Partnership for scaling up gender and nutrition-sensitive CSA II (P4S II)

2020 Regional Annual Report

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FEBRUARY 18, 2021

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1. Basic Project Information

Project Title	**Partnership for scaling up gender and nutrition-sensitive CSA II (P4S II)**
Institution ***(Partner's Name and full address)***	World Agroforestry Centre, West and Central Africa Regional Office (ICRAF-WCA), Sahel Node | BP E5118, Bamako, Mali, Telephone: +223 20 70 92 20|
Name of Partner's Project Investigator ***(project coordinator)***	Dr. Bayala Jules
Duration ***(Start-End ; mention any extension if applicable)***	January - December 2020
Budget (currency as indicated in the sub-agreement)	337,000 USD
CCAFS sub-agreement no. Or Addendum number	Addendum 2
CCAFS Theme and Objective	**FP2:** Climate Smart Technologies and Practices **Objective:** To address the challenge of how to transition to CSA at scale, FP2 will work with partners to test, evaluate, promote and scale up CSA technologies and practices that meet the needs of farmers - including women and marginalized groups
Geographic cover ***(sites, countries)***	Burkina Faso, Ghana, Niger and Senegal
Partners ***(list partners, names of collaborators and full address)***	Dr Bationo Babou André, INERA, Burkina Faso Dr Buah Saaka, SARI, Ghana Dr Sanogo Diaminatou, ISRA, Senegal Dr Somda Jacques, IUCN, Burkina Faso
Report prepared by ***(person who prepared the report)***	Dr Jules Bayala & Dr Adéyèmi Chabi
Report endorsed by ***(head of department of Director General who endorsed the report)*** **and date**	Dr Rosenstock Todd CIFOR-ICRAF Focal person for CCAFS
Submission date and Stamp	February 18, 2021

2. The Research Problem

The basic rationale for the project and the research problem or problems that were addressed should be stated and why the research is being conducted

Agriculture is the main source of livelihood of the majority of the people living in the West Africa (Sissoko et al. 2011). At the same time, African societies face growing global change risks, with rapidly changing patterns of human settlements and intensity of use of ecosystem services. In addition, climate variability and change has emerged as a major threat on agriculture, food security and livelihood of millions of people in this continent (IPCC, 2014) and particularly in Africa. Climate change and variability trends are worsening the stress on the ecosystems that ensure environmental security, both locally (e.g., ecosystem services), regionally (e.g., sustainable development options) and internationally (e.g., carbon sequestration). Several studies indicated that agriculture production could be significantly impacted due to increased temperatures, changed rainfall patterns, and more frequent and intense floods and droughts.

In West-Africa region, agro-sylvo-pastoral production systems are mostly climate-dependent, and climate-related risks can cause severe losses of crop, forest and livestock production, the main livelihood activities of more than 80% of the population. In light of these constraints, more sustainable production systems, ensuring provision of the needs of current generations without jeopardizing those of future ones, are called for. In response, a more holistic approach, known as Climate-Smart Agriculture (CSA), is being developed, aiming at (i) sustainably improving productivity and income, (ii) adapting and building resilience to climate change and (iii) reducing and/or removing greenhouse gases emissions, where possible (FAO, 2010). There are many options to reduce the negative impacts of climate change on agricultural systems, make them resilient to climate change, and reduce emissions. Adopting Climate-smart agriculture (CSA) seems to be a suitable strategy to achieving food security while also mitigating and adapting to climate-related risks. In this perspectives, key elements include a comprehensive and gender-sensitive capacity development approach aligned with and driven by national priorities, applying knowledge management and effective learning approaches, facilitating multi-stakeholder processes, strengthening agricultural innovation systems and leveraging information and communication technologies (ICTs) and communication for development approaches FAO (2013).

In line with the above, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) seeks to develop up-scalable options of CSA through improved understanding of mitigation and adaptation opportunities in agriculture among smallholders in West Africa. In 2015, ICRISAT and ICRAF signed a partnership agreement to implement the project ***"Building resilient agro-sylvo-pastoral systems in West Africa through participatory action research (BRAS-PAR).*** Merging the actions of BRAS-PAR and P4S I to become P4S II was done with the intention to use tools and evidence/lessons learned from the Climate-Smart Villages and other development activities, with existing and new partners through direct scientific support to decision makers (e.g., governments, civil society, and researchers) and capacity building to help bring CSA to scale. This project led by the World Agroforestry (ICRAF) and jointly implemented with the national research institutes in Burkina Faso, Senegal and Ghana, and the International Union for Conservation of Nature (IUCN) aims to develop up-scalable technological and social innovations of climate-smart agriculture integrating crop-livestock-tree systems through improved understanding of farmer's perceptions and demands, by addressing barriers to adoption taking into consideration the gender and social differentiation. P4S also aims to providing CSA evidence and tools to key partners at the right

time and in the right format to create a sea change in CSA implementation in Burkina Faso, Ghana and Senegal.

3. Methodology

Describe the research methods and analytical techniques used and any problems that arose. Research instruments such as questionnaires, interview guides, and any other documentation judged useful to understanding the project should also be attached. Indicate and explain any changes in orientation that may have occurred since the project was designed. Indicate any particular learning about merits of different methods for addressing the project's research problem and generating desired outputs and outcomes.

