

GRANT NO. 873 - ICRAF/IFAD PROGRAMME

**SMALLHOLDER CONSERVATION AGRICULTURE PROMOTION (SCAP)
IN WESTERN AND CENTRAL AFRICA**

BURKINA FASO, GUINEA, NIGER



SCAP PROJECT - FINAL REPORT

Implemented by



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PREFACE

While Africa has seen an extraordinary rebound in economic growth over the past decade by having some of the world's fastest growing economies, hunger has increased by 20 million people in Sub-Saharan Africa (SSA) in the last four years. Population trajectory postulates that SSA's population will increase by 150% from now to 2050. Considering that cereal yields have remained stagnant over the last forty years, there is widespread consensus that, going forward, farmers must produce more food per unit of land, water, and agrochemicals. However, if they continue producing in the same way as they have been over the last forty years, they will get the same results - hunger. With meaningful support from other stakeholders, they will have to produce more food while facing climate change and variability, shifting nutrition needs, and the increasing scarcity of most of the physical factors of production. The way farming has been carried in SSA must undergo a transformation.

Farmers in USA, Brazil, Australia and Argentina, have had revolutionary best practices in response to the low productivity and perceived negative environment impact of conventional farming practices described by the term "Conservation Agriculture". Conservation agriculture emphasises on application of three main principles for managing agro-ecosystems: minimising mechanical soil disturbance (by not tilling the land); providing permanent soil cover (through crop residues, cover crops and agro forestry), and diversifying crop rotations. Conservation agriculture is currently being practiced in about 125 million hectares worldwide in more than 50 countries and the area is expanding at the rate of 6 million hectares per year. The smallholder Conservation Agriculture Promotion (SCAP) project in West and Central Africa is an attempt at promoting a more comprehensive approach to restoration of natural resources that integrates environmental, technical, economic and social dimensions.

This report presents the views of the project implementation team on the performance and achievements of the SCAP project (GRANT NO. 873 - ICRAF/IFAD), which has been operating in Burkina Faso, Niger and Guinea since July 2008. The project had a total budget of US\$ 1,800,000, of which USD 1.5 million is funded as grant by IFAD and US\$ 300,000 was contributed by the French Development Agency (AFD). There was also in-kind contribution of ACT, CIRAD, ICRAF and the four IFAD loan projects for an estimated value of 900,000 US\$..

The report is an internal evaluation, in the absence of an external evaluation by IFAD, with a view to providing an updated assessment of the performance of the project to IFAD, the Governments of Burkina Faso, Niger and Guinea and other stakeholders. While the report has been shared with the host National Governments, their official responses are being received and have not been included.

Main views regarding the project are presented in the Executive Summary, followed by recommendations on the Way Forward. The main body of the report gives additional information on the project and assessments of its performance, while annexes provide detailed information of some specific features of the project.

The report has been generated using information synthesised from the internal monitoring and evaluation system checks and reports. A writeshop held in May 2012 in Ouagadougou

Burkina Faso and attended by the implementation team members aided synthesis of the generated information into several knowledge sharing products including this report. This report and other related project documents have made great attempts to capture and share the behavioural changes of and outcomes in the beneficiary target groups. However, innovations to adapt and adopt CA emerge all the time and an impact assessment at a later date will validate the quality and quantities.

The Project Implementation Team greatly appreciates the financial and technical support provided by IFAD, AFD and the four IFAD-financed project hosts namely: Programme de Développement Rural Durable (PDRD) and Programme d'Investissement Communautaire pour la Fertilité Agricole (PICOFA) in Burkina Faso; Programme d'Appui au Développement Rural en Basse Guinée Nord (PADER/BGN) in Guinea, and Projet de Promotion de l'Initiative Locale pour le Développement à Aguié (PPILDA) in Niger. Support of the farmers, Government Counterparts, private sector, Universities, Research Centres and CBO/NGO collaborators is much appreciated.

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LIST OF ACRONYMS

ABACO	Agro-ecology based aggradation-conservation agriculture
ACT	African Conservation Tillage Network
AFD	Agence Française de Développement
BTOR	Back to Office Report
CA	Conservation Agriculture
CA2AFRICA	Conservation Agriculture in AFRICA: Analysing and Foreseeing its Impact - Comprehending its Adoption
CA SARD	Conservation Agriculture for Sustainable Agricultural Rural Development
CAWT	Conservation Agriculture with Trees
CBO	Community Based Organisation
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
COMESA	Common Market for Eastern and Southern Africa
CRS	Catholic Relief Services / Cathwel
DAP	Draught Animal Power
FAO	Food and Agriculture Organization (of the United Nations)
FFS	Farmer Field School
FG	Farmer Group
FIDA	Groups Fonds International pour le Développement Agricole
HH	Household(s)
ICRAF	International Centre for Research in Agroforestry (World Agroforestry Centre - Nairobi)
IFAD	International Fund for Agricultural Development
M&E	Monitoring and Evaluation
MAFSC	Ministry of Agriculture Food Security and Cooperatives (Tanzania)
MOA	Ministry of Agriculture
NGO	Non-Governmental Organization
PADER/BGN	Programme d'Appui au Développement Rural en Basse Guinée Nord
PDRD	Programme de Développement Rural Durable
PICOFA	Programme d'Investissement Communautaire en Fertilité Agricole
PPILDA	Programme Promotion des Initiatives Locales de Développement à Aggie
SACCOS	Savings and Credit Cooperative Society
SCAP	Smallholder Conservation Agriculture Promotion Project in Western and Central Africa
SLM	Sustainable Land Management
SMART	Specific, Measurable, Achievable, Realistic and Time bound (Indicators)
WCA	Western and Central Africa

Background

Confronted with declining crop productivity, environmental degradation and climate change variability, Western and Central Africa smallholder farmers are seeking means to ensure food security and sustainability of their production systems. The Smallholder Conservation Agriculture Promotion (SCAP) Project in Western and Central Africa (WCA) was conceived to explore the potentialities and modalities of the implementation of conservation agriculture based farming practices in West and Central Africa as a mean to sustainably improve the productivity of natural resources and livelihoods of farmers.

The general goal of SCAP was to reduce rural poverty, improve food security, conserve agricultural land and water resources, and foster economic growth through sustainable improvements in the productivity of agroecosystems in WCA, through improved access on the part of poor rural communities to technical options inspired by the principles of conservation agriculture, with a primary focus on selected sites in Burkina Faso, Guinea and Niger.

The Conservation Agriculture Technology

The Conservation Agriculture (CA), technology being promoted, is a concept for resource-saving agricultural crop production that strives to achieve acceptable profits and high and sustained production levels while concurrently conserving the environment. CA relies on the simultaneous application of three basic principles at plot level of: (a) continuous minimum mechanical soil disturbance, requiring direct planting of crop seeds and if possible no tillage at all; (b) permanent soil cover using cover crops or crop residues; and (c) diversified crop rotations or plant associations. External inputs such as agrochemicals and nutrients of mineral or organic origin are applied at an optimum level and in a way and quantity that does not interfere with, or disrupt, the biological processes.

There are currently some 125 million hectares in CA systems worldwide, the majority being in the United States, Brazil, Argentina and Paraguay with Africa having about one million hectares. The area under CA is expanding at the rate of about 6 million hectares per year. These have shown that CA can become the agricultural mainstream in a variety of farming systems when also leveraged on indigenous minimum tillage and intercrop approaches found in many parts of Africa.

Project Objectives

The development objective is to raise the productivity and improve the sustainability of natural resources in WCA, as a way to reduce rural poverty and to improve the rural poor's access to technology and natural resources including land and water.

The development objective of the project is to be achieved through four general objectives:

1. Strengthen the capacity of poor rural communities to identify, assess and further adapt crop, livestock and resource management practices and cropping systems that are in accordance with the principles of conservation agriculture; that are compatible with local environmental, social and economic conditions; and that build on indigenous knowledge and skills. (*Building cropping systems*)
2. Foster networking among farmer-innovators as a means of adapting and accelerating the widespread use of suitable new practices. (*farmer-innovators*)

3. Expand the range of technical options from which communities and farmer innovators can choose, through sharing knowledge on NRM and conservation agriculture practices, including practices used in other communities and even in other regions. (*Knowledge sharing and management*)
4. Strengthen institutional mechanisms, including the consolidation of ACT, as a means of fostering knowledge-sharing and community-led assessment of conservation agriculture practices in the region. (*Capacity building*)

Project Design

The SCAP is a regional multi-stakeholder programme whose key implementation players are ACT, CIRAD, ICRAF and representatives of the four national IFAD-Loan projects. The governance set-up to support and facilitate Project management and implementation involved three main units namely: The African Conservation Tillage Network (ACT) Secretariat; Project Scientific and Technical Advisory Team; and Project Implementation Team - all established and functioning with specific but complementary responsibilities.

ACT, through its Secretariat based in Nairobi-Kenya has been responsible for overall coordination and project management functions. The ACT Secretariat took responsibility for overall Project delivery according to stipulated time-frames; ensure the production of quality work and the consistency and compatibility of outputs with regard to the Project purpose and goal. ICRAF's functions included the due and timely performance of all obligations ascribed to it as the formal recipient of the IFAD grant for the SCAP project. During the Project's first phase, ICRAF, additional to its roles and responsibilities as a Project core partner, provided necessary administrative and financial management support to ACT, in ACT's efforts to mainstreaming and strengthening its capabilities as a continental/regional institution on promotion of conservation agriculture, and hence able to eventually engage with IFAD directly on the management and implementation of future Projects.

The Project Implementation Team has been composed of a Project Manager, a member of staff of ACT¹, and two professional staff (one CIRAD² and one ICRAF³) seconded to the Project. The three functioned with responsibilities across the three target countries. The team was supported by representatives of the four partners IFAD financed projects⁴, who were mandated to integrate related SCAP activities within their programmes with the SCAP programme. The Project Implementation Team has been directly responsible to the ACT Secretariat through the ACT Executive Secretary for the actual field level administrative and technical and scientific management of the Project. The Project Scientific and Technical Advisory Team steered and supported the implementation of the Project by providing independent and professional review of the Project approaches and deliverables, as well as technical, scientific and managerial guidance. It also provided oversight in strategic thinking with regards to Project vision and related social, economic, technical, scientific and policy matters. The Scientific and Technical Advisory Team is composed of five professional members⁵ selected on the basis of predetermined criteria.

At the village level, the project is implemented through the individual Farmer Innovators and Farmer Field Schools (FFS) by Ministries of Agriculture staff under guidance and supervision of the IFAD-financed host projects. Project monitoring, evaluation and some training are done by the

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³ Dr Andre Babou Bationo

⁴ SANKARA Souleymane of PDRD Burkina Faso; BARRY Issa of PICOFA Burkina Faso; SANO Sékou of PADER Guinea; and BAGNAN Salifou of PPILDA Niger.

⁵ Prof Jacques Nanema (University of Ouagadougou), Mr Thio Bouma (Ministry of Agriculture, Burkina Faso), Dr Patrick Dugué (CIRAD), Dr Zac Tchoundjeu (ICRAF, Cameroon) and Dr Abdoulaye Mando (IFDC, Togo)

Implementation Team led by ACT. The project has also been building CA scaling out capacity to a number of different target groups: farmers, agricultural advisors and decision makers in the departments of agriculture and private sector service providers.

The CA technology is innovative, has proven feasible in various settings and is technically consistent with smallholder agricultural systems. Individual innovator farmers were mainly used in the first year of the project before full-fledged FFS groups were formed in the second and third years. Besides the learning CA by doing through the FFS, participating farmers/groups were supported with “best bet” CA inputs for the research/validation plots perceived to address the land degradation concerns and increase productivity. They included improved seeds of major staples, cover crop seeds, leguminous tree/shrubs seedlings, fertilisers and direct seeding implements.

Budget, Expenditure and Milestones

The total project budget is USD 2.7 million, of which USD 1.5 million if funded as grant by IFAD, USD 300,000 by AFD and the rest are contributions in kind from ACT, CIRAD, ICRAF and the IFAD-financed host projects involved in the project. The biggest planned expenditure items were Personnel 28%; Research and technical assistance 18%; and strengthening the organizations 15%. Others cost categories were International visits 12%; Management costs 11%; National students’ fellowships 8%; and Local travel 8%.

At project end, (Table 2), the actual expenditure pattern (with budget targets in brackets) was: Personnel 40.1% (28%); Research and technical assistance 19.0% (18%); and strengthening the organizations 9.8% (15%). Other cost categories were Meetings and International visits 11.2% (12%); Management costs 10.8.0% (11%); National students’ fellowships 4.1% (8%); and Local travel 6.0% (8%).

Timeline (Major Milestones)

Date	Activity
By December 2008	<ul style="list-style-type: none"> ○ ACT WCA/SCAP office in Ouagadougou Burkina Faso acquired and furnished ○ Project launch in Ouagadougou Burkina Faso with all stakeholders in Dec 2008 ○ Project implementation arrangements discussed with key partners and development of MOUs initiated ○ ICRAF and CIRAD scientists attached to SCAP in place
By December 2009	<ul style="list-style-type: none"> ○ SCAP Project Manager, Assistant, and IFAD – host projects contact persons recruited/attached to SCAP, MOUS signed with partners ○ Registration of ACT as an international NGO (Kenya) and in Burkina Faso recognized and tax exempted by the Burkina Faso Government ○ CA/FFS training course and learning visit for the 8 SCAP focal persons at CA sites in East Africa, September 2009. ○ 11 farmers, 4 technicians from Burkina Faso, Guinea and Niger and the SCAP implementation team participated in a training visit organized by CIRAD and Project ESA in Cameroon in October 2009 ○ SCAP scientific and technical Advisory Committee (SCAP-STAC) launched. ○ 43 innovator farmers from 9 villages were selected and supported for the implementation of CA development and validation trials. ○ First tranche (Euro 44,270) of the AFD USD 300,000 contribution to SCAP was received
By December	<ul style="list-style-type: none"> ○ 7 MSc students selected and supported with fellowships to conducted studies in different CA themes.

2010	<ul style="list-style-type: none"> ○ 31 FFS groups established and supported to run CA-demonstration and research operations ○ 24 Extension field Staff trained on CA and FFS approach, and supported FFS groups and Farmers innovators ○ Group analytical and learning sessions conducted with FFS members to draw lessons and explore scenario for replication and dissemination ○ Intra-and inter-village exchange visits organized ○ SCAP coordination meetings (National coordination meeting, scientific and technical advisory Team) held ○ Participatory action research on CA-based farming systems: testing combinations of soil tillage with crop association; potential of trees and shrubs CA-systems ○ The efficiency and sustainability of farmer to farmer extension approach was assessed ○ ACT signed and agreement with the Government of Burkina Faso
By June 2012	<ul style="list-style-type: none"> ○ 19 students (1 PhD, 11 MSc and 7 BSc) selected, supported with fellowships and conducted studies in different CA themes. All but the PhD have completed. ○ 130 farmer innovators supported and are validating/experimenting with different CA options on their farms ○ 35 FFS field school established and validating/experimenting with different CA options in 31 villages ○ 900 farmers directly reached and practicing some components of CA through FFS methodology (770) and the rest 130 being individual farmer innovators. ○ Specific and combined effects of CA principles on crop yield and labour assessed and compared ○ Factors determining the adoption of CA by FFS members identified and analysed ○ End of SCAP phase I – 30th June 2012

Generally, the project has been implemented according to plan; the single exception being a discrepancy in synchronizing project start time with the cropping season. The SCAP work plan runs from July to June, while the rainfall seasons begin in June. The first year (July 2008 to June 2009) of SCAP could therefore not be utilized for on-farm CA validation/experimentation. Thanks due to the no-cost July 2011 to June 2012 extension which enable SCAP Phase 1 attain three cropping seasons out of 3 years.

