputs on recommendations on a path forward, including possible capacity building activities to strengthen the ability of main actors in the seed sector to engage in licensing arrangements. Based on stakeholder consultations in both Mali and Senegal, main challenges to licensing public varieties were identified as misconceptions and limited knowledge on licensing and licensing agreements, lack of an intellectual property (IP) policy or strategy for public research institutions, a weak private sector, and other issues related to expensive regulatory procedures, such as compulsory seed certification, and limited capacity of regulatory institutions. The assessment and

consultations also revealed the absence of a legal and regulatory enabling environment that would support licensing agreements, including absence of PVP/PBR policy, law, and regulations. For Mali and Senegal, activities were proposed to address the following key capacity building needs, as summarized in Table 1 below.

- **Capacity Building Activities for the Public Sector** to enable public sector representatives to promote and implement licensing agreements among stakeholders.
- **Development of Institutional Licensing Policies or Strategies for Public Research Centers** to provide institutional guidelines to licensing of public varieties and build confidence in licensing agreements among seed companies and public institutions.
- **Strengthening of the Enabling Environment** to address the needs of the seed sector and increase growth and reliability.
- **Promoting Public-Private Dialogue** to streamline licensing agreement procedures and create opportunities for partnerships.

Table 1: Capacity Needs and Proposed Activities in Mali and Senegal

<i>Capacity Building Need</i>	<i>Specific Activities Proposed</i>	<i>Challenges to Be Addressed</i>	<i>Time Frame</i>
Capacity Building Activities for the Public Sector	Meetings with NML, public research institutions, and SFSA Small Training Sessions	Limited knowledge of licensing agreements, key provisions, and implementation gaps. Limited knowledge of PBR and PVP	2022
Public-Private Dialogue	Discuss partnership opportunities	Weak private sector Limited knowledge of licensing agreements and opportunities	2022
Institutional Licensing Policies	Meetings between public institutions Possible assistance with development of institutional licensing policies	Lack of public policies oriented towards licensing agreements Limited knowledge of licensing agreements	Medium/long-term
Strengthening the Enabling Environment	Regulatory and Private Sector Assessment	Weak private sector	Medium/long-term

Both Uganda and Malawi are also priority countries under PASTTA, and both have also been the focus of licensing workshops and other activities. Due to ongoing COVID-19 uncertainties, NML and AATF responded to interest in conducting a workshop in Uganda in 2021, with plans for a workshop in Malawi postponed to 2022 following engagement with the public sector. Proposed activities for 2022 under PASTTA include:

- Licensing and IP workshop in Malawi (local stakeholders expressed a preference for an in-person workshop, so this was postponed to 2022 due to COVID-19 concerns and in order to provide the government with additional time to advance on PVP regulations);
- Follow up discussions with private and public seed sector stakeholders in Uganda, Malawi, and Kenya, many of which could be conducted virtually; and
- Additional capacity building training in Uganda, where interest in licensing was highlighted in 2021, resulting in the May 2021 workshop; additional capacity building training will be designed to involve the private sector.

I. Introduction

Licensing agreements can be important vehicles to get more public varieties into the market and into the hands of smallholder farmers. Licensing agreements are essentially contracts between two parties, where one party authorizes the other to use and commercialize a plant variety in exchange for a royalty payment. They can contain different elements and take different forms based on local interests and needs of both the public and private sectors.

Licensing agreements are not commonly used in most African countries, although consultations indicated growing interest. Kenya has one of the more well-developed licensing systems (since 2001), with non-exclusive, non-IP-based licenses most common (See Box 1 below); although royalty collection remains an issue. In Zambia, the Zambia Agricultural Research Institute (ZARI) has also licensed varieties to seed companies on a nonexclusive basis, although there is increasing demand for exclusive licenses in exchange for more financial benefits. In Nigeria, licensing is not yet very popular, and stakeholders have cited the absence of a complete PVP/PBR regulatory framework as one of the major reasons. Nonetheless, national agricultural research organizations (NARS) have used nonexclusive contracts with seed companies to provide access to public varieties, although most seed companies have expressed strong preference for exclusive licenses. In Uganda, verbal agreements are the most common type of variety access agreement between those supplying released varieties, seed companies, farmer seed producers' organizations, and other seed producer groups. Even where something is agreed upon, licensing agreements are not commonly used.

International, regional, and national rules on PBR and PVP are relevant in creating a conducive environment for licensing, although licensing can also be done outside of PVP frameworks. At the international level, the most relevant international agreements are the World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs Agreement), which calls for *sui generis* protection for plant varieties,¹ and the Convention of the International Union for the Protection of New Varieties of Plants (UPOV Convention).² The UPOV Convention determines the scope of plant breeders' rights, which impacts the types of rights that can be transferred through licensing agreements. The UPOV Convention has also influenced many regional agreements on PVP, including Annex X of the Bangui Agreement 1999 under the Organisation Africaine de la Propriété Intellectuelle (OAPI), the Arusha Protocol for the Protection of New Varieties of Plants of the African Regional Intellectual Property Organization (ARIPO), and the East African Community (EAC) Seed and Plant Varieties Bill. All of these international and regional agreements guide national frameworks for PVP, and, consequently, licensing agreements. Entering into a licensing agreement based on PVP will have implications for some of the elements, in particular the scope of rights being transferred; however, IP protections are not a requirement for licensing agreements.

II. Capacity Building Activities for Licensing Agreements in Malawi and Uganda

On May 17, 2021, NML collaborated with AATF to facilitate a licensing and IP workshop in Uganda. The workshop was attended by the National Agricultural Research Organization (NARO)'s IP Management Committee (IPMC), NARO Holdings, breeders, NARO'S executive team, and legal counsel. NML gave a presentation on the relationship between elements of the seed regulatory system and licensing agreements, including Uganda's regulatory framework for seed; regulation of licensing, including rationale, dimensions, and impact of regulation on licensing agreements; national, regional, and international legal frameworks on PBR and PVP, including key definitions, conditions of protection, scope of the right, exceptions, and duration; procedures on how to claim PBR in Uganda; and comparative licensing trends in sub-Saharan Africa.