The project operates in selected benchmark sites in Burkina Faso, Ghana, and Senegal (Annex 1; Bayala et al. 2016). The implementation of P4S is based on participatory research approach. Scaling up of CSA options in Burkina Faso has been based on participatory analysis of the situation of vulnerability and adaptation capacity to the impact of climate change in the community in a new site of Tialgo (Tenado department) in the Centre West region of the country. This participatory exercise has culminated in the development of partnership and implementation of field tests and lessons learning in this new site of Tialgo. This temporary relocation of the activities is due to the security issues the country is experiencing currently. On-farm participatory testing has continued in Ghana and Senegal with a re-orientation of the activities based the goal and new directions of P4S. The social learning study started by IUCN last year in Burkina Faso was completed this year. In Ghana, review and planning meetings were held in two CSVs in June 2020 followed by community participatory technology development (PTD) workshops to identify, prioritize and validate CSA innovations or technologies for scaling. In Senegal, most of the activities were about awareness raising and connecting farmers to service providers. The monitoring of on-going trials was pursued. In all countries, establishing partnership has been key to strengthening CSA deployment and mainstreaming it in on-going projects/programs. To do so, capacity development was conducted through a range of actions: field visits, formal trainings, demonstrations, etc.

4. Project Activities *(in bullet points and rationale included). Describe the activities* supported *under the project.*

4.1 INERA/Burkina Faso

The "Climate Change Agriculture and Food Security" (CCAFS) research program, in collaboration with INERA, is implementing activities in the Northern Region of Burkina Faso in an area of 900 km2 (30 km x 30 km) spread over 51 villages in five rural municipalities. After several years of research-action in that site (since 2012), we have adopted a new approach with the P4S project and also because of security reasons. This consisted to extending actions to the Centre West region, more specifically in the rural municipality of Ténado in the province of Sanguié. The identified communities were subsequently involved in the diagnosis of problems /constraints, identification of potential solutions, development of experimental trials design, implementation, and monitoring. The activities of the project in 2020 included:

- Discussions with VIAMO, ANAM and ICRAF on the use of VIAMO platform to disseminate climate information et CSA agronomy messages for farmers;
- Participation in an IUCN activity on the identification of social learning models of climate-smart practices and technologies in the municipality of Tenado;
- Inventory and prioritization of climate-smart practices and technologies in the municipality of Tenado;

- Participation in the academic seminar at Centre Agricole Polyvalent de Matourkou from December 15 to 16, 2020 on the topic: role of agro-silvo-pastoral extension services in scaling up climate-smart practices;
  The capacity building activities; and publications writing.

4.2. UICN / Burkina Faso

Because of several constraints, including the Covid-19 outbreak, the insecurity issue and the late disbursement of the funds, the initial workplan was adapted will keeping the same desired change. The adaptation of the workplan consisted of a change of the target population of the activity, which was initially the local communities. Taking into consideration the above-mentioned constraints, we have replaced the local communities by the trainees from a training school for agricultural extension officers, the Centre Agricole Polyvalent of Matourkou in Burkina Faso.

4.3. ISRA / Senegal

In 2020, the team of Senegal conducted the following activities:

- Advocacy with the regional authorities in charge of forest management in Kaffrine and members of the national platform / NOCC for a more flexible management of farmers' regenerated trees allowing them to access and benefit from their products (Farmers' Managed Natural Regeneration (FMNR), exclures, plantation of local fruit trees, gardening, etc.);
- Connecting members of the Daga-Birame innovation platform with improved seeds provider in Ndiognick in order to facilitate the acquisition of the inputs for the implementation of CSA practices;
- The establishment of a regional innovation platform (IP) to reflect on strategies to adapt to climate change, identify and characterize priority value chains;
- The dissemination of intra-seasonal climate information by SMS in close collaboration with Météo Mbay.
- The strengthening the capacity of the members of Keur Sawéli zonal platform to set up agroforestry house gardens (market gardening / forest fruit trees) and the supply of vegetable seeds, tree seedlings and small materials;
- The provisions of a revolving fund to women of the Association Villageoise d'Epargne et de Crédit (VSLA) network of Ndiognick as well as to members of the Keur Sawéli zonal platform of the municipality of Ndiognick to promote gardening activities;
- The development of participatory monitoring of farmer field schools in the country to promote the extension of the climate-smart technology package (FMNR + ISFM + SIC).
- The establishment of permanent vegetation monitoring plots in all CSVs comparing direct seeding of *Moringa oleifera, Ziziphus mauritiana, Parkia biglobosa, Tamarindus indica, Adansonia digitata.*

4.4. SARI / Ghana

Activities carried out at the CSVs in 2020 included the following:

- Community participatory technology development (PTD) workshops to identify, prioritize and validate CSA innovations or technologies for scaling including the test of technologies selected by communities for implementation at field scale with households and on-farm trials and demonstrations, climate information, particularly seasonal forecasts a combination of improved agronomic practices and soil/water conservation techniques (earth bunds, tie ridges, crop rotation and organic fertilization);