Another challenge encountered was severe fluctuations and unpredictable rainfall in some training and demonstration sites. This caused poor crop germination and failure in others. The earlier earmarked host project for Guinea (PPDR-HG Guinea) had to be changed for PADER/BGN for the better and as recommended by IFAD. The changeover was a cost of 1 year lost for the project in Guinea. The subsequent insecurity which followed in 2009 impeded smooth operations.

It was clear that comparatively longer term efforts on capacity building was required to instil new CA skills and change the behaviour of the extension staff to embrace the FFS methodology. Most of the National Extension services staff who are ageing have been working with the top-down approach for several decades. The remedial measure was to ask the SCAP focal persons in the IFAD projects to provide additional CA/FFS backstopping to their staff.

At the farmer level, limited supply of cover crop seeds, agroforestry trees and shrubs seeds/seedlings and restricted availability of CA implements have sometimes affected implementation.

Achievements

Against the targets established under the four immediate objectives, the following have been achieved:

- A total of 35 FFS groups (22 in Burkina Faso, 8 in Niger and 5 in Guinea) with over 770 members have been formed to date in 31 villages, it being 83% of the project target.
- An additional 130 farmer innovators (30% women) have been experimenting/validating preferred CA options in their individual farmers.
- 80% of the targeted farmers in SCAP have taken up at least one components of CA in their own farms. The proportion of targeted farmers adopting individual CA components has increased: by 35.1% (from 15.7%) for direct seeding; by 77.2% (up from 3.5%) for soil cover and by 42.1% (up from 41.6%) for crop rotations. Average area under CA for adopters is 0.6 ha, it being about 15.6% of the cultivated area.
- Intercropping increases labour and causes a decrease (11%, not statistically significant) of sorghum yield. Sorghum yield is increased with increasing amount of soil cover. However, intercropping increases land and labour productivity (Annex 14-1).
- Economic performances of CA systems developed were 50 to 100% higher than that of conventional farming, cereal yield in CA fields is 15 - 40% higher than in conventional agriculture fields.
- Direct seeding applied solely had a negative effect on both technical and economic results except for labour where a slight reduction was noted. Results obtained under direct seeding can be improved if ground covered is achieved. These results tend to confirm the importance of applying simultaneously the three CA principles.
- 120 purposefully selected FFS members were re-trained to become CA trainers of other farmers.
- Indigenous knowledge on use of native trees & shrubs (*Faidherbia albida*, *Prosopis africana*, *Hyphaene thebaïca*, *Piliostigma reticulatum*) was synthesised and integrated as option amongst the CA /agroforestry options being validated
- 90 farmers from two of the 4 SCAP Project sites have formed 3 voluntary CBOs. Capacity building support is being provided to link them to other networks and enable them provide CA services.
- A SCAP dedicated web-page (<http://scap.act-africa.org>) was established within the ACT website and is effectively linking many CA partners including farmer networks. The website hosts an e-resource centre for all of the referred annexes in this document.
- 12 field days conducted whereby 800 farmers attended; 7 exchange visits (including those to Tanzania and Cameroon) conducted; local and international training/workshops (e.g. on the analysis of root systems and intercropping); SCAP stakeholders participation in related workshops, conferences and seminars convened by others for sharing experiences; print materials (leaflets, brochures, training manuals); videos .
- The African Conservation Tillage Network (ACT) has become, as a result of the support of IFAD through SCAP (and FAO through CA-SARD), a key player in a number of CA initiatives in the region and beyond. These include: CA2AFRICA⁶ project funded by EU and led by CIRAD; ABACO⁷ project, funded by EU, led by ACT and operating in 6 African countries involving 9 North-South and South-South partners; and the international training courses on CA conducted in each ACT sub-region annually.
- With support of COMESA and CAADP/NEPAD, ACT has and continues to participate in building the capacity of national Governments to promote and attract investments for CA. It is a founder member of the continental NEPAD-CAADP Agriculture - Climate Change Special Management Team and sits in the COMESA Technical Committee. ACT has participated in

⁶ Conservation Agriculture in AFRICA: Analysing and Foreseeing its Impact - Comprehending its Adoption

⁷ Agro-ecology based aggradation-conservation agriculture

developing CA investment proposals for the Governments of Kenya, Tanzania, Zimbabwe, and Southern Sudan.

Impacts

- SCAP has resulted to several behavioural, economic and technical impacts to the farming communities, the extension and service providers. The monitoring and evaluation data suggests implementation of CA systems developed will lead to increases in food security, farm income and soil health (soil aggradation), and crop yields for CA adopters which however need to be qualified through an impact assessment.
- Based on the positive beneficial results of the SCAP project, the newly developed IFAD-financed project in Niger (PASADEM⁸) and the proposed project for Burkina Faso (Neer Tamba) have in-built components to scale out conservation agriculture. The Catholic Relief Services (CRS) and UGCPA/BM⁹ (a farmer organization supported by FARM¹⁰) are partners receiving technical backstopping from ACT and who have introduced and are financing CA initiatives in the region.
- The capacity of ACT to promote CA in Africa has greatly been enhanced with support of IFAD through SCAP. In addition to the Nairobi headquarters, ACT has since 2008 opened the West and Central Africa sub-regional office in Ouagadougou Burkina Faso, the East and Horn of Africa office in Dar es Salaam Tanzania and re-opened the ACT Southern Africa office in Harare. The number of permanent staff has increased from 2 to 17 (8 international) and from managing one conservation agriculture project to five.

Challenges and constraints

Despite exceeding most of the project targets, a number of challenges have been encountered:

1. Initial inertia and suspicion from the IFAD host project partners on what really SCAP was meant to do. It took an almost one year for the IFAD host projects to appreciate that SCAP was adding value to whatever they were doing, complementing rather than compete for project resources and to eventually sign MOUs and embrace SCAP/ACT's roles.
2. More time and concerted effort was required to change behaviour of CA/FFS TOTs to embrace CA. The majority are unmotivated Government extension officers who have worked with top-down extension systems all their careers.
3. Competition for crop residues between soil cover and other uses such as livestock fodder, building materials, fuel and handcrafts remains a major problem. Shrubs and trees are playing a complementing role. More science and farmer innovations' validation is required to optimise agronomic specifications.
4. Insecurity in Guinea delayed, for almost one season, experimentation to validate the best practices and benefits of CA under different farming systems.

Proposed Way Forward

1. The triple win (food security – curbing land degradation – climate change adaptation/mitigation) attributes of conservation agriculture as successfully demonstrated by the SCAP adopters warrant further support by IFAD for scaling up adoption to reach more farmers and in many more WCA countries. This is also essential to ensure that the momentum of existing adopters is not wasted, but nurtured to increase to a critical mass of adopters capable of attracting private sector service providers. The Burkina Faso, Niger and Guinea Governments should support scaling up CA through the countries' climate

⁸ Projet d'appui à la Sécurité alimentaire et au Développement de la région de Maradi

⁹ Union des Groupements pour la Commercialisation des Produits agricoles de la Boucle du Mouhoun (UGCPA/BM)

¹⁰ FARM : Fondation pour l'Agriculture et la Ruralité dans le Monde

smart agriculture investment programmes linked with ECOWAS and AU-NEPAD/CAADP.

2. The IFAD should support ACT and partners for an additional 5 years funded phase whose focus should be:
 - To document the success stories as CA scaling up models in Burkina Faso, Niger and Guinea,
 - Extended on-farm validation/experimentation is needed to quantify the variability of the CA adoption benefits with time, under different agro-ecologies, and different CA management options;
 - To build farmer and service provider capacity to tackle inadequately addressed challenges from the ended phase of SCAP and those likely to emerge as adoption intensifies and scales out;
 - To strengthen capacities of local communities to develop necessary collective and technical innovations (land management, access and management of crop residue) to foster the adoption of CA;
 - Support establishment at the ECOWAS level, a climate smart agriculture task force to champion adaptation and massive adoption of conservation agriculture. Coordination, knowledge management, communication and peer review will be some of their key functions.
3. ACT, CIRAD and ICRAF should seek for partnerships to assess, synthesize, package and publish for wider sharing the findings of SCAP. The evidence-based project findings should assist in the advocacy and lobby for policy changes that support scaling up of CA /Climate Smart agriculture in WCA. Salient issues include: introducing CA in national extension systems; uptake of CA in curriculum of colleges and universities; attracting private sector and development partners' investment funding for CA.
4. Livestock keeping should be integrated as part and parcel of future CA packages to be promoted in WCA to ensure that they are addressed as part of the solution to scale up beneficial CA rather than the problem. Furthermore, livestock would enable efficient utilisation of household labour for an equal part of the year when crop production is not taking place. Livestock would also provide much needed nutrition, power for traction and manure.

RESUME EXECUTIF

Contexte

Face à la baisse de la productivité de leurs systèmes de production, la dégradation de l'environnement, la variabilité et les changements climatiques, les agriculteurs d'Afrique de l'Ouest et du Centre (AOC) sont à la recherche d'alternatives pour assurer la sécurité alimentaire et la durabilité de leurs activités.

Le projet Promotion de l'agriculture de conservation pour les petits producteurs d'Afrique de l'Ouest et du Centre (SCAP) a été conçu pour explorer le potentiel et identifier les modalités de la mise en œuvre des pratiques agricoles basées sur l'agriculture de conservation (AC) comme un moyen d'améliorer durablement la productivité des ressources naturelles et les conditions de vie des producteurs.

L'objectif global du projet SCAP était de réduire la pauvreté rurale, améliorer la sécurité alimentaire, préserver les terres agricoles et les ressources en eau, et favoriser la croissance économique grâce à l'amélioration durable de la productivité des agroécosystèmes d'AOC, à partir d'un meilleur accès des communautés rurales pauvres aux alternatives techniques inspirées des principes de l'agriculture de conservation, avec une attention particulière sur des sites sélectionnés au Burkina Faso, en Guinée et au Niger.

L'agriculture de conservation (AC) est un concept qui regroupe des systèmes de cultures économes en ressources qui visent à assurer des niveaux de production élevés, soutenus et à faible coût tout en contribuant en même temps à la conservation de l'environnement. L'AC repose sur l'application simultanée de trois principes fondamentaux au niveau de la parcelle : (a) un travail minimal du sol en permanence avec élimination totale du labour dans la mesure du possible ; (b) couverture permanente du sol en utilisant des plantes de couverture ou des résidus de cultures et ; (c) la diversification des rotations ou des associations culturales. Les intrants externes comme les produits agrochimiques et les nutriments d'origine minérale ou organique sont appliqués de façon optimale et, avec des quantités et des pratiques qui ne vont pas interférer avec les processus biologiques.

En 2012, on comptait environ 125 millions¹¹ d'hectares en AC dans le monde entier. La majorité de ces superficies se trouvent aux États-Unis d'Amérique, au Brésil, en Argentine et au Paraguay. L'Afrique compte moins d'un million d'hectares. Les superficies en AC augmentent à un rythme d'environ 6 millions d'hectares par an. Ces données montrent que l'AC peut devenir le principal mode de production dans une diversité d'environnements.

Objectifs du projet

L'objectif de développement du projet SCAP était d'augmenter la productivité et d'améliorer la durabilité des ressources naturelles en AOC, comme un moyen de réduire la pauvreté rurale et d'améliorer l'accès des ruraux pauvres à la technologie et aux ressources naturelles comme la terre et l'eau.

¹¹ Friedrich, T., Derpsch, R., Kassam, A. (2012). Overview of the Global Spread of Conservation Agriculture. *Field Actions Science Reports*. [Online], Special Issue 6 | 2012, Online since 06 November 2012, Connection on 06 November 2012. URL : <http://factsreports.revues.org/1941> (Accessed on 21st December 2012)

Cet objectif global était décliné en quatre objectifs spécifiques :

1. renforcer les capacités des communautés rurales pauvres pour identifier, évaluer et adapter les pratiques agricoles, d'élevage, de gestion des ressources et des systèmes de cultures en harmonie avec les principes de l'AC, et qui sont compatibles avec les conditions socio-économiques et environnementales locales et, reposant sur les savoirs et les compétences locales (construction des systèmes de cultures) ;
2. promouvoir le réseautage parmi les producteurs innovateurs comme un moyen d'adapter et d'accélérer l'utilisation généralisée de nouvelles pratiques agricoles (réseaux de producteurs innovateurs) ;
3. élargir les références et les options techniques parmi lesquelles les communautés et les producteurs innovateurs peuvent choisir, au travers le partage des connaissances sur les pratiques de gestion durable des ressources naturelles et d'AC, y compris les pratiques utilisées dans d'autres communautés voire d'autres régions (gestion et partage des connaissances) ;
4. Renforcer les mécanismes institutionnels, dont la consolidation du Réseau ACT, comme un moyen de faciliter le partage des connaissances et, l'évaluation participative et communautaire des pratiques d'AC dans la région (renforcement des capacités).

Gouvernance du projet

SCAP est un projet sous-régional et multipartite dont les principaux acteurs responsables de la mise en œuvre sont ACT, le CIRAD, l'ICRAF et quatre projets nationaux d'investissements du FIDA. La gouvernance et le dispositif pour la mise en place de SCAP comprend trois principales composantes à savoir : le secrétariat de ACT ; le comité consultatif scientifique et technique et, l'Equipe technique du projet. L'ensemble des trois composantes fonctionnent avec des responsabilités spécifiques mais complémentaires.

ACT à travers son Secrétariat basé à Nairobi-Kenya a été responsable de la coordination générale et de la gestion du projet. Le Secrétariat d'ACT a assuré la responsabilité de la gestion globale du projet selon les échéanciers prévus et a veiller à la cohérence des activités du projet et à la production d'un travail de qualité conformément aux objectifs visés par le projet. Pendant la première phase du projet, l'ICRAF en plus de son rôle de principal partenaire, a apporté l'assistance nécessaire à ACT dans la gestion administrative et financière du projet. Ceci dans un contexte où ACT fait des efforts pour renforcer ses propres capacités comme structure continentale/régionale de promotion de l'agriculture de conservation et donc à mesure de travailler directement avec le FIDA dans la gestion et la mise en œuvre des futurs projets.