¹ Other international agreements also apply, including the International Treaty of Plant Genetic Resources for Food and Agriculture (ITPGRFA), the Convention on Biological Diversity (CBD), and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits arising from their Utilization to the Convention on Biological Diversity (Nagoya Protocol).

² The UPOV Convention was adopted in Paris in 1961 and revised in 1972, 1978, and 1991. The International Convention for the Protection of New Varieties of Plants, available at: <https://www.upov.int/portal/index.html.en>.

Participants responded positively to the training workshop, noting that while NARO had MOUs with several private sector stakeholders with respect to their varieties, they were unaware of the details of licensing and PVP regulatory frameworks. Recognizing the relevance of the legal framework to licensing, the meeting resulted in a recommendation for the NARO executive to advise the Minister to expedite finalization of the PVP regulations that have been in draft form since 2020. NML also facilitated a moot licensing negotiation aimed at assisting NARO in further understanding the elements of licensing agreements. The workshop only involved stakeholders from NARO due to COVID-19 concerns and the government's request to begin with the public sector, and, moving forward, additional capacity building training has been proposed, especially involving the private sector to assess their interests and have a more engaging moot negotiation. NML could also conduct follow-up discussions with both public and private sector stakeholders, as envisioned by the PASTTA 2022 work plan, and the May 2021 workshop set the stage well.

A similar licensing workshop was scheduled to be held in November 2021 in Malawi in partnership with AATF and the Department of Agricultural Research Services (DARS). NML developed a complete set of workshop materials for Malawi licensing workshop and had begun workshop coordination and preparation. However, this workshop was postponed due to COVID-19 concerns and the emergence of a new variant. DARS also advised that the workshop should be held following consultations on the draft Plant Variety Protection Regulations, which are yet to be finalized. DARS opined that waiting would allow stakeholders to attend the licensing workshop with more insight into the PVP legal and regulatory framework. As of December 2021, consultations regarding the PVP Regulations remained ongoing. Moving forward, NML will conduct the workshop in collaboration with AATF and DARS as early in 2022 as feasible.

III. Key Findings from Stakeholder Consultations in Mali and Senegal

Licensing workshops in Senegal and Mali in 2019 and 2020, respectively, focused on building stakeholder capacity around using licensing agreements to share germplasm and early generation seed (EGS) between public research institutions and the private sector, including seed companies and farmer organizations. In Mali and Senegal, breeding is done by public research institutions, namely, IER and ISRA respectively. International Agricultural Research Centers (CGIAR Centers) are also involved in breeding activities in Mali and Senegal, including the World Vegetable Center for vegetable varieties and the International Institute of Tropical Agriculture (IITA) and the International Maize and Wheat Improvement Center (CIMMYT) for maize.³ However, in the absence of public policies on the dissemination of new public varieties,

³ Malian Farmers Garner Benefits of Breeding Initiatives, Despite Pandemic, ICRISAT Newsletter, available at <https://www.icrisat.org/malian-farmers-garner-benefits-of-breeding-initiatives-despite-pandemic/>.

commercialization of public varieties remains very limited. The involvement of the private sector in varietal breeding is essentially nonexistent, leaving the public sector as the sole source of improved seed varieties.

A. Approach to Consultations

While the capacity building licensing workshops were well received and are viewed as critical in building capacity, the uptake of licensing agreements between public research institutions and seed companies or farmer organizations remains minimal. In 2021, as part of the PASTTA work plan, NML conducted stakeholder consultations in Mali and Senegal to follow up on the licensing workshops, assess licensing gaps and challenges, and identify a way forward. Stakeholders consulted included individuals who had participated in the licensing workshops and representatives from both the public and private sectors (see Annexes 1 and 2 with the lists of consulted stakeholders in Mali and Senegal, respectively). The purpose of the consultations was twofold: (a) gain stakeholder feedback from the licensing training workshops and (b) assess the needs of the sector in entering into and implementing licensing agreements. Consultations with public sector stakeholders mandated with public research and breeding, such as the Rural Economy Institute (IER) in Mali and the Senegalese Institute of Agricultural Research (ISRA) in Senegal, were critical in understanding challenges and opportunities with licensing of public seed varieties. The consultations with private seed companies of different sizes gave a better perspective into seed company interests and opportunities and challenges faced by the private sector with regard to entering into licensing agreements for the use of public varieties.

Questionnaires were used as tools for gathering information to guide the consultations and were structured around several questions related to the practice of licensing agreements in Mali and Senegal. Two sets of questionnaires were developed, one for the public sector and another for private sector respondents. The questionnaires included opinion and Likert scale questions to help qualitatively and quantitatively gauge private or public sector interest in licensing agreements. Substantively, the questionnaires also included questions related to PVP, with the goal of understanding the current situation of protected varieties in Mali and Senegal and gaining a better sense of main stakeholders' knowledge of PVP/PBR and their perception of its impact on licensing agreements.

The questionnaires focused on understanding public research institutions and seed companies' experiences and interests in entering into licensing agreements, type of licensing agreements preferred, the extent to which dialogue is taking place among the key stakeholders regarding licenses, any challenges with licensing agreements, and options for support. Questionnaires also assessed public sector stakeholders' and seed companies' knowledge of licensing agreements, including their flexibilities and benefits. Finally, the questionnaires addressed the previous licensing training workshops in the respective countries and gathered feedback from participants in order to identify gaps that could be addressed under future activities. For the private sector,

questionnaires also assessed seed company experiences with regulation of the seed value chain (including seed certification, production, and distribution).