- Training of farmers and development agents on the CSA innovations/technologies (best management practices for maize, soybean and cowpea production);
- Organize training activities to empower local level institutions with information, knowledge and capability to address longer term issues such as climate change;
- Training of farmers on fall armyworm management;
- Training of women farmers on postharvest handling and value addition as well as processing and storage of vegetables all year round;
- Support farmers to access the inputs needed to implement the CSA technology package. This involved linking farmers at the CSVs to the Government of Ghana flagship project of *Planting for Food and Jobs* so as to increase farmers' access to subsidized inputs (seed and fertilizers) in other to increase maize and soybean production in the region;
- Organize farmer field days to visit trials and share their perceptions with researchers;
- Introduction of biofortified crops. This included high iron millet (ICTP 8203-Fe-2), provitamin A maize (Ahodzin) and orange flesh sweetpotato;
- Identification and implementation of social learning groups on promising CSA options;
- Build the capacity of the learning groups on the promising CSA options;
- Work to influence plans and programs of development / finance institutions so that they take into account what we have to offer;
- Identify policies that support the adoption of CSA technologies;
- Identify and set up dialogue groups on Agro-Silvo-pastoral policies;
- Conduct a study on the actual potential influence of policies on the implementation and adoption of CSA technologies;
- Identify champions and support them to advocate for policy change.

5. Project Outputs **(max 3 pages)**

This section should include a list and short description of the main outputs that resulted from the project. Draft papers for publication or any relevant documents produced shall be attached to the report.

5.1. INERA / Burkina Faso

5.1.1. Discussions with VIAMO, ANAM and ICRAF

These exchanges aim to come to agreement to use the platform of VIAMO as channel to provide context adapted climate information et technical messages on CSA options in local languages. The short messages should help farmers to use climate information and especially the seasonal forecasts for their activities planning. Scripts developed and will be soon uploaded and aired.

5.1.2. Participation in the identification of models of social learning of climate-smart practices and technologies

This activity included groups interviews of 10 women (old and young) and 10 men (old and young) carried out separately to identify learning models by gender in Tenado. The questions focused on climate-smart knowledge and practices, from which actor farmers got the information and what were the arguments used to convince them as well as the confidence that farmers have in these actors, etc.

5.1.3. Participatory inventory and prioritization of climate-smart technologies and practices

The Central West region of Burkina Faso is affected by climate variability and change calling for the use of appropriate CSA options. Thus, the inventory of climate-smart technologies in this new area of intervention constitutes the entry point for P4S project. This activity was conducted at Tialgo (Tenado) with the specific objectives to: conduct an inventory of climate-

smart technologies and innovations, classify technologies according to six (6) criteria (Productivity, income, adaptation, mitigation, economic viability and ecosystem services). The same exercise was done for the climate-smart value chains of this site. The inventory and prioritization of climate-smart technologies used a participatory and collaborative approach with partners in the field, namely the technical services of agriculture, the environment and livestock, the local populations. Mixed groups of 40 participants (20 men and 20 women) participated in the meetings. Two agricultural officers, a livestock officer and an environmental officer attended these discussions. The scoring method was used as tool for prioritizing technologies. Scoring is based on 6 criteria (productivity, income, adaptation, mitigation, economic viability and ecosystem service). The score goes from 0 to 10 (0 not useful for this criterion, 1: Used a little for this criterion, …… 10: Technology no longer used for this criterion). The climate-smart value chains are summarized in Table 2. Climate-smart value chains are both economically and ecologically viable. From the results of the interviews, it emerged that market garden products (onion, tomato, cabbage), livestock (poultry and pigs) as well as rice constitute climate-smart value chains at the site.

It is important to mention that this new activity constitutes a support to the project « CREWS/CProj/03/Burkina: Strengthening national capacities for EWS Service Delivery in Burkina Faso » of National Meteorological Service of Burkina Faso of US$2,192,200, operating in the same site. In this project INERA is acting as an implementing partner as a result of the collaboration that has taken place since the beginning CCAFS program in Burkina Faso.

5.1.4. Participation in an academic seminar

The academic seminar on the roles of agrosilvopastoral extension services in the scaling up of climate-smart practices was co-organized by the International Union for the Conservation of Nature (IUCN), the Institute for the Environment and Agricultural Research (INERA), the World Agroforestry (ICRAF) and the Centre Agricole Polyvalent de Matourkou (CAP) and was held from December 15 to 16, 2020 at the Center Agricole Polyvalent de Matourkou. A total 229 student, trainees and lecturers attended to the seminar. Four communications were delivered on December 15 and knowledge coffee or group work organized on December 16, 2020. The four communications were: (i) climate smart agriculture and climate smart village concepts by Dr Jules Bayala from ICRAF (ii), The scaling up of climate smart technologies: the three pillars by Dr Josias Sanou from INERA, (iii) Behavior changes, social learning and agrosilvopastoral extension: What relationships and how to value them? by Dr Jacques Somda from IUCN and Finally (v) the use of climate information in agrosilvopastoral extension by Dr Jules Bayala. The second day was devoted to knowledge coffee where the participants were split into four groups to deepen their knowledge on climate information facilitated by Dr Jules Bayala from ICRAF, on the scaling up of climate-smart technologies facilitated by INERA (Dr Sanou and Barry) and finally on agricultural extension and behavior change, and social learning facilitated by Dr Jacques Somda of IUCN.