L'Equipe technique du projet était composé d'un Coordonnateur¹², membre du personnel de ACT et de deux chercheurs (un respectivement du CIRAD¹³ et de l'ICRAF¹⁴) affecté au projet. Les trois membres ont travaillé avec des compétences sur l'ensemble des trois pays de la zone d'intervention. L'Equipe technique était appuyée par les représentants¹⁵ des quatre projets nationaux d'investissement du FIDA, ces représentants avaient pour mandat de travailler à l'intégration harmonieuse des activités de SCAP dans leurs programmes respectifs. L'Equipe technique rendait compte directement au Secrétariat Exécutif de ACT

¹² Dr Patrice Djamen Nana

¹³ Dr Rabah Lahmar

¹⁴ Dr Andre Babou Bationo

¹⁵ SANKARA Souleymane du PDRD Burkina Faso; BARRY Issa du PICOFA Burkina Faso; SANOHO Sékou du PADER Guinée; et BAGNAN Salifou du PPILDA Niger.

pour la gestion administrative, technique et scientifique du projet sur le terrain. Le Comité scientifique et technique du projet a appuyé la mise en œuvre du projet à travers (i) une revue indépendante et professionnelle de la démarche d'intervention et des réalisations du projet et, (ii) des recommandations sur le plan scientifique, technique et managérial. Ce comité a également assuré la veille en développant des réflexions stratégiques par rapport à la vision du projet et ses aspects sociaux, économiques, techniques, scientifiques et politiques. Le comité scientifique et technique de SCAP était composé de cinq professionnels sélectionnés sur la base de leurs compétences avérées sur les thématiques de recherche et du développement similaires à celles abordées dans le projet SCAP.

Au niveau du village, le projet était mis en œuvre avec la participation effective des agriculteurs innovateurs individuels et des producteurs membres des champs écoles d'agriculture de conservation (CEP-AC) avec l'appui des conseillers agricoles du Ministère de l'Agriculture et sous la direction des points focaux de SCAP dans les projets partenaires financés par le FIDA. Le projet a également travaillé au renforcement des capacités en AC de différents groupes cibles : producteurs, conseillers agricoles, décideurs relevant aussi bien du Ministère de l'Agriculture que du secteur privé.

L'agriculture de conservation est une innovation, son applicabilité dans différents environnements et sa fiabilité sur le plan technique ont été éprouvés dans les petites exploitations agricoles. Les producteurs innovateurs ont surtout été mobilisés pendant la première année du projet avant la mise en place complète des CEP-AC durant la deuxième et la troisième année du projet. En plus des activités d'apprentissage réalisées au travers les CEP-AC, les producteurs ont bénéficié d'intrants nécessaires pour la conduite des tests. Ces intrants comprennent des semences de céréales, des plantes de couverture, des plants de ligneux, des engrais et des équipements de semis.

Budget, dépenses et repères

Le budget total du projet était de 2,7 millions de Dollars US dont 1,5 million sous forme de don du FIDA, 300 000 USD apportés par l'AFD et le reste sous forme de contribution en nature de ACT, CIRAD, ICRAF et les projets d'investissement du FIDA, partenaires de SCAP. La répartition initiale du budget globale prévoyait : personnel (28%) ; recherche et assistance technique (18%) ; appui et renforcement des organisations (15%). Les autres catégories de dépenses incluaient : les rencontres et les voyages internationaux (12%) ; les frais de gestion (11%) ; les bourses aux étudiants nationaux (8%) et les voyages internes (8%).

A la fin du projet (Tableau 2), la répartition des dépenses (les prévisions initiales sont indiquées entre parenthèses) se présentait ainsi qu'il suit : personnel 40,1% (28%) ; recherche et assistance technique 19,0% (18%) ; appui et renforcement des organisations 9,8% (15%). Les autres catégories de dépenses incluaient les rencontres et les voyages internationaux 11,2% (12%) ; les frais de gestion 10,80% (11%) ; les bourses aux étudiants nationaux 4,1% (8%) et ; les voyages internes 6,0% (8%).

Calendrier (principaux repères)

Date	Activités
Décembre 2008	<ul style="list-style-type: none"> Les bureaux de ACT-AOC/SCAP sont acquis et équipés ; Lancement officiel du projet à Ouagadougou (Burkina Faso) avec les principaux acteurs au mois de décembre 2008 ; Les modalités de mise en œuvre du projet ont été discutées avec les principaux partenaires, les conventions de partenariats sont initiées ; Affectation des chercheurs du CIRAD et de l'ICRAF au projet SCAP ;
Décembre 2009	<ul style="list-style-type: none"> Le Coordonnateur du projet SCAP, l'assistante administrative et les points focaux de SCAP dans les projets partenaires du FIDA sont recrutés/désignés ; les conventions sont signés avec les partenaires ; Immatriculation de ACT au Kenya comme une ONG internationale au Kenya et au Burkina Faso ; Session de formation en Tanzanie de huit points focaux de SCAP sur l'AC et l'approche CEP ; Les trois membres de l'Equipe technique de SCAP, 11 producteurs et 4 techniciens venant du Burkina Faso, de Guinée et du Niger ont participé à un voyage d'étude organisé au Nord Cameroun par le CIRAD et le Projet ESA ; Composition du comité scientifique et technique de SCAP (SCAP-STAC) 43 producteurs innovateurs de neuf villages pilotes ont été sélectionnés et appuyés pour conduire des tests AC sur leurs parcelles ;
Au 31 Décembre 2010	<ul style="list-style-type: none"> Signature d'une Convention entre le Gouvernement du Burkina Faso et ACT ; 7 étudiants de niveau Master ont été sélectionnés, ils ont reçu des bourses et l'encadrement scientifique pour réaliser des recherches sur l'AC ; 31 champs écoles des producteurs (CEP) ont été formés et ont reçu l'appui technique et matériel nécessaire pour mettre en œuvre des tests démonstratifs ; 24 facilitateurs des champs écoles des producteurs (CEP) ont été formés sur l'AC et l'approche CEP, ils ont accompagné les producteurs innovateurs et les membres des CEP dans la conduite des tests AC ; Des sessions d'analyse et d'apprentissage avec les membres des champs écoles ont été réalisées afin d'évaluer les systèmes testés et explorer les modalités et scénarios pour la diffusion ; Des visites d'échanges inter et intra-villages ont été organisées ; Les réunions de coordination du projet SCAP ont été organisées (réunion de coordination nationale, réunion du comité scientifique et technique) ; Des opérations de recherche action en partenariat sur des systèmes de culture apparentés à l'AC ont été conduites : évaluation des combinaisons, mode de travail du sol et cultures associées, potentiel des ligneux ; L'efficacité et la durabilité de l'approche de Paysan Formateur (PF) dans la diffusion des techniques de GRN ont été évaluées ;
Au 30 Juin 2012	<ul style="list-style-type: none"> 19 étudiants (1 thèse de doctorat, 11 Masters et 7 licences) ont été sélectionnés et bénéficiés des bourses pour la conduite des recherches sur différents thèmes relatifs à l'AC. En dehors de la thèse de doctorat, toutes les recherches sont achevées ; 130 producteurs innovateurs ont reçu un appui et conduisent des tests AC sur leurs propres parcelles ; 35 champs écoles des producteurs – Agriculture de conservation (CEP-AC) mettent en œuvre des tests et des démonstrations AC dans 31 villages ; 900 producteurs ont participé directement aux tests sur les principes de l'AC à travers l'approche champ école (770 producteurs) et les 130 restant étant des producteurs innovateurs ; Les effets spécifiques et combinés des principes l'AC sur les performances technico-économiques et les besoins en main d'œuvre ont été évalués et comparés ; Les facteurs influençant l'adoption de l'AC par les producteurs membres des CEP-AC et les producteurs innovateurs ont été déterminés et analysés ; Fin de la phase I du projet au 30 juin 2012.

Globalement, le projet a été mis en œuvre conformément aux prévisions, la seule différence étant le décalage entre la date de début du projet et celle de la campagne agricole. En effet, le programme annuel d'activité du projet allait de juillet à juin tandis que la saison des pluies commence au mois de juin. Aussi, il n'a pas été possible de conduire les tests pendant la première année du projet. Néanmoins, la prolongation du projet de juin 2011 à juin 2012 a permis à la première phase de SCAP de couvrir trois campagnes agricoles.

L'irrégularité et le déficit des pluies constituent une autre contrainte majeure rencontrée dans la mise en œuvre du projet. L'irrégularité des pluies a entraîné des mauvaises levées dans certains cas et des échecs complets dans d'autres cas. Le projet partenaire initialement ciblé en Guinée (PPDR-HG) a été remplacé, dans une optique d'amélioration et sur recommandation du FIDA, par le PADER/BGN. Cet ajustement couplé aux troubles sociaux en Guinée au cours de l'année 2009 a retardé le début des activités du projet dans ce site.

Il est apparu clairement que des efforts de renforcement des capacités des conseillers agricoles pour leur permettre de bien maîtriser l'approche champ école des producteurs sont nécessaires sur le long terme. La majorité du personnel de vulgarisation est vieillissant et a longtemps travaillé avec une approche directive pendant plusieurs décennies. La mesure correctrice pour lever cette contrainte était de demander aux points focaux de SCAP d'apporter un suivi rapproché à ces agents.

Au niveau des producteurs, la faible offre locale des semences des plantes de couverture, des plants d'essences agroforestières et des équipements d'agriculture de conservation a affecté négativement la mise en place des tests et les processus d'adoption.

Réalisations

Les résultats suivants ont été obtenus conformément aux quatre objectifs spécifiques du projet :

- 35 (22 au Burkina Faso, 8 au Niger, 5 en Guinée) champs école des producteurs – agriculture de conservation (CEP-AC) ont été mis en place avec 770 producteurs dans 31 villages, soit 87% de réalisation des objectifs du projet ;
- 130 producteurs (30% de femmes) conduisent les tests d'AC sur leurs propres parcelles et partagent leurs expériences avec d'autres producteurs ;
- 80% des producteurs ayant participé aux activités de SCAP appliquent au moins un des trois principes fondamentaux de l'AC dans leurs propres exploitations. La proportion d'agriculteurs cibles qui utilisent les différents principes de l'AC a augmenté: de 15,7% à 35,1% pour le semis direct; de 3,5% à 77,2% pour la couverture du sol et de 41,6% à 42,1% pour la rotation des cultures. La superficie moyenne des parcelles en AC chez les producteurs adoptants est de 0,6 ha, soit 15,6% de la superficie totale cultivée.
- L'association culturale augmente le temps de travail et provoque une diminution (11%, statistiquement non significative) du rendement en sorgho. Le rendement du sorgho augmente avec le taux de couverture du sol. L'association culturale augmente la productivité de la terre et du travail.
- Les performances économiques des systèmes d'AC développés étaient de 50 à 100% plus élevées que celles de l'agriculture conventionnelle, le rendement des céréales en AC est de 15% à 40% plus élevé qu'en agriculture conventionnelle.
- Le semis direct appliqué uniquement sans la couverture du sol a un effet négatif sur les résultats techniques et économiques à l'exception de la main-d'œuvre où une

légère diminution a été notée. Les résultats obtenus en semis direct peuvent être améliorés si le sol est paillé. Ces résultats tendent à confirmer l'importance d'appliquer simultanément les trois principes de l'AC.

- 120 producteurs membres des CEP-AC ont été sélectionnés et formés pour vulgariser l'agriculture de conservation auprès d'autres producteurs ;
- Les savoirs locaux sur l'utilisation des arbres et arbustes indigènes (*Faidherbia albida*, *Prosopis africana*, *Hyphaene thebaica*, *Piliostigma reticulatum*) ont été synthétisés et intégrés dans les systèmes d'AC et d'agroforesterie en cours de développement;
- 90 agriculteurs innovateurs ont formé des organisations communautaires pouvant réaliser des prestations de services. Des efforts sont en cours pour renforcer leurs capacités et celles de leurs organisations afin qu'ils puissent participer efficacement à la promotion de l'agriculture de conservation;
- Une page web (<http://scap.act-africa.org>) dédiée au projet SCAP a été créée dans le site Web de ACT, elle permet de mettre en réseau de nombreux acteurs travaillant sur l'AC, y compris les réseaux d'agriculteurs. Toutes les annexes mentionnées dans le présent document sont disponibles sur la page web de SCAP.
- 12 journées portes ouvertes et des visites commentées ont été organisées avec la participation effective de plus de 800 producteurs ; 7 voyages d'études (y compris en Tanzanie et au Cameroun) ont été organisés ; des sessions locales et internationales de formation (par exemple sur l'analyse du système racinaire) ont été réalisées ; l'Equipe de SCAP a participé à plusieurs rencontres sur la problématique de l'agriculture de conservation.

Grâce au soutien apporté par le FIDA et l'AFD à travers le projet SCAP (et la FAO via le projet CA-SARD), ACT est devenue un acteur clé dans plusieurs initiatives de promotion de l'AC dans la région, voire au-delà. Ces initiatives comprennent notamment : CA2Africa¹⁶, un projet financé par l'Union Européenne et coordonné par le CIRAD ; ABACO¹⁷, projet financé par l'UE, coordonné par ACT et mis en œuvre dans six pays africains avec neuf institutions des pays du Nord et du Sud ; des sessions internationales de formation sur l'AC organisées annuellement par ACT dans les différentes sous-régions de l'Afrique ;

Avec l'appui du COMESA et du PDDAA / NEPAD, ACT a, et continue de participer au renforcement des capacités des gouvernements nationaux de promotion et d'attraction des financements pour l'AC. ACT est membre fondateur de l'Equipe continentale du NEPAD-PDDAA-Agriculture travaillant sur les changements climatiques, ACT siège également au Comité technique du COMESA, et a participé à l'élaboration des projets d'investissement dans l'AC pour les gouvernements du Kenya, de la Tanzanie, du Zimbabwe et du Sud-Soudan.

Impacts

- La mise en œuvre du projet SCAP a généré des impacts tant sur le plan technique, économique et comportemental des acteurs du développement agricole (vulgarisation, prestataires de services). Les données du suivi-évaluation et les performances des systèmes d'AC développés tendent à montrer que la mise en œuvre réussie de ces systèmes aboutira à l'amélioration de la sécurité alimentaire, des revenus, de la fertilité des sols et des rendements des

¹⁶ Conservation Agriculture in AFRICA: Analysing and Foreseeing its Impact - Comprehending its Adoption

¹⁷ Agro-ecology based aggradation-conservation agriculture

producteurs adoptants. Ce résultat attendu doit toutefois être vérifié à travers une évaluation d'impact du projet.

- Sur la base des résultats positifs du projet SCAP, de nouveaux projets financés par le FIDA au Niger (PASADEM¹⁸) et le projet proposé pour le Burkina Faso (*Neer Tamba*) ont intégré l'agriculture de conservation parmi les techniques à vulgariser pour améliorer la durabilité des systèmes de production. Catholic Relief Services (CRS) et UGCPA / BM¹⁹ (une organisation de producteurs bénéficiant du soutien de FARM²⁰) sont des partenaires qui reçoivent l'appui technique de ACT dans la mise œuvre des opérations de promotion de l'AC qu'ils financent dans la région.
- La capacité de ACT pour promouvoir l'AC en Afrique s'est significativement améliorée grâce au soutiens apportés par le FIDA et l'AFD dans le cadre du projet SCAP. En plus de son siège à Nairobi, ACT a depuis 2008 ouvert : à Ouagadougou (Burkina Faso) un Bureau sous régional pour l'Afrique de l'Ouest et du Centre ; un Bureau Afrique orientale et Corne de l'Afrique à Dar es Salam (Tanzanie). Par ailleurs, le Bureau pour l'Afrique australe à Harare (Zimbabwe) a été rouvert. Le nombre d'employés permanents a augmenté de 2 à 17 (dont 8 internationaux), le portefeuille des projets d'AC gérés est passé de un à cinq.