B. Key Findings Mali and Senegal

In Mali, the seed sector relies heavily on informal seed, with certified seed use more prevalent among seed companies,⁴ and publicly developed varieties under instruments like Material Transfer Agreements (MTAs) with CGIAR Centers (such as IITA and CIMMYT). Government benefits, including tax exemptions and subsidies, are also common, which can reduce the incentive to enter into licensing agreements. Traditionally, IER has entered into agreements with seed companies for pre-basic and basic seeds, for which it obtains fees that barely cover production costs. IER representatives reported that the institute only obtains royalties from an agreement with cotton companies. IER is also involved in a project with AfricaRice (See Box 2 below) to develop varieties and select the seed companies in charge of producing certified seeds, for which IER could potentially receive royalty payments (they have not received royalties so far). However, this project has been delayed due to the COVID-19 pandemic and the disturbances created by the civil war. IER generally coordinates private seed companies' access to licensed varieties from the CGIAR (there are MTAs between public research institutions and CGIAR centers). For instance, the seed company Société de Production de Semences Améliorées (SOPROSA) obtained marketing licenses for hybrid varieties from CYMMYT and IITA through IER.

In Senegal, ISRA has never entered into licensing agreements with seed companies, partly due to lack of knowledge and its heavy reliance on ever-dwindling government funding. Limited financial resources have impacted ISRA's capacity to supply pre-basic seed and conduct research for better performing varieties. In 2021, for instance, ISRA reported that it did not have the financial resources to produce enough pre-basic groundnut seeds, which is Senegal's flagship crop, to meet demand. Moreover, ISRA's limited resources have contributed to an information gap between ISRA and the private sector about the availability of quality varieties. For instance, although ISRA developed new and more efficient groundnut varieties in 2012, the private sector has been reluctant to use them and has shown preference for two groundnut varieties developed in 1990/91 and marketed in 2005. These challenges have curtailed private sector access to quality publicly-bred varieties, which has further discouraged the use of licensing agreements that could otherwise have been a helpful tool in commercializing public varieties and motivating varietal development in Senegal. Consultations revealed a number of challenges, discussed below, in transferring public varieties to the private sector.

⁴ Michael Waithaka, Sokona Dagnoko, Siaka Dembele, Mainza Mugoya, and Krisztina Tihanyi, Mali Brief 2018, The African Seed Access Index, October, 2019. Available at: https://tasai.org/wp-content/themes/tasai2016/img/tasai_mali_brief_2018_lr.pdf.

C. Limited Knowledge of PVP and PBR Framework and Challenges in Implementation

In both Mali and Senegal, consultations also highlighted gaps with respect to knowledge of PBR frameworks. In Mali and Senegal, PVP and PBR are granted through membership in OAPI, with Annex X of the 1999 agreement revising the Bangui Agreement.⁵ OAPI's regional rules on PVP and PBR are based on international treaties and conventions, including the UPOV Convention, and are applicable within the Western African region.⁶ Annex X includes provisions on compulsory, exclusive, and non-exclusive variety licenses, and contains provisions identical to the UPOV Convention.⁷ OAPI establishes both common IP laws and a single Intellectual Property Office for its members. OAPI's members are required to grant right holders a single regional title of protection, issued by each country, rather than national protection.⁸ PVP regulations are adopted at the regional level, meaning that once PBR is claimed in one country within the regional organization, they will be enforceable within the other countries of the regional bloc. In Uganda and Malawi, PVP is regulated at the national level, specifically under Uganda's Plant Variety Protection Act of 2014 and Malawi's Plant Variety Protection Act of 2018, with implementing Plant Variety Protection Regulations still in draft form in both countries.

The PASTTA licensing workshops presented an opportunity to share detailed information on licensing agreements both without PVP and based on PVP legal and regulatory frameworks in the specific countries. Even if some licensing agreements are conducted for non-PVP varieties, it is important to keep in mind that an effective PVP legal and regulatory system at the national level (most times mirrored on the regional and international frameworks) would provide protection against third party violations in a licensing agreement. The licensing workshops also covered key elements of licensing agreements, including the scope of rights transferred, exclusivity or non-exclusivity of rights, duration, range of territory, royalty payment, termination, among others.

Despite Mali's regulatory framework on PVP through OAPI, IER does not have an institutional specialist in IP and lacks a strategy to efficiently protect and exploit publicly developed varieties. In 2009, IER obtained financing through a project with the Center for International Cooperation in Research (CIRAD) to protect its varieties through OAPI.⁹ This protection covered about 65 varieties (4 cotton, 16 rice, 12 sorghum, 7 maize, 16 cowpea, 7 millet, 2 okra, and 1 onion). However, in 2011/12, IER no longer had the financial resources to pay the maintenance fees, and

⁵ Annex X, Agreement Revising the Bangui Agreement of March 2, 1977, on the Creation of an African Intellectual Property Organization.

⁶ New Markets Lab, "*Annotated Guide on Flexible Licensing Models and Agreements*", New Markets Lab and Seeds2B, AVISA, 2019.

⁷ Annex X, Agreement Revising the Bangui Agreement of March 2, 1977, on the Creation of an African Intellectual Property Organization.

⁸ Article 7, Agreement Revising the Bangui Agreement of March 2, 1977, on the Creation of an African Intellectual Property Organization.

⁹ Consultations with stakeholders, 2021.

the varieties fell into the public domain. While the Bangui Agreement allows the holder to request restoration of protection upon payment of fees, this request should have been made within a period of two years from the date in which the renewal fee was due.

In Mali, lack of knowledge and expertise on PVP and PBR regulations prevented IER from protecting its varieties through OAPI. While under protection, the varieties were not sufficiently popularized or commercially exploited, and a number of other varieties had existed for years and were already being used by farmers (and were no longer novel). Nevertheless, consultations have shown that stakeholders are currently more familiar with PBR and acknowledge the importance of claiming PBR protection. The additional benefits that PBR gives to licenses to produce, market, and sell a variety can be an incentive to claim PBR and increase implementation of licensing agreements.