5.1.5. Capacity building activities

Mr Somé Casimir has been recruited as master student and is working on the constraints and opportunities for adopting and implementing climate-smart technologies and practices. He has already done the literature review and designed a questionnaire. Currently, he is collecting data on the new site in the Centre West of the country (Tenado).

5.1.6. Publications

A blog was produced on social learning. Three drafts of various documents are being finalized.

- Somda J., Ouedraogo M., Buah S., Barry S., Bationo B. A., Bayala J., Zougmoré R. 2020. Scaling climate-smart agriculture: Linking participatory action research to social learning. Jan 23, 2020, https://ccafs.cgiar.org/research-highlight/scaling-climate-smart-agriculture-linking-participatory-action-research social#.Xir1DCOH4l0. Blog
    - Bationo B.A., Somda J., Sanou J., Barry S., Dayamba S. D, Bayala J., Dembelé C., Adeyemi C. 2021. Dégradation des parcs agroforestiers traditionnels au Burkina Faso: la part de la legislation forestière. Note de politique
    - Barry S., Bationo B.A., Sanou J., Dayamba S. D, Ouedraogo M., Somda J., Bayala J., Dembelé C., Adeyemi C., Zougmore R. 2021. Developpement participatif et communautaire d'une agriculture intelligente face au climat: Experience du Burkina Faso. Document de travail
    - Sanou J., Bationo B.A., Barry S. Dayamba S. D, Somda J., Bayala J., Adeyemi C., Dembelé C. 2021. Guide operationnel pour les pratiques et technologies climato-intelligentes (ACI) au Burkina Faso. Note technique

5.2. UICN / Burkina Faso

The main outputs of this activity include:

- 229 trainees and teachers are knowledgeable of the concepts and approaches related to climate smart village and agriculture, behavior changes and social learning.
- Gaps on the curricula of the training schools for agricultural extension officers identified and recommendation made to address them.
- Somda J., Ouedraogo M., Buah S., Barry S., Bationo B. A., Bayala J., Zougmoré R. 2020. Scaling climate-smart agriculture: Linking participatory action research to social learning. Jan 23, 2020, https://ccafs.cgiar.org/research-highlight/scaling-climate-smart-agriculture-linking-participatory-action-research social#.Xir1DCOH4l0

5.3 ISRA / Senegal

5.3.1. Activity: Extension of the AIC technology package (FMNR + ISFM+ SIC)

- Empowerment in social learning of CSA platform members of the Keur Sawéli (29 including 5H and 24F)
- CSA platform members were also trained in market gardening techniques for the establishment of agroforestry house garden. To promote this initiative, 100 plants (tamarind, lemon, baobab, papaya) were distributed to participants as well as materials to women for the establishment of ten (10) agroforestry house gardens;
- The members of the platform were put in touch with a seed operator in Ndiognick to acquire seeds from Thialack 2 and mineral fertilizer for 60 producers;
- Comparison trials of enrichment plantations by seeding pursued;
- Trial on Climate Resilient Agroforestry Technological Package / trial on the optimal density of RNA compatible with crops continued. The preliminary results of the inventories show that the vegetation of the Daga Birame observatory is dominated by two species *Combretum glutinosum* and *Guiera senegalensis*.

5.3.2. Activity P34A195: Influence policies (local and agro-sylvo-pastoral)

Awareness-raising and advocacy with forestry authorities to support sustainable restoration practices (formalization of local initiatives to protect certain areas of their territory for restoration purposes) through a more flexible status of the farmers' regenerated trees in terms of access to the benefits of their actions.

5.3.3. Activity P34A195: Development of smart value chains facing CC to attract the private sector

- Support / connect social learning groups to the climate-sensitive food value chain development strategy, including access to climate information (PI - Keur Sawély CV / baobab powder, Sorghum / vegetables and NTFP network, COPROSEM / seeds;
- Support for the operation of the climate sensitive value chain / group selling / product selling stores

5.3.4. Publications

- Sanogo D, Sall M, Camara B.A, Diop M, Badji M, Ba H.S. 2020. The climate-smart village approach – putting communities at the heart of restoration in Senegal. In Restoring African Drylands ETFRN NEWS Issue No. 60, December 2020. http://www.etfrn.org/index.php?id=55
- NGOM NA. 2021. Etude de la croissance et de la production fruitière de quatre (04) accessions de Tamarindus indica L. (Fabaceae) en plantation dans le Sud du Bassin arachidier au Sénégal. Mémoire de Master soutenu le 30/01/2021 à l'Université Cheikh Anta Diop de Dakar (UCAD).
- Sanogo D., Ky-Dembele C., Camara B.A., Badji Ma., Diop M., Ba H.S., Sall M., Drame M., Ngom N.A., Bayala J. 2021. Performance of four planted accessions of *Tamarindus indica* (Fabaceae) in the Groundnut Basin of Senegal (being finalized).
- Camara B.A., Sanogo D., Ndiaye O., Sall M., Ba H.S., Diahate P.B., Diop M., Badji M. 2021. Socio-economic determinants of the adoption of Farmer managed natural regeneration and Farmer's perception in the Southern Groundnut Basin of Senegal. Agroforestry Systems (Submitted).