Défis et contraintes

La majorité des objectifs du projet ont été dépassés, mais certaines contraintes ont été rencontrées pendant la durée de vie du projet :

- les inquiétudes initiales des projets d'investissements du FIDA qui s'interrogeaient sur les objectifs et la démarche d'intervention du projet SCAP. Il a fallu à peu près une année aux projets d'investissements pour bien apprécier la plus-value potentielle que le projet SCAP pouvait apporter à ce qu'ils faisaient déjà, et de voir plus nettement qu'il s'agissait plutôt de développer des complémentarités dont la réalisation ne devait pas affecter leurs ressources financières. Cette clarification des rôles a abouti à la signature des conventions de collaboration déclinées annuellement en protocole d'exécution avec une précision du rôle de ACT / projet SCAP.
- Il a fallu du temps et beaucoup d'efforts pour faire évoluer les démarches d'intervention des vulgarisateurs et des facilitateurs des champs écoles et les amener à maîtriser le concept d'agriculture de conservation et à utiliser les approches participatives. La majorité d'entre eux étaient des agents du service public de vulgarisation agricole qui ont travaillé pendant de longues années avec une approche directive.
- La compétition pour l'utilisation des résidus de récolte pour la couverture du sol ou d'autres usages comme l'alimentation des animaux, l'artisanat, l'énergie reste une contrainte majeure. Les arbres et les arbustes jouent un rôle important pour l'apport de la paille complémentaire et la réduction de la pression sur les résidus de récolte. Des recherches approfondies et la validation des savoirs locaux sont nécessaires pour préciser les modalités d'intégration des ligneux dans les systèmes d'AC.
- La situation politique en Guinée en 2009, a retardé d'une année le début des opérations d'expérimentation pour valider les bonnes pratiques et les bénéfices de l'AC dans différents systèmes de production.

¹⁸ Projet d'appui à la Sécurité alimentaire et au Développement de la région de Maradi

¹⁹ Union des Groupements pour la Commercialisation des Produits agricoles de la Boucle du Mouhoun (UGCPA/BM)

²⁰ FARM : Fondation pour l'Agriculture et la Ruralité dans le Monde

Perspectives

1. Le triple bénéfice (sécurité alimentaire – aggradation de la fertilité des sols – adaptation / atténuation des effets des changements climatiques) de l'AC comme démontré avec succès par les producteurs adoptants AC de la zone du projet SCAP justifie un soutien supplémentaire par le FIDA et de l'AFD pour soutenir l'adoption afin d'atteindre davantage de paysans et plus de pays de l'AOC. Ceci est également essentiel pour veiller à ce que la dynamique d'adoption ne s'arrête pas, mais se renforce pour toucher une masse critique de producteurs, susceptibles d'attirer les prestataires de services privés. Il est important que les gouvernements du Burkina Faso, de la Guinée et du Niger soutiennent la diffusion de l'AC à travers les programmes nationaux de lutte contre les changements climatiques en lien avec la CEDEAO et l'UA-NEPAD/PDDAA.
2. Il est souhaitable que le FIDA appuie ACT et ses partenaires pour la mise en œuvre d'une seconde phase d'une durée de 5 années avec pour principaux objectifs :
 - Documenter les expériences réussies d'adoption de l'AC au Burkina Faso, Guinée et Niger pour alimenter la stratégie de diffusion de l'AC ;
 - Finaliser les opérations de recherche action pour quantifier les effets de l'AC, leur évolution dans le temps et dans différents contextes agroécologiques et de pratiques de gestion ;
 - Développer les capacités des producteurs et des fournisseurs de services pour trouver des solutions aux défis non totalement relevés pendant la première phase de SCAP et ceux susceptibles d'émerger avec l'augmentation de l'intensité d'adoption et la diffusion de l'AC ;
 - Renforcer les capacités des communautés locales à développer des innovations collectives aussi bien techniques qu'organisationnelles (gestion de l'espace et des résidus de récolte etc.) nécessaires pour faciliter l'adoption des systèmes d'AC ;
 - Appuyer la mise en place au niveau de la CEDEAO d'une cellule spécialisée sur les changements climatiques pour soutenir les opérations d'adaptation et les dynamiques d'adoption de l'agriculture de conservation. Les principales activités de cette cellule porteront entre autres sur la coordination, la gestion des connaissances et l'évaluation par les pairs.
3. ACT, le CIRAD et l'ICRAF doivent développer d'autres partenariats pour évaluer, synthétiser, éditer et publier les résultats du projet SCAP. Les résultats innovants du projet seront très utiles pour le plaidoyer en faveur des politiques qui promeuvent davantage l'AC et les techniques agricoles pour l'adaptation aux changements climatiques en AOC. Les principaux axes à développer comprennent : l'introduction de l'AC dans les options techniques vulgarisées par les services de conseil agricole ; la prise en compte de l'AC dans les programmes des établissements secondaires et universitaires de formation agricole ; l'incitation du secteur privé et des partenaires de développement à financer davantage l'AC.
4. L'élevage doit être mieux pris en compte en tant que partie intégrante des systèmes d'AC promus en AOC, ceci permettrait de le considérer lors des opérations de vulgarisation de l'AC comme un des bénéfices de l'AC et non plus comme une contrainte. Par ailleurs, l'élevage peut permettre une utilisation plus efficace de la main d'œuvre familiale notamment pendant l'intersaison. Il peut en outre jouer un rôle important dans l'alimentation de l'exploitant et de sa famille, la couverture des besoins en force de travail et la production de fumure pour la fertilisation des sols.

1. SCAP MONITORING AND EVALUATION MATRIX

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
Improved livelihood and sustainable socio-economic growth among rural communities in WCA	<ul style="list-style-type: none"> • Area under CA • Existing strategies and initiatives for the dissemination of CA • Percentage of target farmers practicing CA • Yield improvement between CA and conventional farming 	<ul style="list-style-type: none"> • Four categories of locally-adapted CA-based practices developed and validated • Economic benefits of CA 50-100% higher than that of the conventional system. • Cereal yield in CA fields is up by 15 - 40% higher than in conventional agriculture fields • 80% of involved farmers are implementing one or all CA principles on their plots. Area under CA has increased from 0 to 15.4% (0.6 ha) in farms during the project lifetime • Governments of Burkina Faso and Niger empowered and promoting CA through IFAD loan projects (fourth coming phase of PDRD and PICOFA in Burkina Faso; PPILDA/PASADEM in Niger) and pilot experiences being implemented by field extension staff of the MOA 	<ul style="list-style-type: none"> • SCAP progress report (Annex 1) • Copies of document on forth coming phase of PPILDA and PDRD/PICOFA (Annex 2) • Research report on pre-adoption of CA in SCAP (Annex 3)
<u>Purpose:</u> To stimulate and facilitate community bases processes in which the target rural communities (including the poor and disadvantaged) are empowered to innovate and sustain conservation agriculture farming practices	<ul style="list-style-type: none"> • Number of FFS groups established and functional • Report on the synthesis and assessment of CA systems developed • N° of new initiatives targeting the promotion of CA 	<ul style="list-style-type: none"> • 35 CA-FFS groups established and functioning • 215 farmers innovators practicing CA on their own plots and sharing experience with other farmers • CA systems assessed and synthesized for sharing using university students, consultants and the SCAP implementation team. • Three NGOs are engaged on the promotion of CA with their own funds as a trickle-down effect of SCAP • Four rural development and research projects targeting CA (CA2Africa, ABACO, PASADEM, PDRD & PICOFA) based on SCAP experiences have been developed and are being implemented 	<ul style="list-style-type: none"> • List of FFS groups established (Annex 4) • List of farmer innovators (Annex 5) • Progress reports (Annex 1)

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
OBJECTIVE 1: BUILDING CROPPING SYSTEMS. ENHANCE DEVELOPMENT, ADAPTATION AND WIDE SCALE ADOPTION OF PROFITABLE CONSERVATION AGRICULTURE PRACTICES BY WEST AND CENTRAL AFRICA FARMERS			
Sub-component 1.1: To enable participating farmers experiment with CA using FFS approach and applying adapted CA practices in own plots			
Project villages representative of agro ecological zones in Burkina Faso, Niger and Guinea are identified	<ul style="list-style-type: none"> Criteria elaborated for the selection of pilot villages N° of pilot villages selected 	<ul style="list-style-type: none"> Criteria for selection of project villages were developed with field partners 31 pilot villages selected in the three countries (20 in Burkina Faso, 5 in Guinea and 6 in Niger) District level consultations with agriculture stakeholders conducted 	<ul style="list-style-type: none"> Criteria for the selection of villages (Annex 6) List of selected pilot villages (Annex 7) Report of consultations meetings organized at district level (Annex 8)
Baseline information collected, analyzed and reported	<ul style="list-style-type: none"> N° of report synthesizing baseline information in all project's sites 	<ul style="list-style-type: none"> Four reports on baseline information for each project site were produced 	<ul style="list-style-type: none"> Reports on base line information (Annex 8) Progress reports (Annex 1)
CA-FFS groups established/ identified and ground breaking exercise including diagnostic/ problem analysis conducted	<ul style="list-style-type: none"> N° of sensitization meeting conducted N° of criteria for the selection of FFS members N° of FFS groups established and functional 	<ul style="list-style-type: none"> 31 sensitization meetings were organized in selected villages Five criteria jointly elaborated with farmers and SCAP partners were used to select FFS members 35 FFS groups were established 900 farmers directly benefiting from the project, 180 are farmers innovator 	<ul style="list-style-type: none"> List of farmer innovator (Annex 5) List of FFS groups (Annex 4) List of FFS members (Annex 4)
Sub-component 1.2: To create awareness to farmers on CA/SLM and FFS training support			
Group facilitators are trained on CA and FFS approach	<ul style="list-style-type: none"> N° of FFS facilitators trained N° of training sessions organized for FFS facilitators 	<ul style="list-style-type: none"> 24 FFS group facilitators were identified and trained on CA and FFS approach and management Four training courses organized (one/site). Further training course in Tanzania and a training visit in Northern Cameroon were organized for SCAP Staff and its focal persons in IFAD Loan projects 	<ul style="list-style-type: none"> List of FFS facilitators (Annex 9) Report of training course on CA and FFS management (Annex 10)

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
Farmers more aware and knowledgeable on causes and implications of land degradation	<ul style="list-style-type: none"> • N° of field events organized • N° of training/exchange visit organized • N° of learning sessions conducted 	<ul style="list-style-type: none"> • 12 field days and demonstrations were conducted • Approximately 3,000 participants including farmers, traditional rulers administrative authorities and extension staff attended field days and demonstrations organized in Burkina Faso, Guinea and Niger • Learning sessions were organized weekly in FFS groups 	<ul style="list-style-type: none"> • Progress reports (Annex 50)
FFS groups supported in setting-up and running on-farm experiments	<ul style="list-style-type: none"> • N° of demonstrations and research protocols developed and validated with farmers • type and quantity of farms inputs procured and delivered to FFS groups and innovator farmers to run CA tests and demonstration 	<ul style="list-style-type: none"> • Demonstrations and research protocols adapted to each SCAP site were designed and validated experiments and demonstration protocols with farmers • Seeds of cereal, leguminous crops, cover crops, agroforestry species, fertilizers and herbicides were procured and delivered to farmers according to their needs 	<ul style="list-style-type: none"> • Progress reports (Annex 1) • Research protocols of FFS (Annex 11) • List of farm input procured and delivered to farmers (Annex 12)
Subcomponent 1-3: To carry out adaptive research on CA-based farming in Sahel and WCA Savannah			
Students (BSc, MSc, PhD) attached to SCAP	<ul style="list-style-type: none"> • N° of criteria for the selection of students • N° of research contracts 	<ul style="list-style-type: none"> • Four criteria developed for the selection of students • 19 students (1 PhD, 11 MSc and 7 BSc) selected based on their academic performance, curriculum vitae and level of understanding of the chosen topic 	<ul style="list-style-type: none"> • List, Tors and contract of student internships (Annex 13) • Students research reports and theses (Annex 14)
Conduct in partnerships with NARS action research on locally adapted CA-based cropping systems	<ul style="list-style-type: none"> • N° of MoUs and research contracts with NARS • N° of CA-based cropping developed and validated with farmers • N° of research meeting/event organized 	<ul style="list-style-type: none"> • Three research contracts were signed with research institutions • 19 research contracts signed for students attachment to SCAP • Four categories of CA-systems developed and validated with farmers. Research work included: (i) effects of the interaction between tillage pattern and intercropping, (ii) effects on <i>Guiera Senegalensis</i> and <i>Hyphaene thebaica</i> on soil properties and millet production • One international training session on the analysis of root systems in intercropping cropping systems was organized 	<ul style="list-style-type: none"> • MoUs and research contracts signed with NARS and students (Annex 15) • Workshop report on the analysis of root systems in intercropped cropping systems (Annex 16) • Research reports on effects of the interaction between tillage pattern, intercropping and shrubs on soil properties and millet production (Annex 17)

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
OBJECTIVE 2: FARMER INNOVATOR NETWORK			
TO BUILD MECHANISMS AND SYSTEMS THAT WILL STIMULATE AND SELF-DRIVE/SUSTAIN INITIATED FARMER INNOVATORS NETWORKS			
Sub-component 2.1: To identify, understand and document farmer innovations and innovator networks			
Farmer innovations identified, understood and documented	<ul style="list-style-type: none"> A document synthesizing the SLM and CA-related experiences in WCA 	<ul style="list-style-type: none"> A survey of existing farmers' innovations CA, SLM experiences was conducted in Cameroon in the framework of a collaboration with CIRAD 	Report by CIRAD on SLM / CA experiences in WCA (Annex 18)
SLM technologies and Farmer innovation managed by CBOs/NGOs /GO inventorised	<ul style="list-style-type: none"> Inventory of SLM technologies and farmers innovations managed by CBOs/NGOs/GO 	<ul style="list-style-type: none"> An inventory and analysis of SLM technologies and farmers innovations managed by CBOs/NGOs/GO in PDRD zone was carried out 	<ul style="list-style-type: none"> Report on the characterization of stakeholder of NRM and modalities of their collaboration (Annex 19)
Sub-component 2.2: To strengthen and link farmer innovator networks to enable them champion CA/SLM up/out scaling			
Farmer innovator networks linked to regional and Continental Networks	<ul style="list-style-type: none"> Existence of SCAP Newsletter and dedicated webpage 	<ul style="list-style-type: none"> The SCAP dedicated portal http://scap.act-africa.org/ for knowledge and information sharing has been developed. The portal does also host generated documents for wider sharing with stakeholders. All of the SCAP documents referred to as appendices in this M&E matrix are available in this portal. 	<ul style="list-style-type: none"> Copy of the e-newsletters (Annex 20) Link to the SCAP dedicated webpage : http://scap.act-africa.org/
Innovative mechanisms for the sustenance of networks is developed	<ul style="list-style-type: none"> Report on the assessment of farmer innovators network conducted Propositions to improve the sustainability of farmer innovator network 	<ul style="list-style-type: none"> An analysis of the efficiency and sustainability of farmers innovators/trainers network was conducted 	Report on the assessment of the efficiency and sustainability of farmer trainers approach Annex 21)