Although licensing can be done under contract laws, PBR provides an extra layer of protection from any third-party violations. This level of protection could motivate breeders to engage in varietal research and development. IER could benefit from protecting its varieties under OAPI in the medium/long term, and licensing agreements could help increase IER's financial resources for the development and protection of new varieties. Further capacity building training sessions could focus on PVP and PBR with the purpose of ensuring better understanding among public stakeholders of what these protections entail and why they are important in the context of licensing publicly developed varieties.

In Senegal, stakeholders consulted had a good understanding of PVP regulatory frameworks and agreed that these protections are important when entering into licensing agreements. Nevertheless, the consultations revealed that stakeholders were unaware of the possibility of obtaining and granting licenses for non-protected varieties. In 2012, ISRA obtained financing to protect four groundnut varieties through OAPI through a project with CIRAD. However, some of these varieties had already been commercialized in Senegal and thus did not meet the requirements for PVP, since the varieties had been popularized and were no longer novel. For the varieties that met the requirements, CIRAD stopped paying the maintenance fees, and the varieties lost their protection under OAPI. Stakeholders, including representatives from the public sector, expressed the belief that ISRA could not license its varieties, as they were not protected under OAPI. However, while licensing protected varieties could be more beneficial over the long term the lack of PBR protection (and registration under OAPI in this case) is not an obstacle, as illustrated by the KALRO Case Study in Box 1 below, and should not be a reason to limit licensing agreements between ISRA and seed companies.

Box 1: KALRO Case Study¹⁰

The national research institute of Kenya, KALRO, has used licensing agreements since 2001 and has entered into over thirty licensing agreements to improve access to seeds and increase financial resources. Most of its licensing agreements have included licenses transferring the right to use a registered variety, even if these varieties were not protected under PBR. While Kenya's law does provide for PBR protection, the licenses simply transfer the right to production, marketing, and selling of formally registered varieties. For example, KALRO entered into a licensing agreement of non-protected varieties with a private seed company, KISIMA. The key features of this licensing agreement were a non-exclusive license not based on PBR, non-transferable license clauses, royalties based on sales (fixed percentage), and reporting duties as a verification mechanism for royalty payments.

In addition, consultations highlighted the need for more capacity building for all stakeholders with respect to licensing agreements and PVP more specifically, especially among the public sector. It should be noted, however, that ISRA does have an IP and Genetic Resources Office, as well as a lawyer familiar with licensing agreements who contributed to the capacity building activities and assessment described in this report. Nevertheless, ISRA representatives reported that protecting varieties is not a short-term goal, due to high maintenance fees, although it could be an additional incentive to enter into licensing agreements, since it would add an extra layer of protection to enforce their rights over the variety.

D. Misconceptions and Limited Information about Licensing and Licensing Agreements

While most stakeholders reported that the licensing training workshops were helpful in sharing information about licensing agreements, they also noted that they are still not familiar enough with key aspect of licensing agreements and remain reluctant to use them. This signals that a single workshop is likely not enough and that more sustained engagement through additional workshops could help stakeholders gain familiarity with licensing agreement elements and become more inclined to use them in practice.

In Senegal, some stakeholders reported they were not aware of the possibility of entering into licensing agreements with ISRA, while others noted that they understand licensing agreements to be too sophisticated, with long-term commitments that may be difficult to meet. Private sector seed associations flagged the need for awareness building by the public sector regarding the existence of newly developed high-quality public varieties and the possibility of entering into

¹⁰ New Markets Lab, "Case Study on KALRO Model Plant Varieties Licensing Agreement," Syngenta Foundation for Sustainable Agriculture and New Markets Lab, 2019, publication forthcoming.

licensing agreements with seed companies to commercialize these varieties. Stakeholders also noted that additional training focused on the practical aspects of licensing agreements would be helpful in the short- and medium-term.

In Mali, consultations revealed a misconception regarding the differences between MTAs and licensing agreements, and some IER representatives flagged that they did not understand the difference between MTAs and licensing agreements. When asked about licensing agreements between seed companies and NARS, stakeholders reported that MTAs with CGIAR Centers are “similar” in nature to licensing agreements, even though they contain very different rights and obligations. At the time of the 2020 training workshop in Mali, stakeholders reported that some CGIAR Centers were working with private companies under exclusive agreements for some varieties. The differences in how the NARS and CGIAR operate are notable, however. While NARS can grant exclusive or non-exclusive licenses to the private sector and obtain royalties from these arrangements, CGIAR Centers work through MTAs based on the Standard Material Transfer Agreement (SMTA), which, due to the CGIAR mandate, are always non-exclusive. The difficulty differentiating these agreements could explain the lack of use of licensing agreements. Nevertheless, when discussing the possibility of obtaining royalties from developed varieties, IER representatives acknowledged that licensing agreements would be helpful to finance their research and would also be a financial incentive for breeders to disseminate new varieties among seed producers.

Overall, the private sector is more familiar with MTAs. Faso Kaba reported that it had an MTA with IITA for the multiplication of hybrid varieties and was considering entering into an agreement after the seeds had been certified. The World Vegetable Center reported the use of MTAs with seed companies and also noted that the “Africa Vegetable Breeding Consortium” shares germplasm with companies for research and development.

E. Limited Information on the Key Elements of a Licensing Agreement

During consultations, different licensing agreement features were discussed, including the difference between exclusive and non-exclusive licenses, royalty calculation methods, and mechanisms for conflict resolution. From the consultations, it seemed that stakeholders in both Mali and Senegal were still not familiar enough with how licensing agreements could be structured and the likely impact on their interests.

1. Exclusive Versus Non-exclusive Licenses

Exclusive licensing agreements grant to the licensee the exclusive and non-transferable right to produce, market, and sell seed of one or more varieties in a certain territory.¹¹ Non-exclusive licensing agreements grant to the licensee the non-exclusive and non-transferable right to produce, market, and sell seed of one or more varieties in a certain territory.¹² With a non-exclusive licensing agreement, the licensor remains free to exploit the same variety and grant any number of other licenses to exploit such variety.