5.4 SARI / Ghana

5.4.1. Key findings

- The results over the years showed that the top ten CSA technologies/practices preferred by farmers in the CSVs sites were: improved crop varieties, drought-tolerant, early maturing crop varieties, integrated use of organic and inorganic fertilizers, off-season crop market-gardening, tie ridges, earth bunds and use of climate information services;
- Results in the CSV sites showed that improved varieties of drought tolerant maize led to an average 35% yield increase, compared with traditional varieties;
- Economic indicators used for project acceptability criteria indicate that drought tolerant/short cycle variety is the best technology;
- Tie ridges and earth bunds technologies, which helps improve water and nutrient use efficiency, has increased crop yield by an average of 36% compared to farmer usual practice of planting on the flat with fertilizer ;
- Maize-cowpea rotation, no-tillage with fertilizer, combined tie ridges and fertilizer are potential sustainable intensification options that can improve farm incomes;
- The portfolio of CSA practices and technologies demonstrated multiplier effects on crop yields, nutrient use efficiency, and emissions reduction;
- The portfolio of improved crop varieties, zero tillage, crop rotation and integrated nutrient management has been further evaluated by farmers in their own fields;
- Through training on good agronomic practices for crop production, Capacity of about 450 farmers to grow the various crops has been enhanced;
- In Upper West region, extra-early and early maturing yellow maize are preferred especially by women for their earliness and yellow endosperm.

5.4.2. Publications

- Buah S.S.J, Ibrahim H., Deigubah M., Kuzie M., Segtaa J.V., Kabo-bah L., Bayala J., Zougmore R., Ouedrago M. 2021. Promising climate-smart agriculture options in the Bompari and Doggoh communities in northern Ghana: Smallholder Farmers' Attitude toward adaptation. Finalization stage.
- Buah S.S.J, Ibrahim H., Deigubah M., Kuzie M., Segtaa J.V., Kabo-bah L., Bayala J., Zougmore R., Ouedrago M. 2021. Synergetic effects of combining water management and fertilizer for sustainable maize production under variable rainfall conditions in Guinea Savanna Zone of Ghana. Finalization stage.
- Buah S.S.J, Ibrahim H., Deigubah M., Kuzie M., Segtaa J.V., Kabo-bah L., Bayala J., Zougmore R., Ouedrago M. 2021. Maize Responses to Integrated Nutrient Management options under variable rainfall conditions in the Guinea Savanna Zone of Ghana. Finalization stage.

6. Gender *(is gender consider in the project? Please elaborate on how gender is integrated in the project)* (300 words)

In Burkina Faso, women and youth who are the most vulnerable social groups are fully involved. To guarantee this, a quota is defined for women when selecting beneficiaries. About 25% of the 229 participants to the academic seminar held in December 2020 were female. The female participants were all trainees. There was no female in the lecturers' sub-group. In Senegal, the plantations have been made in the towns with the main target of the Ndiognick women's group. To promote market gardening and the introduction of forest fruit trees into households for women and children, a revolving fund has been made available to women. In addition, the women's group of Daga Birame is active in the processing of baobab fruits. Several women benefited from capacity building in market gardening techniques and seedlings were granted to them so that they could plant them in their concessions. About 620 farmers of which 45% were women were reached through promotion and awareness creation activities in 2020 in Ghana.

7. **Project Outcomes** (if any) (300 words)

One of the major outcomes for this year in West Africa is the project entitled "Creating land of opportunities: Transforming livelihood through landscape restoration in the Sahel (Burkina Faso, Ghana and Niger)" led by IUCN and funded by Global Mechanism/UNCCD. It has a budget of Euro 5 million, a duration of 3 years with target beneficiaries of 300,000 persons (50% women and youth). The objective of the project is to make a significant and sustainable contribution towards gender-responsive landscape restoration in the Sahel while creating income generating activities for women and men from local communities in Burkina Faso, Ghana and Niger; and empower women in these three countries as key actors in agriculture and land degradation neutrality interventions. Specific objectives are (1) to promote gender-responsive landscape restoration and facilitate the sustainability of these actions through the creation of land-based jobs and income-generating opportunities for rural populations across the Sahel, particularly benefiting women and youth; (2) to promote and strengthen the enabling environment for leveraging land-based investments benefiting women and men from

local communities across the Sahel; and (3) to improve the livelihoods of rural communities by establishing sustainable production of high-value drylands products to connect local producers, particularly women producers, to international markets. Field implementing partners include the same institutions which have been collaborating in the regional CCAFS program: INERA (Burkina Faso), CSIR/SARI (Ghana) and INRAN (Niger), Governmental agencies and NOGS in each country. ICRAF will participate in the project Regional Steering Committee".

Increased awareness among stakeholders of the need to integrate climate change into farm-level decision-making in the choice of varieties and the associated technical itineraries of CSA options in Burkina Faso, Ghana and Senegal. Currently, farmers are strategically planning the season's activities (preferred crop, growing area, area to sow, etc.) based on available resources and climate information. The most performant climate smart practices are being replicated in the surrounding villages through partnering with other players. There has also been a better collaboration between actors involved in rural development for their intervention in a specific zone. This is the case in Tenado municipality between INERA through P4S and National Meteorological Service of Burkina Faso through its project« CREWS/CProj/03/Burkina: Strengthening national capacities for EWS Service Delivery in Burkina Faso».