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
OBJECTIVE 3 : KNOWLEDGE MANAGEMENT AND SHARING			
TO BUILD INSTITUTIONAL MECHANISMS THAT WILL FOSTER KNOWLEDGE MANAGEMENT AND SHARING			
Sub component 3.1: To build institutional mechanisms to sustain knowledge sharing, foster innovation and scaling up in the region			
Networking dynamics for SLM/CA in WCA consolidated	<ul style="list-style-type: none"> List of MoUs and partnerships agreements signed with organizations working on SLM/CA List continental initiatives/project developed on CA 	<ul style="list-style-type: none"> 8 MoUs and partnerships agreements were signed with SLM/CA organizations including IFAD loan projects, Research, Universities and NGOs Two consultation meetings for CA stakeholders to foster synergies and networking were organized ; Two training and exchange visits organized in Central and East African for Western Africans staff and farmers participating in SCAP 	<ul style="list-style-type: none"> MoUs and partnership agreement ((Annex 23) Report of consultations meetings with stakeholders (Annex 23) List of participants at the workshops (Annex 24) Report of the training visit in North Cameroon (Annex 25; Annex 26) Report of the study visit of SCAP Partners to Nanyuki-Kenya (Annex 27)
Partnerships and structures built to facilitate dialogue between key players	<ul style="list-style-type: none"> Exchange visit organized N° of CA related seminars and symposium attended by SCAP team 	<ul style="list-style-type: none"> Stakeholder exchange visits were organized resulting in collaborative MoUs and contracts with key players Members of SCAP implementation Team have actively participate in 23 CA-related workshops / conferences and seminars convened by stakeholders for sharing experiences 	<ul style="list-style-type: none"> MoUs with key partners (Annex 22) List of workshops attended by members of SCAP implementation Team (Annex 28)
Sub-component 3.2: To establish and make functional active knowledge management basis for distilling, learning and disseminating local and exogenous knowledge			
Evolving knowledge and experiences on CA application captured	<ul style="list-style-type: none"> N° of learning session organized N° of tools developed for data collection and assessment of cropping systems tested and capturing of lessons learned by farmers 	<ul style="list-style-type: none"> FFS facilitators and farmers trained in the monitoring, evaluation and learning (M&E/L) exercise Two grids including one for follow-up and data collection and, the second for the assessment of tested CA systems was developed and used in FFS groups learning meetings were conducted weekly in FFS groups A study was carried out on farmers' assessments of tested 	<ul style="list-style-type: none"> Report of the training of FFS facilitators (Annex 10) Grids for the follow-up of experimentation and data collection and assessment of CA-systems (Annex 29; Annex 30) Report on Farmers assessments

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
		CA systems	of CA-systems (Annex 31)
Relevant CA information and experiences from the region compiled, synthesized and disseminated	<ul style="list-style-type: none"> Report on relevant information on CA in the region 	<ul style="list-style-type: none"> A synthesis on CA innovations and adoption processes in the sub-region and particularly in Northern Cameroon where CA experience is more ancient and is gaining momentum was produced 	<ul style="list-style-type: none"> Report of the synthesis of CA innovations and processes in North Cameroon (Annex 18)
OBJECTIVE 4: CAPACITY BUILDING TO BUILD AND CONSOLIDATE THE CAPACITY OF CONTINENTAL, REGIONAL, NATIONAL AND VILLAGE ORGANIZATIONS/GROUPS IN ENHANCING CA KNOWLEDGE GENERATION AND SHARING			
Sub-component 4.1: To capacitate ACT to function as a CA – NRM networking platform in West, Central and rest of Africa			
ACT WCA branch opened and functioning	<ul style="list-style-type: none"> ACT office premises acquired ACT WCA regional representative and staff recruited Registration of ACT with authorities obtained Financial and technical capacity support to ACT WCA by ICRAF and ACT Nairobi headquarters provided Six accounting reports produced and submitted on time to ICRAF Four ACT Executive Committee and 3 Board meetings held 	<ul style="list-style-type: none"> ACT WCA has its registered offices at 80, rue Soeur Delphine, Ouagadougou Burkina Faso ACT WCA Regional Representative and three support staff have been recruited ACT is registered as a not-for-profit NGO in Burkina Faso and is operating in WCA from this base. The Financial and Administrative systems in ACT WCA have been setup and are operating efficiently. Certified accounting software was procured and installed in ACT Ouaga and Nairobi offices. ACT Executive Secretary and Finance Manager backstopped ACT WCA branch through missions Six half year financial reports have been generated by ACT and submitted to ICRAF Four annual ACT Board meetings and four Executive Committee meetings were held between 2008 and 2011 	<ul style="list-style-type: none"> Office obtained from CILSS in a developed partnership MOU (Annex 32) Advert of the call for applications for the positions, TORs and employment contracts of ACT WCA Staff (Annex 33) Registration Certificate of ACT in Burkina Faso (Annex 34) Copy of Convention between the Gvt of Burkina Faso and ACT (Annex 35) BTORs of ACT ES and Account Manager (Annex 36) Minutes of ACT Board and Executive Committee meetings (Annex 37)
	•	•	•
Office equipment procured	<ul style="list-style-type: none"> Planned equipment procured One project vehicle procured 	<ul style="list-style-type: none"> 6 Computers and accessories; 2 printers, 1 photocopier, 1 fax, 1 multi-media projector were procured 	<ul style="list-style-type: none"> Inventory list of office equipment (Annex 38)

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
		<ul style="list-style-type: none"> One vehicle (Toyota Land Cruiser Prado 11 GJ 5946 IT) has been procured 	
Project staff recruited and trained	<ul style="list-style-type: none"> ACT/ SCAP Project Manager ACT/SCAP Field staff (3) CIRAD/SCAP full time personnel staff ICRAF/SCAP staff Three local support staff Further staff training 	<ul style="list-style-type: none"> Project Manager (Dr Patrice Djamen) was recruited in Feb 2009. SCAP focal persons in the four IFAD Loan projects designated (Souleymane Sankara –PDRD; Sekou Sanoh - PADER-BGN; Issa Barry – PICOFA; Salifou Bagnan – PPILDA) CIRAD scientist (Dr Lamah Rabah) seconded and contracted to SCAP in July 2008. ICRAF scientist (Dr Andre Bationo) was contracted part-time to SCAP in July 2008. Support staff (Judith Koudougou – Admin Assistant; Angeline Dabiré- Accounts Assistant; Etienne Sankima – Office attendant /driver) were recruited Learning visit on CA was organized for 17 participants (including 7 SCAP implementation team members) to Cameroon Learning course /visit on CA and FFS organized for 8 Participants to Karatu Tanzania. 	<ul style="list-style-type: none"> Copies of Duly signed Employment contracts(Annex 33) Copy of implementation arrangement document between SCAP and the IFAD projects partners (Annex 39). Duly signed ACT-CIRAD agreement Annex 40) Duly signed ACT-ICRAF agreement (Annex 41) TORs and Employment Contracts (Annex 33) Cameroon visit report (Annex 25) Learning course proceedings in Karatu / Tanzania (Annex 10)
Students engaged and trained	<ul style="list-style-type: none"> 3 PhD and 9 MSc students supported Studies undertaken in at least three CA fields of Cropping systems, Knowledge Management and Innovator network Number of innovations developed 	<ul style="list-style-type: none"> 19 students (1 PhD, 11 MSc and 7 BSc) were selected, in liaison with SCAP STAT and host Universities, based on endorsed criteria and supported with fellowships. All of the studies have been concluded except the PhD. Studies have been undertaken in Cropping systems (10 students), Knowledge Management (4 students) and Innovator networks (5 students). New knowledge has been generated including: the proof to simultaneously apply the 3 CA principles for optimal crop productivity, profits, and sustenance of the system. 	<ul style="list-style-type: none"> Terms of reference of the student internships (Annex 13) ACT – Universities contracts to support the students Students’ research reports and theses (Annex 14)
Refresher training for ACT staff on key intervention areas	<ul style="list-style-type: none"> Training for 8 SCAP/ACT staff in CA and Monitoring and Evaluation conducted 	<ul style="list-style-type: none"> Training course was organized for 8 SCAP Staff on CA; FFS approach; and Participatory Planning, Monitoring, Evaluation and Learning. 	<ul style="list-style-type: none"> Training curriculum; list of participants and Report of the training course organized in

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
	<ul style="list-style-type: none"> Two international study visits to CA sites conducted Seminars for ACT staff on financial management procedures and reporting 	<ul style="list-style-type: none"> Three members of the SCAP Team participated in a study visit in North Cameroon Two back stopping missions were carried out by ICRAF to ACT WCA and 3 missions by the ACT Finance and Administration Manager 	<ul style="list-style-type: none"> Karatu (Tanzania) in September 2009(Annex 10) Report of the training visit in North Cameroon (Annex 26) BTORs by ICRAF and ACT Finance and Admin Managers to SCAP (Annex 42)
Sub-component 4.2: To enhance farmer groups, associations and networks capabilities and functioning in project implementation			
WCA CA networks (based on ACT and other stakeholders) consolidated	<ul style="list-style-type: none"> No. of FFS linked to region and ACT network No. of FFS networks linked together N° of workshops to discuss role for farmers associations in implementation of SCAP 	<ul style="list-style-type: none"> Further to SCAP, ACT is participating in several other CA and NRM initiatives in WCA (ABACO, CAWT, Bio Carbon Fuel, Programme FASO/CRS) 11 farmers, leaders of farmer groups (from Burkina Faso, Guinea and Niger), 4 technicians and three members of the SCAP Team participated in a study visit in North Cameroon ACT has signed MoUs and contracts with key stakeholders for the promotion of CA Two workshops were organized in Ouahigouya and Fada N’Gourma with farmers organizations and other actors of NRM 215 farmers members of FFS have been retrained and are disseminating CA in their communities 	<ul style="list-style-type: none"> MoUs between ACT and other stakeholder for the promotion of Conservation Agriculture in WCA (ABACO, CAWT, CA2Africa) (Annex 43) List of participants, agenda and report of the training visit in North Cameroon (Annex 44) MoUs and protocols between ACT and IFAD loan projects, INERA and University of Niamey (Annex 46) Reports of workshops organized with farmers organizations and other NRM stakeholders (Annex 23) List of farmers being trained to become trainers; list and details of FFS groups (Annex 45)
OBJECTIVE 5: IMPLEMENTATION AND MANAGEMENT OF THE PROJECT PURPOSE: TO WELL MANAGEMENT THE PROJECT IN CONFORMITY TO AGREED TARGETS			
Project staff recruited	<ul style="list-style-type: none"> Recruit three members of the Project implementation Team; 	<ul style="list-style-type: none"> Project Manager recruited (Dr Patrice Djamen) CIRAD scientist seconded (Dr Lahmar Rabah) ICRAF scientist seconded (Dr Andre B Bationo) 	<ul style="list-style-type: none"> TORs & employment contracts (Annex 33) Agreements between ACT,

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
	support staff and SCAP focal persons in the four IFAD loan projects	<ul style="list-style-type: none"> Support staff recruited (Judith Koudougou – Admin Assistant; Angeline Dabiré- Accounts Assistant; Etienne Sankima – Office attendant/driver) SCAP focal persons in the four IFAD Loan projects designated (Souleymane Sankara –PDRD; Sékou Sanoh - PADER-BGN; Issa Barry –PICOFA; Mahamane Adamou –PPILDA) 	CIRAD and ICRAF for the secondment of their scientists (Annex 40 & Annex 41)
Sub-component 5.1: To conduct steering and coordination meetings			
Stakeholders well-coordinated	<ul style="list-style-type: none"> Grant agreement signed Conduct project inception workshop N° of coordination meetings organized N° of MoUs & implementation agreements signed between key project partners Implementation protocol between SCAP and its field partners 	<ul style="list-style-type: none"> SCAP grant agreement signed An inception workshop with project stakeholders was conducted Two SCAP steering committee meetings were held at the launch of the project (Dec. 2008) and at mid-term of the project (April 2010). ACT signed two MoUs with CIRAD and ICRAF Four MoUs and annual implementation agreement signed between SCAP and four IFAD loan projects Coordination meetings between implementation team and national partners were held 	<ul style="list-style-type: none"> SCAP grant agreement (Annex 47). Annex 46. MoUs and protocols between ACT, IFAD loan projects and other SCAP implementation partners Annex 47SCAP KOM and orientation report (Annex 48) Report of the Inception meeting (Annex 49) Copy of duly signed MoUs with partners (Annex 46) Stakeholder meeting report held in March 2010 (Annex 23) Progress report (Annex 1)
Sub-component 5.2: To produce quarterly / annual financial, management and technical reports			
Financial and management reports produced	<ul style="list-style-type: none"> No. of reports produced by date Number of audit queries Audit reports produced 	<ul style="list-style-type: none"> Five technical and financial progress reports were produced and circulated. 	<ul style="list-style-type: none"> Copies of technical and financial progress reports produced (Annex 50).
Project performance monitored as scheduled and feedback utilized to improve performance	<ul style="list-style-type: none"> Efficient use of project resources Farmers evaluate CA options at field and farm level Form the SCAP Scientific and 	<ul style="list-style-type: none"> Implementation protocol between SCAP and its field partners AESA exercises carried out in all CA-FFS groups enabled farmers to develop indicators and evaluate tested CA options SCAP Scientific and Technical Advisory Team constituting 	<ul style="list-style-type: none"> MoUs and implementation protocols signed between SCAP and its IFAD loan projects (Annex 46) Report on farmers indicators for the assessments of CA-systems

Narrative summary	Objectively verifiable indicators	Results / achievements	Means of verification
	<p>Technical Team (SCAP STAT) and utilize their feedback to improve performance</p> <ul style="list-style-type: none"> Facilitate Mid-Term review and final external evaluation of the project 	<p>of five professional members was formed and two meetings held</p> <ul style="list-style-type: none"> MTR and external M&E were planned but postponed due to insecurity in host countries and other reasons. 	<p>(Annex 31)</p> <ul style="list-style-type: none"> Report of the SCAP STAT meeting (Annex 51)

2. BACKGROUND, OBJECTIVES AND INSTITUTIONAL ARRANGEMENTS

2.1. BACKGROUND AND JUSTIFICATION

In West Africa and Central Africa (WCA), agriculture remains the main source of income for the population. It contributes significantly to national economy of countries of the sub-region. However, the agricultural sector is facing several challenges, including population growth, urbanization, pressure on natural resources (soil, water, and biodiversity), climate hazards and their impact on agricultural production.