Regarding the choice between exclusive and non-exclusive licenses, representatives of IER in Mali and ISRA in Senegal mentioned that they would generally prefer non-exclusive licensing agreements, as they allow for greater dissemination of a variety by more seed companies, enabling the public research institutions to meet their mandate of breeding varieties that are publicly accessible. Public sector representatives also acknowledged that licensing agreements could be a good tool to finance research and that exclusive licenses could potentially increase financial resources.

Seed companies consulted in both Mali and Senegal had different views on exclusive and non-exclusive licenses. The medium- and large-sized companies expressed a preference for exclusive licensing agreements, noting that they would have the capacity to meet market demands and preferred to be the sole license holder that would invest in marketing the variety, including through advertising. Some of these companies also noted a preference for exclusive agreements with the option of granting “sub-licenses” to other seed companies; however, this is something that would need to be discussed further with the NARS. Smaller companies, on the other hand, expressed preference for non-exclusive licensing agreements, noting that they do not yet have the financial capacity to enter into exclusive licenses, which require payment of higher royalties and greater resources and capacity. The majority of seed companies in both countries are relatively small and encounter difficulties with growth, reportedly due to financial restrictions (which leads to limited access to good quality seeds). Non-exclusive licensing agreements could be an affordable solution to improve access to seeds and increase market access. Larger companies that prefer exclusive licenses could still negotiate this type of agreement for varieties that would generally not be commercialized by smaller companies. While it is difficult to match each party’s wishes, NARS are not limited to one type of agreement, and these could be customized and negotiated differently for each variety.

¹¹ New Markets Lab, “*Annotated Guide on Flexible Licensing Models and Agreements*”, New Markets Lab and Seeds2B, Accelerated Varietal Improvement and Seed Delivery of Legumes and Cereals in Africa (AVISA), 2019.

¹² *Ibid.*

2. Royalty Determination

Royalties are the fees the licensee pays to the licensor for the use of the licensed varieties.¹³ Because royalties should be calculated to ensure access and profitability for all parties involved, there is a wide variety of calculating methods, including but not limited to royalties based on production, sales, fixed royalty rates, and a minimum royalty rate. It is also possible for licensing agreements to include more than one royalty payment method.

Fixed royalty is commonly used in Europe. For example, both Gestion De Licencias Vegetales (GESLIVE) in Spain and SICASOV18 in France negotiate fixed annual royalties for each variety. In Africa, ZARI in Zambia imposes a one-off fixed rate for some of its varieties, and KALRO applies a fixed rate percentage royalty on annual seed sales. The National Centre for Genetic Resources and Biotechnology (NACGRAB) in Nigeria also reported that its royalties are usually contingent on annual seed sales of the seed company. The royalty rates largely depend on the nature of the licensing agreement, exclusive versus nonexclusive; the type of variety, open pollinated varieties (OPVs) versus hybrids, and the negotiation between the parties. Generally, OPVs and nonexclusive licenses have royalties ranging between 2.5 to 3 percent, while hybrids and exclusive licenses fetch higher royalties ranging from 6 to 10 percent.

Well-established seed regulatory systems and supportive government policies can have a positive impact on royalty collection, because they increase transparency and establish traceability mechanisms throughout the seed value chain, enabling the process of royalty collection. Royalty collection also requires establishment of proper systems and institutional capacity, and royalties are rarely paid if systems are not in place to enforce payment. In countries like Nigeria and Kenya where the royalty fee is based on annual sales, companies have also been said to under-report their sales or not report at all. As a best practice, breeders' associations and farmer producer cooperatives have been involved in South Africa (The South African National Seed Organization and Grain SA), France (SICASOV), and the United Kingdom (British Society of Plant Breeders) to facilitate royalty collection, considering their proximity to the seed companies, breeders, or farmers.

Public sector stakeholders in Mali and Senegal showed preference for royalties based on production. Stakeholders noted that this royalty payment method is the most transparent and that certification entities could help track production amounts for different varieties to ensure that the licensee pays accurate royalty fees. Most seed companies, on the other hand, preferred royalties based on sales, which they said would depend on varietal performance in the market. The World Vegetable Center also reportedly advocated for a method based on a percentage of sales. The public sector generally expressed concerns related to the difficulties with tracking seed production

¹³ New Markets Lab, "Annotated Guide on Flexible Licensing Models and Agreements", New Markets Lab and Seeds2B, AVISA, 2019.

and sales in order to claim royalties. They flagged the need for a transparent and clear process for the development and approval of licensing agreements with the private sector, along with specific clauses in the licensing agreements related to royalties payments.

3. Conflict Resolution

Conflict resolution provisions are essential, as they are designed to establish the terms for resolving any dispute that may arise among the parties in relation to the licensing agreement.¹⁴ For example, stakeholders raised concerns in relation to royalty calculation and payment, varietal performance, and compliance with varietal research and development, signaling possible areas for dispute.

Conflict resolution provisions can stipulate arbitration, mediation, or litigation through the court system as a channel for resolving disputes. Related to addressing disputes are transparency provisions, such as the implementation of a reporting mechanism, especially in relation to varietal research, development, and performance. Stakeholders were not sufficiently aware of the different conflict resolution options available, including using local courts, private arbitrators, or mediators, and questions also remained with respect to the governing legal system. Consultations revealed the need for clear rules on conflict resolution in order to increase trust to facilitate licensing agreements. Provisions related to conflict resolution mechanisms are essential for both the public and private sectors. On one hand, the public sector raised concerns about seed companies not complying with their payment obligations, while seed companies expressed concern with public institutions' ability to comply with research and development obligations. In this sense, stakeholders suggested that provisions related to conflict resolution through arbitration or another form of alternative dispute resolution, as well as a reporting mechanism, would be essential elements of licensing agreements.