In Ghana, farmers from different communities, researchers from different disciplines, NGOs and other partners, all come together to test a range of options in an integrated fashion. The CSV sites in Ghana are becoming learning platforms for many stakeholders in relation to climate-smart interventions in agriculture. They use emerging evidence and lessons to develop and implement development plans. Farmers' field days, exchange visits, and local "durbars" and study tours have been conducted. The national science-policy dialogue platform has also been a useful framework for sensitization through which research results and experiences from the CSV sites are regularly shared by scientists and used to demonstrate effectiveness of diverse CSA technologies. Some evidence from the CSVs has also been used to mainstream CSA into major agricultural development programs (e.g., Planting for Food and Jobs, GIZ-Market Oriented Agriculture Project (GIZ/MOAP)-Training and extension in Conservation Agriculture practices) as well REACH project.

8. Overall Risk and Recommendations

(300 words)

The major risks were the Covid-19 outbreak, and this compromised the timely implementation of the field activities. In Senegal for example, the context did not allow establishing the Kaffrine regional innovation platform. In addition to this, in Burkina Faso, many terrorist attacks were recorded in the province of Yatenga, the project site. This is why the project team is extending the activities to the Centre West region (in Tenado) which thus serves as an opportunity to scale out proven approaches in the project of the National Meteorological Service of Burkina Faso «CREWS/CProj/03/Burkina: Strengthening national capacities for EWS Service Delivery in Burkina Faso».

9. Policy Implications and Future Directions

(300 words)

This section should summarize the implications of the study findings for actions and policies at local, national, regional and/or international levels. The section should also summarize plans/recommendations for future directions (research, capacity building, and/or policy applications) that would build upon the study's accomplishments.

The involvement of municipal councils (Ouahigouya in Burkina Faso) in the project activities increases the awareness of local political actors on the challenges of climate change. The workshop held with the mayors of the rural communes on the risks of conflicts related to climate change adaptation strategies was particularly interesting for local elected officials who made the commitment to be more vigilant on the partners' approaches of interventions in their community territories. This should have an impact on debates on natural resource management inside municipal councils, thus contributing to participatory and inclusive local governance of natural resources.

The results of the academic seminar of the Centre Agricole Polyvalent de Matourkou have two major political implications:
1. Training program for agricultural extension officers: There is need to integrate into the curriculum of the training school for agricultural extension officers the concepts of climate-smart agriculture and village, and behavior change and social learning.
2. National agricultural extension system: There is need to reform the agricultural extension system to promote behavior change and social learning approaches existing in local communities. The reform of the national agricultural extension system will ensure continuous training of agricultural extension officers on climate-smart agriculture and villages, behavior change and social learning approaches in connection with climate-smart practices and technologies,

As several CSA options deployed in Senegal include regenerating trees/shrubs, an advocacy with ministry in charge of environment and forests and its decentralized representations was launched to seek a specific status for these trees/shrubs which allows the farmers who nurture them to benefit from their fruit and services. Indeed, the current forest code if applied without paying attention to the efforts of farmers actively engaged in preserving and protecting trees constitutes a disincentive for farmers to engage in tree-based CSA land and landscape restoration activities. Action will be pursued along that line in 2021 through the production of a policy brief.

In Ghana, there is a need to strengthen support schemes such as the Government of Ghana flagship project dubbed *Planting for Food and Jobs* that would make it easy for farmers to have access to seeds of drought tolerant crop varieties, early maturing crop varieties and fertilizers in order to increase productivity. In addition, the recommendations particularly on good agricultural practices (GAP) were made for improvement.

10. References

List of relevant bibliography/literature cited within the report.

FAO 2010. "Climate-Smart" Agriculture Policies, Practices and Financing for Food Security, Adaptation and Mitigation. Africa Research Bulletin: Political, Social and Cultural Series, 46(11), 18176C-18177A. https://doi.org/10.1111/j.1467-825x.2009.02642.x

FAO 2013. Climate-Smart Agriculture Sourcebook. In ERIS – European Review of International Studies (Vol. 3, Issue 2). https://doi.org/10.3224/eris.v3i2.14

Intergovernmental Panel on Climate Change (IPCC). 2014. *Climate change 2014: synthesis report.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team Pachauri R.K. and Meyer L.A., editors]. IPCC, Geneva, Switzerland.