Advances in production techniques have been recorded during recent years, but the current agricultural production systems are less productive and competitive, they cannot meet the emerging challenges. Prices of farm inputs are increasing despite some governmental efforts to subsidize and make them more available and accessible to farmers. Food security is not yet assured. Cereals are among the main crops, but every year huge quantities of rice, maize or wheat are imported to meet the deficit of the local production. Market failures of agricultural products result in dramatic social unrest such as hunger riots recorded in 2008 in several African countries. It is estimated that a fivefold increase by 2050 of agricultural production in Africa will be necessary to meet the demand for food. Thus, the major challenge of West and Central Africa (WCA) countries is to sustainably increase agricultural productivity which will thus lead food availability, while preserving natural resources and reducing poverty (FIDA, 2001). Indeed, efforts to improve agricultural productivity should not be detrimental to natural resources, with phenomenon such as deforestation or accentuation of water and wind erosion of soils.

Agricultural development actors are increasingly aware of the reality of the effects of climate change and the need to find new production techniques more protective of natural resources. Further to indigenous techniques developed by farmers, agricultural development stakeholders including ministries, NGOs, research centres, community based organizations etc. began since several years testing and implementing a number of soil and water conservation (SWC) and agroforestry practices/techniques aimed at mitigating land degradation and rehabilitating degraded soils. These techniques have been a craze among some farmers who are knowledgeable of their benefits, but it appears that results obtained so far must be consolidated and improved. The International Fund for Agricultural Development (IFAD), through its investment research and development (R&D) projects, played an active role in the promotion of selected SWC techniques, including *zai* (in Burkina Faso), *tassa* (in Niger), semi-circular hoops (*demi-lunes*), stone ridges, options for natural tree regeneration, and the establishment of pastoral corridors. Many farming communities have fully incorporated these practices into their land management systems, and continue to provide the labour needed for their maintenance.

Conservation agriculture (CA) emerged in recent years as an alternative that can allow farmers to meet the challenges of sustainability of their practices and the fight against poverty and food insecurity (FAO, 2008²¹). The successful implementation of CA can generate various kinds of benefits including

²¹ FAO, 2008. Conservation Agriculture. <http://www.fao.org/ag/ca/index.html>

socioeconomic (stable or even increasing yields, simplifying the equipment used, reduction of labour requirements and cost of production, improvement of livelihood); agronomic (increase the rate of soil organic matter, improved physicochemical properties and biological activity of the soil, increase soil fertility) and environmental (soil protection against erosion, carbon sequestration, reduction of pollution, maintenance or increasing biodiversity).

CA is a generic concept that refers to a family of cropping systems in which three fundamental principles are implemented simultaneously at plot level (Dumansky *et al.*, 2006²²; FAO, 2008): minimum tillage, permanent soil cover and diversification of association and / or crop rotation. CA aims to conserve, improve and make better use of natural resources related to the management of soil, water and biological activity. It is not a goal in itself but rather a concept that must be implemented with adaptation according to existing local socioeconomic and agroecological conditions. Although the highest rate of adoption of CA are currently found mainly in areas with highly mechanized large farms (Southern and Northern America, Australia etc.), CA has potential that can be valued for a wide range of farm types in different environments. There is still very little experience in CA in West Africa and Central Africa, like many other parts of the African continent. The contribution of Africa to areas under the CA in the world is estimated at 0.3% (Derpsch and Friedrich, 2009²³).

Despite the delay and the scepticism about the applicability of the CA in the sub-Saharan Africa small holder family farms (Giller *et al.*, 2009²⁴), the potential of this technique remains little explored and valued in West Africa and Centre. The Small holder Conservation Agriculture Promotion (SCAP) in West and Central Africa was designed to fill this gap. This report presents outlines of SCAP implementation and achievements, draws preliminary lessons and proposes pathway to consolidate the momentum that this phase of SCAP has created.

2.2. GOAL AND OBJECTIVES OF SCAP

The general goal of SCAP was to reduce rural poverty, improve food security, conserve agricultural land and water resources, and foster economic growth through sustainable improvements in the productivity of agroecosystems in WCA, through improved access on the part of poor rural communities to technical options inspired by the principles of conservation agriculture, with a primary focus on selected sites in Burkina Faso, Niger and Guinea.

The development objective was to raise the productivity and improve the sustainability of natural resources in WCA, as a way to reduce rural poverty and to improve the rural poor's access to technology and natural resources including land and water.

The development objective of the project was to be achieved through the following four specific objectives:

- i. Strengthen the capacity of poor rural communities to identify, assess and further adapt crop, livestock and resource management practices and cropping systems that are in

²² Dumanski, J., R. Peiretti, J. Benetis, D. McGarry, and C. Pieri. 2006. The paradigm of conservation tillage. *Proc. World Assoc. Soil and Water Conserv.*, P1: 58-64.

²³ Derpsch, D. Friedrich, T. 2009. Global Overview of Conservation Agriculture Adoption. FAO., Rome, 14p.

²⁴ Giller, K. E., Witter, E., Corbeels, M., Tittonell, P. 2009. Conservation agriculture and smallholder farming in Africa: The heretics' view. *Field Crops Res.* (2009), doi: 10.1016/j.fcr.2009.06.017. 12 p

accordance with the principles of conservation agriculture; that are compatible with local environmental, social and economic conditions; and that build on indigenous knowledge and skills. (*Building cropping systems*);

- ii. Foster networking among farmer-innovators as a means of adapting and accelerating the widespread use of suitable new practices. (*farmer-innovators*);
- iii. Expand the range of technical options from which communities and farmer innovators can choose, through sharing knowledge on Natural resource management (NRM) and conservation agriculture practices, including practices used in other communities and even in other regions. (*Knowledge sharing and management*)
- iv. Strengthen institutional mechanisms, including the consolidation of ACT, as a means of fostering knowledge-sharing and community-led assessment of conservation agriculture practices in the region. (*Capacity building*)

2.3. INSTITUTIONAL ARRANGEMENTS

The SCAP is a regional multi-stakeholder programme whose key implementation players are ACT, CIRAD, ICRAF and representatives of the four national IFAD-Loan projects.

African Conservation Tillage Network (ACT) coordinated the implementation of the Project in partnership with CIRAD and ICRAF. These three organizations are the main technical partners. They all have strong specific experience in CA development and dissemination which they will mobilize in complementarity for the achievement of SCAP objectives:

- The African Conservation Tillage network (ACT) promotes and facilitates sharing of information and experiences across sectors, disciplines and geographical boundaries among players and stakeholders involved in promoting adaptation and adoption of conservation farming principles and practices in Africa. ACT is an international association of stakeholders - private, public and NGO sectors, including farmers, input and machinery manufacturers and suppliers, researchers and extensionists - who believe that the adoption of conservation tillage principles and practices in Africa “*can not only reduce but reverse the environmental degradation that is devastating the continent*”. ACT is presently mainly active in Eastern and Southern Africa, but is also involved in development of CA in Ghana. ACT received from the Nairobi congress the mandate to develop a West African Francophone CA initiative.
- The Centre de coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) has been conducting hands-on research on CA for the past 20 years in a host of environments. It is a key partner of CA projects in a variety of countries in the developing world. Specifically in francophone Africa, CIRAD has several partnerships with AFD, specifically in the sudanian zones of Cameroon, Guinea, Mali, and Madagascar and soon in Burkina Faso (dealing with cotton production). A number of research units will be associated to the project: Direct seeding and cover crops, Water management, Livestock systems, UMR System and UMR Innovation and development, among others.
- The World Agroforestry Centre (ICRAF) has invigorated the ancient practice of growing trees on farms, using innovative science for development to transform lives and landscapes.

Our research focuses on four global themes: Land and people, Environmental services, Strengthening institutions and Trees & Markets. The Centre's headquarters are based in Nairobi, with regional centres throughout the developing world in more than 20 countries across Africa, Asia and South America, one of them (Bamako) is directly involved in the SCAP project.

ICRAF's functions in SCAP also included the due and timely performance of all obligations ascribed to it as the formal recipient of the IFAD grant for the SCAP project. Furthermore, ICRAF, additional to its roles and responsibilities as a Project core partner, provided necessary administrative and financial management support to ACT, in ACT's efforts to mainstreaming and strengthening its capabilities as a continental/regional institution on promotion of conservation agriculture, and hence able to eventually engage with IFAD directly on the management and implementation of future Projects.

The SCAP implementation strategy was based on a strong partnership / integration with on-going IFAD financed projects providing infrastructure, selection criteria, a knowledge base and an organizational and institutional basis for this operation. Being the experimentation sites, they provided a basis for comparisons and observations (biophysical, economical and sociological aspects) over time. A regional team and country teams implemented project activities. Four on-going IFAD financed projects in the three project countries (one in Niger, one in Guinea and two in Burkina Faso) are the primary institutional partners in the implementation of the project. The four IFAD financed projects hosted pilot sites and the project directly input to and supports the attainment of development objectives in these projects.

The four IFAD financed projects have been selected as key primary partner institutions as their main agricultural focus and approaches are consistent with the goal and strategies of the SCAP project and as the Country Portfolio Manager (CPM) and project leaders expressed interest in opening "their" project to SCAP. The four IFAD financed projects involved were:

In Burkina Faso:

The Programme de Développement Rural Durable (PDRD) (Sustainable Rural Development Programme)

The programme will assist the target groups (i) in their organizational capacities by empowering the beneficiaries to gain ownership in the planning and management of their own development. (ii) It will help them obtain secure land tenure. The programme involves the implementation of concrete pilot actions to improve land access and tenure rights on land on which agricultural production is hampered because of conflicts and land tenure and (iii) It will enhance the sustainable development of productive capacities by opening up economic opportunities so as to improve the livelihoods and the living conditions of the beneficiaries through: (a) watershed development, protection and management; (b) the intensification and diversification of agricultural production; and (c) support for income generating (iv) The programme is being implemented through village organizations called "comités villageois de gestion des terroirs" (village committees for land resource management), farmers associations and other grass-roots producer groups. The programme will create an enabling environment to strengthen collective action and community involvement. The approach of the programme is

demand driven and participatory and focuses on community-development planning and gender balance. The Programme covers five provinces in the Northern and Central Burkina Faso, with a total area of more than 21.057 km² (8 % of the National territory).

The Community Investment Programme for Agricultural Fertility (PICOFA)

This programme is using a watershed approach with interest in both the upstream and downstream areas of lowlands. It aims to enhance sustainable agricultural productivity through the development and promotion of soil protection and rehabilitation through soil and water conservation techniques, soil restoration, agroforestry and grazing paths. Simultaneously the programme supports income-generating activities, facilitate improved access to credit and land by vulnerable groups (particularly women and rural youths). Among the key aspects in the programme's interventions is, on one hand, water supply, agricultural inputs and equipment supply, and on the other hand, institutional capacity building among farmer organizations, agricultural investments and infrastructure development and maintenance.

In Guinea, The Project for the support of Rural Development in Northern lower Guinea (PADER/BGN)

PADER/BGN is an initiative of the Government of Guinean with its partners. its main objective is to contribute to the improvement of sustainable and equitable food security, incomes and living conditions of rural populations in Northern Lower Guinea. The specific objectives of PADER/BGN are: i) strengthen the capacity of rural populations and those of their organizations; ii) to increase productivity in a sustainable agro-forestry-pasture and iii) to diversify sources of income. Its intervention strategy is based on capacity building of poor rural people and their organizations, improving people's access to financial resources and markets. Hence, the Project is establishing progressively a centre of expertise (technical and socio-economic), responsive to the demands of grassroots communities expressed in the main productive areas including: Sustainable intensification of crop and livestock routes, Facilities and development of lowland rice and their watersheds through agroforestry and reforestation; Promotion of income generating activities (IGA) based on the transformation and valorization of crop and livestock products and livestock, as well as craft activities.

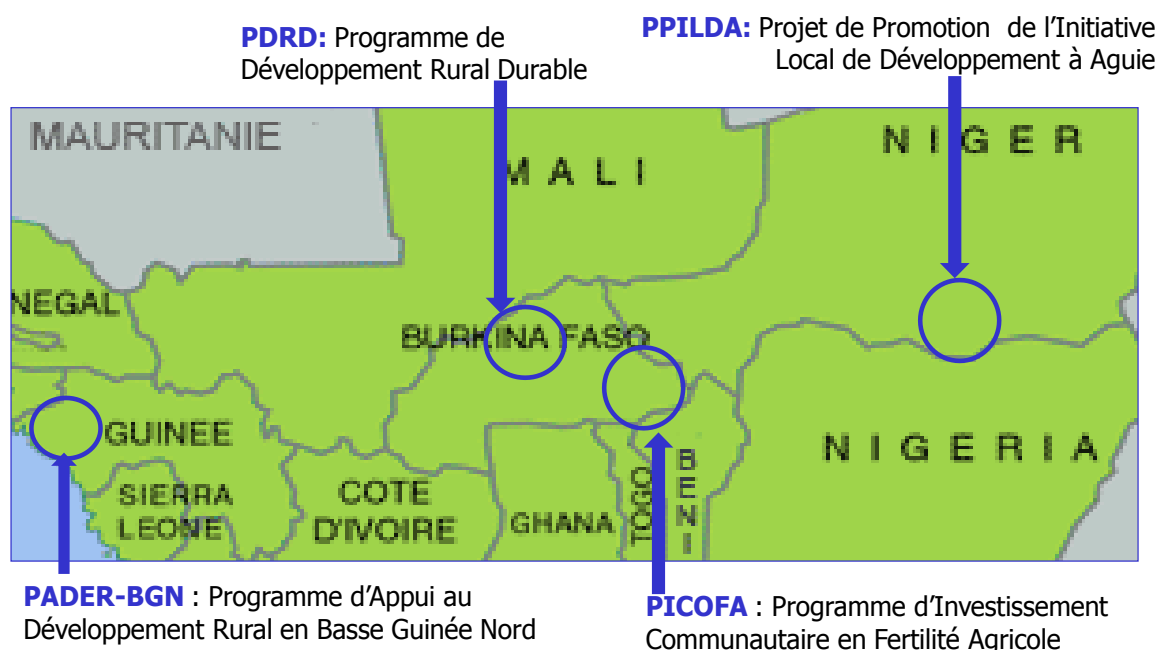


Figure 1. Location of SCAP sites

In **Niger**, the **Project for the Promotion of Local Initiatives for Development in Aguié** targeting those rural farming classified as vulnerable to food insecurity and poor, the programme aims to empower the target rural communities in developing and implementing innovations and initiatives (in technical, economic or organizational areas) that could help reduce poverty, vulnerability and improve their food security. The programme expects to directly reach some 30 000 rural families (over 180 000 persons) including poor women and woman-headed households and the youth. The target communities will be organized and participate through local organizations based either on the concept of the terroir (territory) or upon other rationales (thematic, networking, etc.) and fostered at different levels (such as interest groups, intra- or inter-village, profession).