F. Lack of an IP Policy or Strategy for Public Research Institutions

NARS' IP policies or strategies guide institutional germplasm licensing and exchange. They provide direction on short-, medium-, and long-term use of IP that could enable the NARS to effectively create, protect, and commercially exploit public technologies. These policies or strategies could provide clarity and motivation to public breeders in the NARS, including with respect to financial incentives for the development of new and protected varieties.¹⁵ The absence of an IER or ISRA IP policy or strategy is notable, as it would lay a foundation for institutional principles on dissemination of public varieties and contribute to their commercialization. Within IER, this is exacerbated by the absence of personnel specialized in licensing and IP. The survey

¹⁴ New Markets Lab, "Annotated Guide on Flexible Licensing Models and Agreements", New Markets Lab and Seeds2B, AVISA, 2019.

¹⁵ The World Bank, Intellectual Property Rights: Designing Regimes to Support Plant Breeding in Developing Countries, Report NO. 35517-GLB, page 36.

also showed that there is an additional bottleneck due to lack of political will at the directorate level of IER and the Ministry of Agriculture. In the case of ISRA in Senegal, the bottleneck currently is due to lack of political will at the Ministry level.

G. Limited Capacity and Underdeveloped Private Sector

In Mali, the private sector is weak and has been reluctant to get involved in breeding activities. Formal seed production among Malian seed companies is relatively new, as most of the companies emerged between 2006 and 2007 with the support of the Alliance for a Green Revolution in Africa (AGRA). Moreover, these companies are mostly small- and medium-sized enterprises (SMEs), which face capacity challenges. Moreover, supply of EGS for publicly developed varieties is often limited due to IER's financial constraints. Consulted stakeholders reported that the seed sector in Mali lacks organization and expertise and would benefit from restructuring and coordination in order to attract private sector investment. Some of the proposals from the private sector in this regard included the creation of professional associations (“interprofession”) of seed producers, a permanent dialogue between different seed stakeholders and better access to pre-basic and basic seeds.

Another big challenge is limited access to finance for the private sector, scarcity of private investment, and the inexistence of a long-term plan to promote investment of the sector. Commercial banks generally grant very few loans to agricultural businesses in comparison to other sectors (agricultural loans represent less than four percent of all credit), and due to high interest rates, guarantee requirements, and payment schedules, only big companies can access these loans. Alternatively, smallholder farmers can obtain most of their financing through microfinance institutions (MFIs), although these loans also represent a small percentage of the private sector's outstanding debt.¹⁶

In Mali, while there are projects from development finance institutions, including the West African Development Bank (WADB), the International Finance Corporation (IFC), and the African Development Bank (AfDB), among others, less than 20 percent of these projects impact the agricultural sector.¹⁷ While long-term financing could help improve existing facilities, and seasonal financing could help address the pressing needs of the sector through the different stages of the value chain (production, harvest, and sales), these solutions are rather long-term.

¹⁶ *Financial Sector Assessment Program – Development Module Mali, Agricultural Finance Technical Note*, The World Bank, 2015.

¹⁷ *Financial Sector Assessment Program – Development Module Mali, Agricultural Finance Technical Note*, The World Bank, 2015.

H. Additional Challenges Raised by Stakeholders

In Mali, stakeholders raised concerns about the process for the certification of seeds in the country. While the certification of seeds is not directly related to the conclusion of licensing agreements, it is central to the commercialization process. As of 2021, Mali did not have International Seed Trade Association (ISTA) accredited laboratories that met international standards, even though ISTA standards are reportedly being followed in some cases. Laboratoire National de Semences (LABOSEM), the national laboratory, has not been accredited due to its financial constraints and limited human resources. Public representatives reported though that efforts are being made to increase laboratories and inspectors' availability under LABOSEM. Stakeholders in Mali reported that LABOSEM operates under ISTA standards even without the certification. For the purposes of developing licensing in the country, the lack of ISTA accreditation does not seem to be a problem. However, in the future, it could present an additional challenge to expanding market access (beyond Mali). Also, if licensing agreements do proliferate, and there is more seed production, ISTA accreditation would make it easier to ensure seed quality. In Senegal, ISTA accreditation has increased market access for varieties. Consulted stakeholders reported that this accreditation could impact the proliferation of licensing agreements in the future.

Use of certified and improved seeds by stakeholders in the country ranges between 15 and 30 percent, depending upon the crop.¹⁸ Stakeholders flagged that the low utilization of certified and improved seed is due to Mali's large informal sector and the difficulties with affording the certification process. Mali's regulations for the certification of seeds requires field inspections, sampling, and laboratory testing.¹⁹ Field inspections should include three visits (before, during, and after harvesting), but it has been reported that due to lack of financial resources and inspectors, only one field visit is carried out. As for certification costs, the decree establishes fixed rates regardless of the yield and the size of the production zones.²⁰ This means that while certification costs may be affordable for bigger seed producers, they can be quite challenging for smallholders. Small seed producers reportedly try to maximize the yield to afford certification costs and increase their revenue, but this is not always possible.

It should also be noted that there are numerous traditional varieties being sold in the seed market at competitive prices in comparison with certified seeds, and although only certified seeds can be marketed according to Mali's seeds law, these requirements are rarely enforced. Furthermore, there

¹⁸ Mali Country Report 2020 (DRAFT), TASAI.

¹⁹ Mali's Seeds Law and its decree, and the decrees establishing the National Seed Committee and the National Catalogue of Species and Varieties of Mali.

²⁰ Ministerial Decree No. 2018-1813/MA-SG establishes the following certification costs: field inspections, 20,000 Fcfa per day per agent (2 agents needed) and 500 Fcfa/Km for fuel, driver and car; sampling, 20,000 Fcfa per day per agent, and 500 Fcfa/Km for driver and fuel; laboratory analysis 9075 Fcfa per batch (10125 Fcfa for rice); labels, 80 Fcfa each.

is limited knowledge related to the benefits of using certified seeds, which makes it even more difficult for formally certified seeds to compete in the market. Here, knowledge sharing and perhaps discussion of other forms of quality assurance (e.g., quality declared seed (QDS), which is not recognized in Mali), could be of benefit.