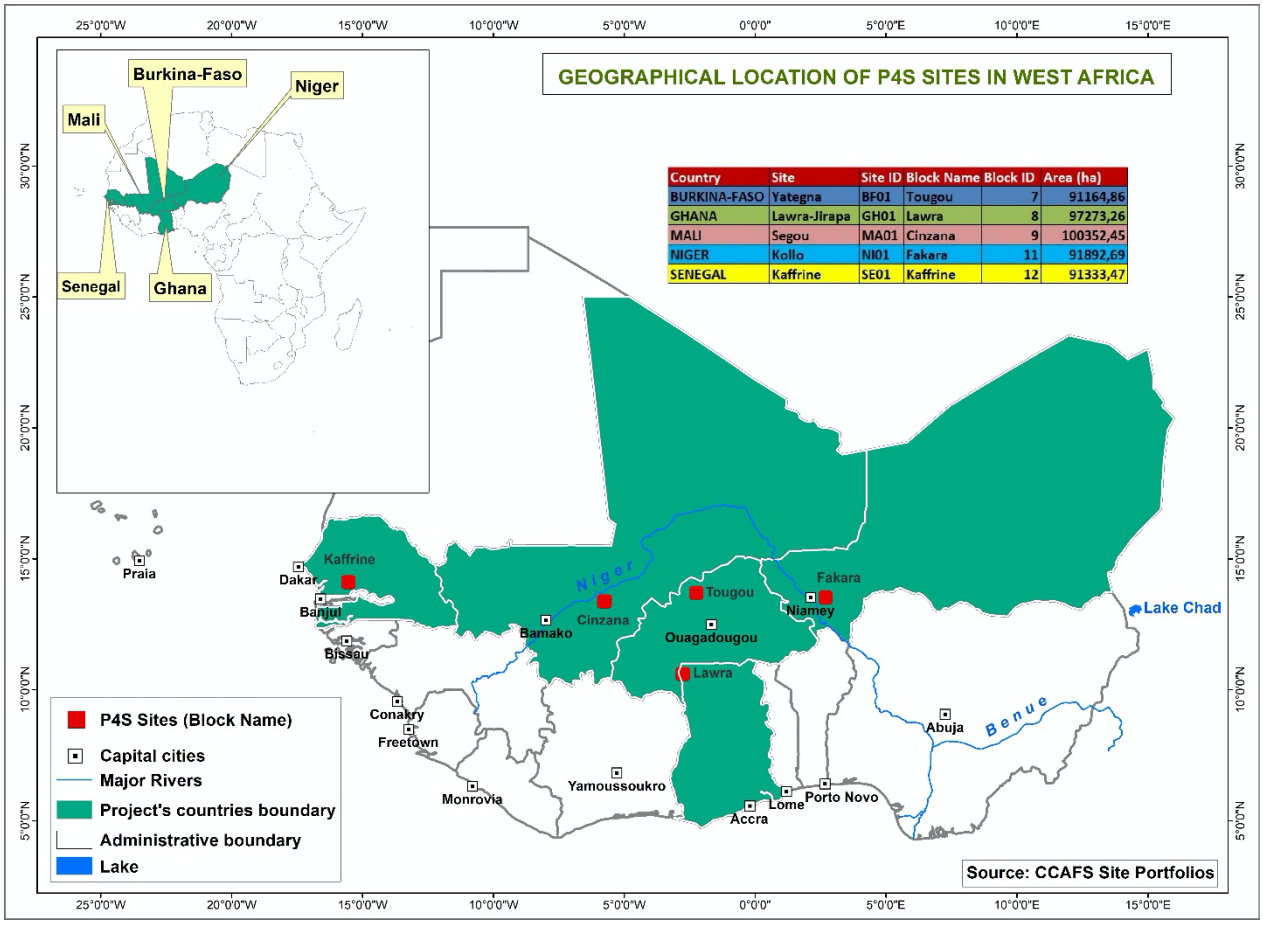
Leys A.J., Vanclay J.K. 2011. Social learning: A knowledge and capacity building approach for adaptive co-management of contested landscapes. Land Use Policy 28(3): 574-584.

Oualbeogo A.T,. Palé R., Zongo L. 2018. Plan Communal de Développement de Tenado 2018-2022, Rapport définitif. Janvier 2018

Sissoko K., van Keulen H., Verhagen J., Tekken V., Battaglini A. 2011. Agriculture, livelihoods and climate change in the West African Sahel. Regional Environmental Change, 11(SUPPL. 1), 119–125. https://doi.org/10.1007/s10113-010-0164-y.

Woodhill J. 2010. Sustainability, social learning and democratic imperative: lessons from the Australian landscape movement. In: Blackmore C. (Ed.) Social learning systems and communities of practice. Part II, London: Springer, pp 57-72.

Annex 1. P4S II Benchmark sites in West Africa



Annex 2. Synthesis of the inventory and prioritization of climate-smart technologies at Tialgo in Burkina Faso

Technology								
	Ranking of technologies for each criterion (0 to 10)							
	Productivity	Income	Adaptation	Mitigation	Economic viability	Ecosystem services	Significance value of technology	Rank
Weather information	10	9	10	9	10	8	56	1th r
Tree planting and care	10	8	9	10	10	8	55	2th ème
Assisted Natural Regeneration (ANR)	10	8	9	8	9	9	53	3th
Suitable habitat for poultry	10	9	10	4	9	7	49	4th
Stone bunds	10	8	8	7	5	10	48	5 th
Fattening Animal	9	8	10	4	10	5	46	6 th
Animal Vaccination	9	9	10	5	8	4	45	7 th
Crop diversification (Market gardening)	10	9	10	3	8	5	45	8 th
Organic manure	8	7	7	10	4	8	44	9 th
Use of improved animal feedings	9	9	9	4	8	5	44	10th
Improved varieties	7	10	10	2	6	8	43	11th me
Mowing and forage conservation	8	7	9	5	10	4	43	12th
Sowing in rows	8	8	7	6	6	6	41	13th
Plowing	7	9	8	4	7	5	40	14th
Zaï	10	5	7	3	3	7	35	15th
Mutual aid	7	5	5	5	6	6	34	16th
Biodigester	6	5	5	5	5	5	31	17th
Criterion value	148	133	143	94	124	110		