2.4. BENEFICIARIES

Smallholder farmers were the primary target group of the Project. Special attention was to be given to a second group: vulnerable groups, which might be negatively affected by the adoption of CA practices, e.g. transhumant and sedentary herdsmen, who rely heavily on crop residues for feeding their livestock. Policymakers and other decision makers form a secondary target group. They benefited from the Project by participating in major Project events such as planning seminars, enabling them to more fully understand the potential of CA and related issues, thereby enabling them to bring CA to those fora where higher level food and environmental issues and policies are discussed and decided.

3. RESULTS AND TRENDS

RESULTS

Throughout the project lifetime, a workplan were developed and validated each year. This section presents the majors achievements from the implementation of activities.

35 CA-Farmers' field school (CA-FFS) groups have been established. Four categories of locally-based CA practices have been developed and validated with farmers. Economic performances of CA systems were 50 to 100% higher than that of conventional farming, Cereal yield in CA fields is up by 15 - 40% higher than in conventional agriculture fields. 80% of farmers involved in SCAP are implementing one or all CA principles on their plots. Area under CA has increased from 0 to 15.4% (0.6 ha). Soil and Land Management (SLM) stakeholders were sensitized on CA. Further discussions and negotiations led to the introduction of CA in activities of some organizations contributing to the dissemination of the technology. Existing CA/SLM innovations in West and Central Africa were documented. The efficiency and sustainability of existing farmers' innovator network in the dissemination of SLM technologies were assessed. Learning sessions organized with FFS members and farmers' innovators make farmers more knowledgeable and eager to share their experience hence learning from each other and providing useful information for the technology being developed. The implementation of SCAP led to the consolidation of ACT and its installation in western and Central Africa, hence contributing to the achievement of its pan-African mandate to disseminate CA all over Africa. ACT –WCA office is opened and fully operational both administratively and technically. 19 students were engaged and trained in the framework of SCAP. Refresher training course were conducted for the SCAP implementation team on key interventions areas. Farmers groups had been empowered and participated in the realization of activities, they constitute a nucleus for the dissemination of CA in their communities. 215 farmers' innovators are practicing CA on their own plots and sharing experience with other farmers. SCAP contributed to the empowerment of Governments of Burkina Faso and Niger who are actually engaged in the promotion of CA through IFAD loan projects (forthcoming phase of PDRD and PICOFA in Burkina Faso; PPILDA/PASADEM in Niger) and pilot experiences being implemented by field extension staff of the Ministry of Agriculture.

Comprehensive results for each of the component of the project are presented hereafter.

3.1. COMPONENT 1: BUILDING CROPPING SYSTEMS

DESCRIPTION AND OBJECTIVES

CA principles are well known but their performance and modalities for their application in the context of SCAP study area still to be identified and assessed. Furthermore, the area covered by SCAP is diversified both regarding the agroecological and socioeconomic conditions. This diversity and the existing farming practices have to be considered when building CA-based cropping systems. The strategy used lies on the consideration that that farmers can adopt CA systems only if these systems are efficient but also adapted to their environment. To build such

systems the full participation of farmers is necessary during the whole process which includes the designing, testing and assessment.

The overall **objective** of this component 1 of SCAP was to **strengthen the capacity of poor rural communities to identify, assess and further adapt crop, livestock and resource management practices and cropping systems that are in accordance with the principles of conservation agriculture; that are compatible with local environmental, social and economic conditions; and that build on indigenous knowledge and skills.**

The achievement of this objective entails the selection of pilot villages, representative of the diversity of the study area, the empowerment and involvement of farmers in the process of building CA cropping systems and the realization of CA demonstration and adaptive research operations to design and validate innovative and locally adapted CA-based cropping systems.

ACHIEVEMENTS

A total of 31 villages representative of the diversity of the project study area in Burkina Faso, Guinea and Niger were selected using criteria elaborated with farmers and SCAP's field partners. 35 farmers' field school groups were established and functioning. 24 FFS facilitators were identified and trained on CA and FFS approach. Learning sessions, breakdown exercises and field visit were organized to increase awareness of farmers on causes and consequences of land degradations. Participatory diagnostic of existing cropping, livestock and agroforestry practices were conducted to identify entry points for the development of locally adapted CA-based cropping systems. Protocols for demonstration and action research operations were developed, validated and implemented with farmers through a participatory and iterative process. Adequate support and backstopping were provided to FFS groups and farmers' innovator in setting-up and running of on-farm experiments. Specific researches were conducted on the three components of CA. Specific and combined effects of CA principles were highlighted. Four types of CA-based cropping systems were identified and tested. 80% of farmers involved in SCAP are implementing one or all CA principles on their plots. Factors affecting the pre-adoption of CA were identified.

SUB-COMPONENT 1.1: TO ENABLE PARTICIPATING FARMERS EXPERIMENT WITH CA USING FFS APPROACH AND APPLYING ADAPTED CA PRACTICES IN OWN PLOTS

The full and effective participation of farmers in SCAP activities and more particularly in the building of CA-based cropping systems was a core element of the implementation strategy of the project. After the kick off meeting of the SCAP project held in Ouagadougou in December 2008, the project implementation team conducted field missions in each of the four IFAD loan projects to discuss the administrative and implementation arrangements of SCAP.

Selection of pilot villages was an important point to address as there was the need to take into account the diversity of the project study area. Multiple sites were chosen to sample this diversity and to use it in developing strategies for technology targeting and scaling out. The idea is not to develop a single innovative cropping system that supposedly will be suitable for everyone, but rather to identify options that perform relatively well in some locations relative to others.

The following criteria were developed and used to select pilot villages:

- be situated in the area of the IFAD loan project;
- the village should be easily accessible even in rainy season;

- population of the village should already be aware or participating in SLM operations so as to enable synergies and improve impacts of actions implemented;
- Should be representative of agro-ecological and socioeconomic characteristics of the province;
- Should have farmers groups (FG) well organized and willing/ready to participate in the development and dissemination of technical innovations;
- Should have a good social cohesion, able to select at least one communal plot, available for at least 3 years and easily accessible for testing and demonstration of CA techniques.

Using these criteria, 31 pilot villages were selected (Annex 7, Table 1). The breakdown per country shows that Burkina Faso has the highest number of sites. This is due to the fact that two (PDRD and PICOFA) of the four key SCAP implementation partners are in Burkina Faso. Moreover, the interest of stakeholders to CA increased rapidly and more particularly in PDRD area where all High Commissioners of the five existing Administrative provinces urged SCAP to have at least one village site in their area. The number of pilot villages increased continually during the lifetime of the project: 9 villages in 2009; 25 in 2010 and 31 in 2011. This increase very noticeable in 2010 was due to the growing interest of farmers but also the launch of field activities in Guinea.

Table 1: Breakdown of project villages according to socioeconomic and rainfall zones

Population density -P- (Nb. Inhabitants/km ²)	Rainfall (mm/year)		
	Low (400-600 mm)	Medium (600-1,000 mm)	High (1,000-1,400 mm)
Low : P < 20	X	PICOFA (BF) 2 vill	PADER BGN (Guinea) 2 vill
Medium: 20 < P < 70	PDRD (BF) : 3 vill PPILDA (Niger) : 3vill	PDRD (BF) 4 vill PICOFA (BF) 3 vill	PADER BGN (Guinea) 3 vill
High: P > 70	PDRD (BF) :4 villages PPILDA (Niger) : 3 vill PICOFA (BF) : 2 vill	PICOFA (BF) 2 vill	X

Caption. Vill=village

Rapid and participatory appraisal activities, group meetings with all village stakeholders and further surveys were conducted in all sites to collect baseline information. Data and information gathered on crop, livestock and agroforestry farming systems were analysed allowing the identification of challenges, opportunities and key entry points for the designing and implementation of CA-based farming systems.

Diagnoses of existing farmers groups (FG) in selected villages showed that almost all of them are aiming at social assistance rather than sharing of farming means or experience. Thus they were not yet ready to act as reliable partner in the development of CA systems. The constitution of FFS groups required facilitation and more sensitization meetings on CA either so as to help existing farmers groups to insert CA in their objective, or to help develop specific CA-FFS groups. Farmers who showed interest in SCAP activities (CA/SLM techniques) were urged to constitute themselves into FFS groups and select a communal plot where they will conduct CA operations.

<i>Tasks</i>	<i>Output</i>	<i>Results</i>
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Identify villages representative of the project study area	<ul style="list-style-type: none"> list criteria elaborated for the selection of pilot villages list of villages selected 	<ul style="list-style-type: none"> 31 pilot villages selected in the three countries (20 in Burkina Faso, 5 in Guinea and 6 in Niger) using six criteria
Collect and analyse baseline information	<ul style="list-style-type: none"> report synthesizing baseline information entry points for the development of CA-based cropping systems 	<ul style="list-style-type: none"> rapid rural appraisal activities focused on farmers' farming, livestock and agroforestry practices were carried out in all project sites
Establish CA-FFS groups established and conduct ground breaking exercise	<ul style="list-style-type: none"> list of criteria for the selection of FFS members list of FFS groups established and functional of sensitization meeting conducted report of sensitization meeting conducted 	<ul style="list-style-type: none"> five criteria jointly elaborated with farmers and SCAP partners were used to select FFS members 35 FFS groups were established 900 farmers directly benefiting from the project, 215 are farmers innovator 31 sensitization meetings were organized in selected villages

While the maximum size of a FFS group was set at 25 members so as to allow the smooth running and a good follow-up of the group by the facilitator, the following five basic criteria were used for the selection of members: (i) be an active farmer with own proper farm; (ii) willingness to improve farming practices and to share experience with other farmers; (iii) common interest with other farmers; (iv) living in the same area with other members of the group and; (v) acceptance to participate to efforts (physical, material or financial) required for the functioning of the group.

35 FFS groups (22 in Burkina Faso, 5 in Guinea and 8 in Niger) were established. In some villages (Yilou and Boursouma in PDRD area; Bardakoye and Dan Saga in PPILDA), the high interest showed by population led to the establishment of two FFS groups rather than one as in other villages.

SUB-COMPONENT 1.2: TO CREATE AWARENESS OF FARMERS ON CA/SLM AND FFS TRAINING SUPPORT

24 FFS group facilitators, mostly extension staff of the ministry of agriculture and already working with IFAD loan projects, were identified and trained on CA and FFS approach and management. Training they received make them more knowledge of CA and FFS approach, allowing them to conduct CA learning sessions with farmers and appropriate follow-up of CA demonstrations and research operations. It came out from sensitization meetings and learning sessions that some farmers already are implementing one or several component of CA. However, they were justifying their practices by socio-economic constraints rather than the management of soil fertility.

During the sensitization meetings organized in villages, discussions were conducted with farmers about land degradation and current solutions they are mobilizing to sort this important issue. This was a strategy to increase their awareness on land degradation but also to introduce CA as one of the potential solutions that could help them overcome the problem of land degradation. In addition to sensitization meetings, twelve field days and exchange visits organized on CA plots contributed to increase the awareness of farmers.

The number of women volunteer to the test of CA systems was lower than that of women who attended diagnosis and sensitization meetings. This is probably due to the fact that most of the time, women are not owner of the land they are cultivating and generally, they have to work first of all on the plot of their husband before going to theirs. Nonetheless, it came out that women are one of the main targets for CA operations because most of the time men in crop rotation patterns usually lend to their wives land that is already degraded or very exposed to erosion. Since women grow traditionally legumes like cowpea and groundnuts, they will contribute to the restoration of soil fertility, before being asked to shift to another degraded plot.

Operations were implemented with farmers innovator selected on the basis of: interest for the systems proposed, commitment to follow protocols and agreement to receive from time to time other farmers on their plot to present and discuss CA systems they were testing.

Demonstration and action research protocols were developed and validated with farmers through a participatory and iterative process. Initial protocols were developed from the primary diagnosis carried out during the first year of the project. The following year, protocols were more or less modified according to results of the participatory assessment sessions conducted with farmers. Protocols were implemented both on the farmers' innovator and FFS communal plots.

Training materials such as note book, blackboards, flip charts and scales were provided to all FFS groups. Furthermore, required farm inputs were procured and delivered to FFS groups and farmers innovators. Four types of crop species were used (Table 2): cereal, leguminous plant for human feeding, woody species and cover crops.

In most cases the main crops were cereals but with some specificity per country: sorghum, millet and incidentally maize in Burkina Faso; rice in Guinea and millet in Niger. Cover crops were generally leguminous. Farmers showed a clear preference for multipurpose cover crops with a priority for those that can be used for human feeding. Woody species were used to develop agroforestry systems, biomass production for soil cover and soil fertility (conservation agriculture with trees-CAWT) but also in some case to establish live fences.

Seeds of different crops were procured and delivered to FFS groups and innovator farmers for the implementation of CA demonstrations and experiments. These seeds were procured from Research Centre (INERA-Burkina Faso, ICRAF-Mali), other CA-projects (Projet ESA, Cameroon) and local certified seeds producers.

Table 2. Crops used in CA-related demonstrations and Action Research

Type	Name
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Cereals	Millet (<i>Panicum miliaceum</i>)
	Sorghum (<i>Sorghum bicolor</i>)
	Maize (<i>Zea mays</i>)
	Rice (<i>Oryza sativa</i>)
Leguminous plants for human / animal feeding	Ambérique (<i>Phaseolus aureus</i>)
	Groundnuts (<i>Arachis hypogaea</i>)
	Cowpea (<i>Vigna unguiculata</i>)
	Dolichos (<i>Dolichos lablab</i>)
Woody	<i>Gliricidia sepium</i>
	<i>Piliostigma reticulatum</i>
	<i>Bauhinia rufescens</i>
	<i>Acacia senegalensis</i>
	<i>Acacia nilotica</i>
	Jatropha (<i>Jatropha curcas</i>)
	Pigeon pea (<i>Cajanus cajan</i>)
Cover crops	<i>Ziziphus mucronata</i>
	<i>Crotalaria retusa</i>
	<i>Crotalaria juncea</i>
	<i>Stylosanthes guianensis</i>
	<i>Sytlosanthes hamate</i>
	<i>Brachiaria ruziziensis</i>
	<i>Brachiaria decumbens</i>
	<i>Mucuna deeringiana</i>
	<i>Mucuna cochinchinensis</i>

Diverse types of CA equipment adapted for WCA smallholder were procured from Brazil. All of the CA equipment was distributed to FFS groups to train them on the correct use and maintenance and encourage their use in the FFS test plots and in individual farms. Equipment procured include: Jab planter (Matraca); Single row No-till planter – Animal drawn; Animal drawn ripper; Dibble stick steel point and Mulch roller-crusher. The training demonstrations on correct use of the CA equipment helped to have farmers' preliminary assessments of the equipment.

In addition to seeds and equipment, several other inputs including mineral fertilizers, manure and herbicides were procured and delivered to farmers during the cropping season.