IV. Proposed Next Steps to Address Challenges to Licensing in Mali and Senegal

To improve licensing in both Mali and Senegal, different interventions should be considered. Given the range of challenges to be addressed, it may not be possible to address all gaps within a short period of time. Key approaches and options, summarized in Table 1 above, are discussed in detail below and sequenced in order of short-, medium-, and long-term options based on needs, practicability, and feasibility of implementation.

A. Capacity Building Activities for the Public Sector

Consultations highlighted that building confidence and expertise related to licensing within the public sector, and among IER representatives in particular, should be prioritized. In order to strengthen capacity, NML and SFSA could facilitate additional training sessions throughout 2022. These training sessions would be designed to address some of the key challenges identified throughout this assessment, including limited knowledge of licensing agreements and their key elements, misunderstandings concerning the difference between MTAs and licensing agreements, and limited knowledge related to PVP and PBR regulatory issues. The training sessions could focus and elaborate on:

- a) The structure and framework of licensing agreements, including the use of exclusive or non-exclusive licenses depending upon market needs.
- b) The benefits of licensing agreements, such as potential approaches to finance public research, new varieties for seed companies, broader market access, etc.
- c) The variety of features that could be included based on the specific needs of the parties, such as conflict resolution provisions and royalty models, among others.
- d) Options for licensing public varieties under PBR protection or without PBR protection (along with related capacity building on legal aspects of PBR).

The training sessions could also include discussions on practical experiences and good licensing approaches adopted by NARS in other countries. Tools could include workshop materials and tailored to IER and ISRA breeders' experiences and identified capacity gaps, model licensing agreements that could be modified and tailored to IER and ISRA interests, and questionnaires to obtain feedback from attendees and assess successes and gaps in training. These activities could

be specifically designed for IER and ISRA but could also include other public institutions, the CGIAR, and private seed companies. To facilitate familiarization with licensing agreement elements, moot negotiations could also be conducted.

B. Development of an Institutional IP Policy or Strategy for Public Research Institutions

In the medium-/long-term, NML and SFSA could engage with IER and/or ISRA to develop an IP policy or strategy (consulted representatives from IER and ISRA reported their goal to develop an IP strategy) that could provide an institutional roadmap for commercialization of public varieties by public research institutions. A model IP policy/strategy could also be designed that could be tailored to the NARS' needs and obligations and the local legal and regulatory environment and seed system. The NARS IP policy could include provisions on an institutional IP administration framework. ownership of IP generated by institution employees, identification and disclosure of IP, institutional position on IP (PBR) protection, IP commercialization, benefit sharing, declaration of conflicts of interest, confidentiality, consequences for breach of policy provisions, handling of disputes and appeals, monitoring and evaluation, and other issues. NML could also conduct workshops to engage with the NARS and the private sector in order to develop and use the IP policy or strategy.

Consulted stakeholders, including IER and ISRA representatives, reported IER and ISRA's willingness to develop and implement a policy for the exploitation of public varieties, especially for hybrid varieties. The development of institutional IP policies would require coordination among several public institutions. In Mali, the key stakeholders to engage in developing the IP Policy include IER, Direction Nationale de l'Agriculture (DNA) in charge of the approval and release of new varieties, and their registration into the National Seed Catalogue, Laboratoire National de Semences (LABOSEM) in charge of seed quality control, inspection, and certification of seeds, and the Service National de Semences (SNS), which is in charge of implementing the National Seed Plan. In Senegal, stakeholders to engage would include those from Ministère de l'Agriculture et de l'Équipement Rural (MAER), ISRA, and the Division de Semences (DISEM). Proper training and capacity building activities for the public sector, along with public-private dialogue, would be essential to enable the development of an institutional policy to support licensing agreements.

C. Promotion of Public-Private Dialogue

Although consultations have shown that there is some dialogue between IER and ISRA and breeders and some seed companies or farmers, often facilitated by other institutions (seed associations, cooperatives, CGIAR, other organizations, etc.), these do not involve all actors in

both the public and private sectors and do not always result in an agreement. Establishing an online platform to facilitate continuous dialogue among stakeholders would provide a forum to promote licensing agreements, identify partnership opportunities, and streamline licensing agreement negotiations. As an example, the Soybean Innovation Lab has developed a platform that brings together regulators and stakeholders involved in research and trade of soybean in Africa. It is an online platform that enables engagement among stakeholders on licensing, discussion on needed changes in policy and regulations, and discussions on best breeding practices, marketing approaches, etc.

Additionally, a forum where partnership opportunities are being discussed could build confidence among private stakeholders that are still reluctant to enter into licensing agreements. Overall, a Public-Private Dialogue would address challenges related to a weak private sector, limited knowledge of licensing agreements and their elements, and limited knowledge related to PVP and PBR.

NML and SFSA could help by identifying contact persons within key stakeholder groupings, facilitating development of an agenda and goals, and providing support to streamline dialogue channels. Consulted stakeholders were open to establishing a dialogue that would promote public-private partnerships. With time and organization, a public-private dialogue could facilitate the creation of consortiums or other type of public-private associations/partnerships, such as the AfricaRice Consortium in Box 2 below.

Box 2: AfricaRice Consortium COSEM-RIZ Case Study

The international organization AfricaRice created a rice consortium, "COSEM-RIZ", which groups seed companies from West, East, and Central Africa, with three-tier annual subscription, licenses, and royalty payments.²¹ Through COSEM-RIZ, its members can finance research and gain exclusive access to new varieties. The members can choose the type of subscription, which varies from obtaining basic seed, pre-basic seed G3, or pre-basic seed G2 and G3. Royalties are calculated based on sales. In Mali, companies including SOPROSA, Faso Kaba, and DOUN KA FA are all members of this consortium. DOUN KA FA and SOPROSA are negotiating an agreement for the production of hybrid varieties. AfricaRice reported that the legal framework for these agreements is still being discussed, as they do not want to limit access to producers. AfricaRice also acknowledged that they could consider licensing agreements; however, these would most likely take the form of non-exclusive licenses to ensure broad access across the sector. The adoption of licensing agreements by a big consortium could be helpful to promoting the use of licensing agreements throughout the sector and building up confidence among private companies. IER representatives have reported that IER would be willing to license other food crops following the model that has been used for rice.