Participants (Farmers and agents of extension services) to the meeting for the inventory and prioritisation of climate-smart practices and technologies at Tialgo (Tenado, Burkina Faso)

Annex 3. UICN / Burkina-Faso

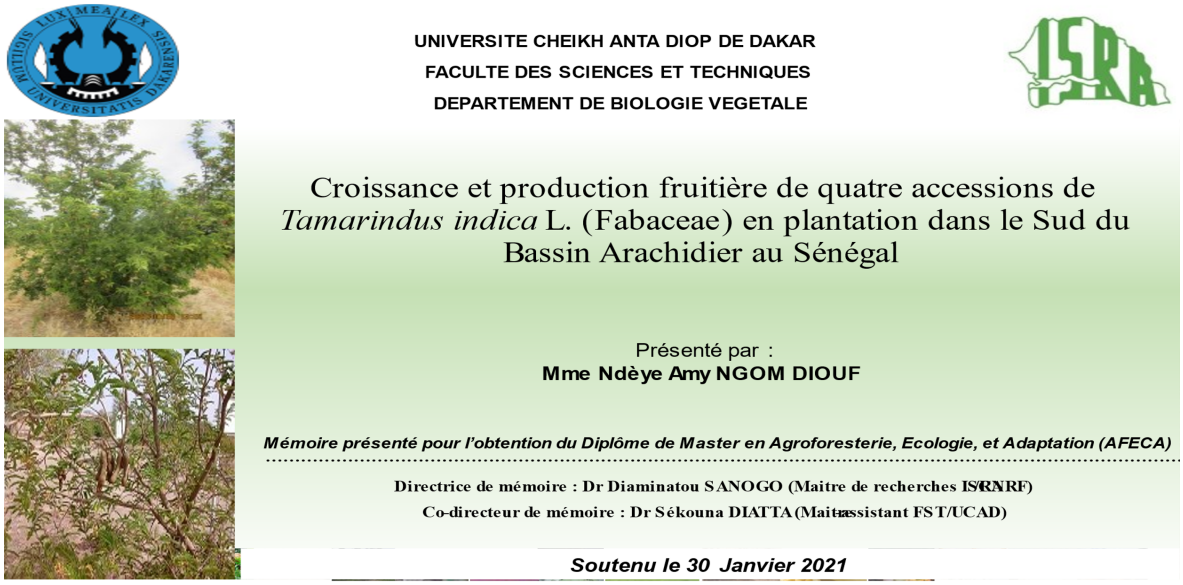
N/A

Annex 4. Draft papers submitted for publication by ISRA / Senegal

Titre	Disponibilité premier draft
Croissance et production fruitière de quatre variétés de *Tamarindus indica* au Sahel	Draft déja éléboré
Sanogo D, Sall M, Camara B.A, Diop M, Badji M, Ba H.S. 2020. The climate-smart village approach – putting communities at the heart of restoration in Senegal. In Restoring African Drylands ETFRN NEWS Issue No. 60, December 2020.	Disponible sur: http://www.etfrn.org/index.php?id=55
Socio-economic determinants of the adoption of Farmer managed natural regeneration and Farmer's perception in the Southern Groundnut Basin of Senegal	Draft soumis dans une revue pour publication
Méthode participative d'inventaire des technologies et pratiques d'agriculture, d'élevage d'agroforesterie climato-intelligentes dans la zone agro-écologique des Niayes au Sénégal	Draft déja éléboré
Intégration de l'analyse de la vulnérabilité dans la planification des capacités d'adaptation au changement climatique : Cas de la zone agro-écologique des Niayes au Sénégal	Draft déjà remis pour impression d'un premier exemplaire
Méthodes participatives de reverdissement des terroirs de la zone agro-écologique du Bassin arachidier/ Sénégal	sous press

1. Un (01) mémoire de master

NGOM NA. Etude de la croissance et de la production fruitière de quatre (04) accessions de *Tamarindus indica* L. (Fabaceae) en plantation dans le Sud du Bassin arachidier au Sénégal. Mémoire de Master soutenu le 30/01/2021 à l'Université Cheikh Anta Diop de Dakar (UCAD).



Annex 5. Summary of experiment, crop variety used and number of technologies farmers who planted the trials at Doggoh and Bompari/Dazuuri in 2020. SARI / Ghana

Technology	Crop variety	Doggoh	Bompari	Dazuuri	Total
Maize cowpea rotation	Wang-data/ Wang kae	8	2	0	10
Tied ridges and fertilizer effect	Wang-dataa	15	5	4	24
Earth bunding	Wang-dataa	0	5	3	8
Groundnut	4 varieties	3	0	0	3
Cowpea up-scaling	Wang kae	5	4	0	9
Soybean up-scaling	Jenguma	3	1	0	4
Maize up-scaling	Wang-dataa	5	4	1	10
Total		38	21	8	68