²¹ Consortium of Seed Companies and Rice Millers (COSEM-RICE), document issued by AfricaRice.

A related assessment of private sector strengths and weaknesses to identify ways in which to support the sector and attract private investment could also be beneficial. Countries in the region that have carried out this type of assessments include Ghana, Benin, Burkina Faso, and Cote d'Ivoire, among others.²²

D. Strengthening the Enabling Environment

An enabling environment specifically tailored to address the challenges of the sector, including strengthening the private sector and promoting quality assurance systems for seed, would promote growth and reliability of the sector. Enabling environment design is important, and there are options that governments could consider in order to engage stakeholders of all sizes. A more comprehensive assessment would entail working with public and private stakeholders to identify constraints and specific legal and regulatory interventions that would be necessary to render the private sector more viable, including aspects of the enabling environment related to investment. This would entail conducting specific consultations and a detailed analysis of the aspects of the enabling environment related to investment and the financial sector, along with a possible comparative study of other countries in the region. These activities could perhaps be carried out as a longer-term goal with the objective of strengthening the enabling environment in relation to private investment and growth of the seed sector.

²² Burkina Faso: Warehouse Receipt System in sub-Saharan Africa, Policy Brief, Platform for Agricultural Risk Management, January 2017 (based on J Coulter Consulting Ltd and Sullivan Worcester UK LLP, Study on Appropriate Warehousing and Collateral Management System in Sub-Saharan Africa, Volume I – Key Findings, AFD, CTA, IFAD, September 2014). See also, Cote d'Ivoire: World Bank, Cashew Value Chain Competitiveness Project, 2018 available at: <https://projects.worldbank.org/en/projects-operations/project-detail/P158810>.

Annex 1: List of Stakeholders Consulted in Mali

Stakeholder	Type	Contact	Contact Information
ASSEMA	Seed Association	M. Dolo YAYA	a.assema@yahoo.fr
Camara Semence	Private Company	Chieck Hamallah CAMARA	camarasemences@yahoo.fr
DOUN KA FA Semence	Private Company	Mahamadou MAKADJI	makadji1@yahoo.fr
Faso Kaba	Private Company	Maïmouna COULIBALY	fasokaba@yahoo.fr
IER Irrigated Rice Breeder	Public Sector	Menidiou DOLO	dolo_m_1@yahoo.fr
IER Lowland Rice Breeder	Public Sector	Cisse Fousseyni	fousscisse@yahoo.fr
IER Maize Breeder	Public Sector	Mahamadou Mory COULIBALY	madoumory@yahoo.fr
IER Scientific Director	Public Sector	Kalifa TRAORE	ibosimon_1@yahoo.fr
IER Sorghum Breeder	Public Sector	Niaba TEME	niabateme@gmail.com
LABOSEM	Public Sector	Dioncounda CAMARA	dioncoundac@yahoo.fr
SOPROSA	Private Company	Dr Kokozié Traoré	soprosa2013@gmail.com
WorldVeg	International Organization	Jean Baptiste TIGNEGRE	jean-baptiste.tignegre@worldveg.org

Annex II: List of Stakeholders Consulted in Senegal

Stakeholders in the Public Sector			
Stakeholder	Type of Institution	Contact	Contact Information
DA/DISEM	Public Sector	Mamadou Felix Sagne	mahgne@yahoo.fr
ISRA	NARS	Abdou Ndiaye	abdou.ndiaye@isra.sn
ISRA	NARS	Youga Niang	niangyouga@gmail.com
ISRA	NARS	Dr Moustapha GUEYE	taffaguey@gmail.com moustapha.gueye@isra.sn
ISRA	NARS	Cheikh Alassane FALL	cheikhalassane.fall@gmail.com alassane.fall@isra.sn
ISRA	NARS	Birame NDIAYE	biramndiaye_isra@yahoo.fr birame.ndiaye@isra.sn
ISRA	NARS	Dr ISSA FAYE	issafaye2001@yahoo.fr issa.faye@isra.sn
ISRA	NARS	Dr Ghislain Kanfany	kanfanyghislain@yahoo.fr ghislain.kanfany@isra.sn
ISRA	NARS	Dr Ousmane SY	oussousyso@yahoo.fr ousmane.sy @isra.sn
ISRA	NARS	Dr Cyril Diatta	bactacyril@yahoo.fr
ISRA	NARS	Dr Oumar Ndaw Faye	omaendawfaye@gmail.com
ISRA	NARS	Mme Marieme Niang BELKO	mareme.belko@isra.sn
ISRA	NARS	Dr Moussa DIANGAR	diangarfils@live.fr

ISRA	NARS	Dr Latyr Diouf	bassf82@gmail.com latyr.diouf@isra.sn
ISRA	NARS	Fatou Fofana	atou.fofana@isra.sn.
Stakeholder in the Private Sector			
AFRICARICE	International Institution	Baboucar Manneh	b.manneh@cgiar.org
GIE AGRO-ASTEL	Private Company	Mamadou Ndiade	mndiade@orange.sn
RESOPP	Network of Farmer Associations	Arona DIOP	resopp@resopp-sn.org
SEDAB SRL	Private Company	Modou Thiam	thiamodou@yahoo.fr
SODISEM	Private Company	Alassane Ndiaye	nd.lassane@gmail.com
TOP MOUNTAIN	Private Company	Mariame Sy Top	info@topmountainsn.com
TROPICAS EM	Private Company	Amadou Sarr	amadou.sarr@tropicasem.sn
UNAOPS	Seed Association	El hadj Moussa Seck	seckelha@yahoo.fr
UNIS	Seed Association	Modou Thiam	thiamodou@yahoo.fr