Tasks	Outputs	Results
Train group facilitators on CA and FFS approach	<ul style="list-style-type: none"> List of FFS facilitators trained List of training sessions/visit organized for FFS facilitators 	<ul style="list-style-type: none"> 24 FFS group facilitators were identified and trained on CA and FFS approach and management Four training courses organized (one/site). Further training course in Tanzania and a training visit in Northern Cameroon were organized for SCAP Staff and its focal persons in IFAD Loan projects
Increase awareness of farmers on causes and implications of land degradation	<ul style="list-style-type: none"> Number of learning sessions conducted List of field visit organized List training /exchange visit organized 	<ul style="list-style-type: none"> 12 field days and demonstrations were conducted approximately 3,000 participants including farmers, traditional rulers administrative authorities and extension staff attended field days and demonstrations organized in Burkina Faso, Guinea and Niger learning sessions were organized weekly in FFS groups
Support and backstop FFS groups in setting-up and running on-farm experiments	<ul style="list-style-type: none"> number of tests and demonstrations set conducted list of type of farms inputs procured and delivered to FFS groups and innovator farmers 	<ul style="list-style-type: none"> Demonstrations and research protocols adapted to each SCAP site were designed and validated with farmers Seeds of cereals, leguminous crops, cover crops, agroforestry species, fertilizers and direct seeding equipment were procured and delivered to farmers according to their needs 180 farmers innovators implementing and disseminating CA in their communities

SUBCOMPONENT 1-3: TO CARRY OUT ADAPTIVE RESEARCH ON CA-BASED FARMING IN SAHEL & WCA SAVANNAH

Several studies and adaptive research were conducted to identify CA modalities of implementation of CA principles in WCA and their effects both on technical and economic results of the farm. The key question to answer was which CA systems in which context. The methodology used for the building of CA-based cropping systems includes four main steps:

- **Exploring CA entry points in different contexts:** After the diagnosis, entry points for the building of CA-based cropping systems CA-CS were identified. Entry points were taking into account both the existing challenges in the context, but also opportunities like some CA principles which were already practiced in some area. This is the case of direct seeding which is very common in PPILDA and PDRD zones. A number of technical options were identifies from based on the entry points.

Preliminary and further surveys show that the main challenge facing the development of CA-based cropping systems in SCAP area is the availability of biomass to cover the soil. This and

the onset willingness of SCAP to build on the local knowledge, practices and resources in designing CA systems that are attractive and easily accessible to smallholders led to the following working assumptions:

- i. In the humid areas (rainfall > 900 mm) e.g. southern part of PICOFA zone in Burkina Faso and the whole area covered by PADER-BGN in Guinea, there is room to design “classical” CA-based cropping systems (CS) where cover crops may be grown without hampering development of the main crops;
- ii. In the intermediate areas (rainfall 600-900) e.g. the central zone of PICOFA and the southern zone of PDRD in Burkina Faso there would be room to design “classical” CA-based CS using crop residue. Field observations evidenced that in some locations, millet and sorghum straw remains on soil surface until the end of the dry season;
- iii. In the dry areas (rainfall < 500/700) e.g. Northern PDRD zone and the whole area of PPILDA in Niger, there would be room for designing innovative CA-based CS where soil is covered by trees and shrubs pruning.
- iv. In the two latter situations, there would be room to integrate native technologies of Soil and Water Conservation as zaï pits and other technologies e.g. half-moons, stone lines and ridges that are being promoted by the IFAD loan projects in these regions.

This classification is not rigid as one CA-system might be operational in several zones.

- **Selecting the cropping systems for experimentation:** a participatory process was established to identify the cropping systems to be tested and monitored. Interests and opinions of farmers and also of SCAP partners were considered. In some village, Groups of experimenters with similar objective and constraints, and will agree on the same cropping system to experiment. This was the case of livestock keepers and also of some farmers who were more interested to use fodder crops for soil cover or, in another cases farmers who were already managing to keep crop residue enough to practice direct seeding under mulch.
- **Testing:** Once the cropping systems have been designed, an implementation protocol was developed. Tests were conducted both on FFS communal plots and farmers’ innovator plots. During the season, extension staff breaking the necessary support to farmers and collect data. Furthermore, the SCAP team conduct backstopping and follow-up mission to monitor the evolution of demonstration and research operations.
- **Assessing:** Assessment of cropping systems was carried using a participatory approach to allow the full participation of farmers. Qualitative (observation during the cropping season, farmers appraisal) and quantitative (yield, labour etc.) collected during the cropping season and after harvesting were used to assess the cropping system. The results of the assessments were shared, during field visits, final meetings in villages and discussions with other technician and researcher working on CA.

Tasks	Outputs	Results
Select and attached students (BSc, MSc, PhD) to SCAP	<ul style="list-style-type: none"> List of criteria for the selection of students Research reports with findings on CA related issues in WCA 	<ul style="list-style-type: none"> 19 students (1 PhD, 11 MSc and 7 BSc) selected on their academic performance, curriculum vitae conducted their researches in the framework of SCAP
Conduct in partnerships with NARS action research on locally adapted CA-based cropping systems	<ul style="list-style-type: none"> N° of MoUs and research contracts with NARS and universities List of innovative and locally-adapted CA-based cropping developed List of research meeting/event organized 	<ul style="list-style-type: none"> Three research contracts signed with research institution Four categories of CA-systems developed and validated with farmers One international training session organized on the analysis of root systems in intercropping cropping systems Analysis of pre-adoption of CA-based cropping systems was conducted

ADAPTING PATTERNS OF CA PRINCIPLES

Tillage pattern

- *Tillage pattern on degraded soils*

An experiment was set up with the INERA in an area with low rainfall (Northern Burkina Faso) on the effects of soil tillage pattern on sorghum yield on highly degraded soils. Four tillage patterns were compared:

- Manual zai. Zai is a planting hole dug to improve water harvesting optimum utilization of mineral and/or organic fertilizers; manual zai mean, these pits are dug manually;
- Mechanized zai. Unlike manual zai, planting holes here are dug mechanically using a ripper (IR 12) drawn draught animal (oxen, donkeys);
- ripping, a ripper is used to open a furrow in dry soil using animal traction;
- Half-moon. Half-moon is also a water harvesting technique practiced in arid areas of less than 800 mm annual rainfall. It is based on the collection of water in basins with the shape of half-moons with a catchment area of four meter of diameter. It is usually associated with the use of compost in the basins.

This test was conducted in 2010, and, because of the high rainfall that year, it was not possible to really assess the effects of ½ moons on water management. Nevertheless, the trial showed that ripper and mechanized zai produce higher yield than the traditional manual zai (Table 3).

Table 3: variation of sorghum yield (kg/ha) according to tillage pattern in degraded soils

Tillage pattern	Yield (kg/ha)
Mechanized zai	1,829 a
Ripping (Ripper n°IR12)	1,267 b
Manual zai	1,141 b
Half moon	333 c

Means between treatments in the same study field followed by different letters differ significantly at $p < 0.05$.

All the four patterns tested are techniques for rehabilitation of degraded land. This rehabilitation can be considered as an initial step in the evolution towards a full CA system.

○ *Tillage versus direct seeding*

Further to test conducted in non-productive soil, other tests were carried out in other soil type to compare the traditional tillage to direct seeding. These tests were conducted in semi-arid and sub-humid zones, that are PDRD and PICOFA zones. Results showed that tillage were giving better results than the direct seeding (Table 4). These results were attributed to the poor soil fertility and compact nature of the soil.

Table 4: Sorghum yield (kg/ha) under tillage and direct seeding in FFS plot in Kompienbiga

	Tillage	Direct seeding
Sorghum in monocropping	1,500	1,250
sorghum + brachiaria	1,125	1,000
Sorghum + cowpea	1,250	1,375
sorghum + crotalaria	1,375	1,750
sorghum + mucuna	875	750

Crops association

Two main aspects of crops associations were studies via demonstration and action research operation: the spatial arrangement pattern and the assessment of different crop associations.

- *Spatial pattern of crop association*

The ability of a crop association to ensure a good ground cover and to generate other benefits including easy installation and crop management, ground cover and straw and grain production also depends on the type of spatial arrangement pattern. Some farmers are already practicing crop association by intercropping sorghum and cowpea in the same seeding hole. Farmers justify this practice with the objective to save labour during seeding and also to the issue of land scarcity. A test was conducted to test alternative spatial patterns that could ensure a better compromise between optimal production of biomass, ground cover and easy realization of farming operations.

Three spatial arrangement patterns were compared : i) sorghum + cowpea planted in the same whole; ii) sorghum intercropped with cowpea, the two crops planted in separate whole but in the same row and, iii) sorghum intercropped with cowpea, the two crops planted in alternate rows. Intercropping with separate rows for each crop gave the best result (Table 5) regarding sorghum yield, ground cover and hence effect on weed control. However this pattern is very time consuming as the third pattern (seeding in separate whole but same row). The latter appeared to be more appropriate for farmers using animal drawn equipment for weeding.

Table 5: Variation of sorghum yield according to intercropping pattern with cowpea

Spatial arrangement pattern	Sorghum yield (kg/ha)
Seeding in the same whole	710
Seeding in alternate rows	1,340
Seeding in separate whole but same row	1,180

Results of a comprehensive and participative assessment of the three intercropping pattern was conducted with farmers are presented in Table 6. These results showed that farmers have a clear preference for planting the two crops in separate and alternate rows. A survey (Annex 3) conducted in three SCAP

villages in PICOFA at the end of the project indicated that the percentage of farmers practicing this pattern has evolved from 3.2 to 74.5% respectively before and after SCAP intervention (Table 7).

Table 6: Famers' assessment of the three intercropping patterns

	Advantages	Constraints
Seeding of the two crops in the same whole	<ul style="list-style-type: none"> • Time saving during seeding • Good production of cereal • Cereal can benefit better of the nitrogen produced by the legume • High production of straw 	<ul style="list-style-type: none"> • high competition between the two crops • weak effect on weed control • poor production of cowpea
Seeding in separate and alternate rows	<ul style="list-style-type: none"> • less competition between the two crops • better ground cover by cowpea hence high contribution for the control of weeds and soil erosion • good conservation of soil moisture • good production of grain and straw • better production of cereal and legume 	<ul style="list-style-type: none"> • Difficulty to carry out weeding operations • High labour requirements for seeding • Difficulty to carry out chemicals treatment
Seeding of the two crops in separate wholes but in the row	<ul style="list-style-type: none"> • Less competition between the two crops • Control of erosion and weed • good conservation of soil moisture • good production of grain and straw • better production of cereal and legume 	<ul style="list-style-type: none"> • Easy to conduct mechanized operations • Poor ground cover • Difficult to do seeding • Time consuming • Difficulty to conduct pest control operations

Table 7: Evolution of the percentage (%) of farmers applying the different intercropping patterns

	Before SCAP	2011	2012
Seeding in the same whole	87.1	9.0	0.0
Seeding in separate wholes but in same the row	9.7	24.4	25.4
Seeding in separate and alternate rows	3.2	66.6	74.6

- *Assessment of different cover crops*

Several cover crops were assessed and compared in intercropping systems with cereals. The objective was to identify and select with farmers multipurpose cover crops that can have a production of biomass for ground cover, but that is also easy to manage (no or less competition with the main crop) and can meet other farmers' needs (fodder, food etc.). Cereal yield in intercropping systems vary according to the type of cover crops (

Table 8). Almost all cover crops are having a negative effect on the yield of cereal. However, effects crotalaria and cowpea are less compared to the other cover crops.

Table 8: Cereal production (kg/ha) when grown in mono-cropping and in association with cover crops in FFS plots in Kompienbiga

		Cereal		
		Maize	Sorghum	Millet
Mono-cropping		2,550	1,396	700
Cover crop	Cowpea	2,375	1,250	636
	Peanut	-	1,065	705
	Brachiaria Sp.	2,185	1,132	602
	Mucuna Sp.	1,935	921,5	563
	Pigeon Pea	2,615	-	755
	Crotalaria	2,522	1,438	797

A participatory comparison of different cover crops was conducted with farmers (Table 9). Globally, it came out that criteria for the appreciation of tested cover crops are variable according to farmers and villages. However some criteria were quite common to several villages:

- the aptitude of the cover crop to diversify or increase food production. This highlight issues of shortage of land and food insecurity. Cowpea and groundnuts emerged as the two first crops farmers would like to grow in association with cereal;
- the potentiality of the cover crop to ensure a good soil cover, without creating competition, as to keep soil moisture even when there is rain shortage or a premature end of the rainy season;
- the contribution to animal feeding; most crop farmers are also livestock keepers, animal feed is a crucial challenge for them, and shall be considered in systems that are proposed. It appears that farmers are not reluctant to grow fodder all the more since livestock is becoming increasingly an important source of revenue for farmers. But the challenge is to find the appropriate pattern for the integration of fodder crops in cropping systems.

Farmers have a clear preference for edible and multipurpose cover crops; however crops selected by farmers might not be the best to ensure good production of biomass and ground cover during and after the rainy season. Hence, the option is to develop CA-systems that meet farmers needs but also CA requirements.

Table 9: Farmers assessment of different cover crops grown in association with sorghum

	Advantages	Constraints
Sorghum + cowpea	<ul style="list-style-type: none"> • control of weeds • Good ground cover • -control of erosion and evaporation • Reduction of water runoff • income generation + food security • animal feeds 	<ul style="list-style-type: none"> • Very sensitive to pest attacks • Competition with the cereal • Difficulties to conduct weeding operations
Sorghum + peanuts	<ul style="list-style-type: none"> • Good ground cover • control of erosion and evaporation • improvement of soil fertility • Reduction of water runoff • income generation + food security • animal feeding 	<ul style="list-style-type: none"> • leaves of peanuts can sustain the dry season • competition with sorghum • Very sensitive to drought
Sorghum + mucuna	<ul style="list-style-type: none"> • keep moisture for a long period • control erosion • weed control • leaves of mucuna are good fodder for livestock • improvement of soil fertility 	<ul style="list-style-type: none"> • high competition with cereal • reduction of cereal yield • inedible for humans • Very sensitive to drought
Sorghum + crotalaire	<ul style="list-style-type: none"> • Good water infiltration • decompaction of the soil • less competition with cereal • Good production of cereal 	<ul style="list-style-type: none"> • poor effect on weed control • low production of biomass • crotalaria inedible for human and livestock
Sorghum + brachiaria	<ul style="list-style-type: none"> • good production biomass • good ground cover • production of fodder for animal feeding • weed control 	<ul style="list-style-type: none"> • difficulty to carry out weeding operation on plots with brachiaria • competition between brachiaria and the cereal particularly when soil fertility is low

ASSESSING THE SPECIFIC AND COMBINED EFFECTS OF CA PRINCIPLES

An on-farm research was conducted in Yilou village (Burkina Faso) to compare CA-based cropping systems to conventional systems, and more particularly to evaluate the specific and combined effects of CA principles on technical and economic results of sorghum production (Annex 14-1). This research was guided by the hypothesis that farmers can transform their farming practices into CA only if they are convinced of the specific and combined benefits of CA principles.

Yilou is located in a semi-arid area with an average rainfall of 650 mm/year. Soil was covered with sorghum straws, about 4t/ha for an average of 70% of ground cover. Sorghum was used as the main crop, and cowpea for intercropping. Eight treatments were designed and implemented so as to highlight the specific and combined effects of the three CA principles. Table 10 presents a brief insight of the findings.

Table 10: Rate (%) of technical and economic performance of specific and combined effects of CA principles compared to conventional agriculture practices

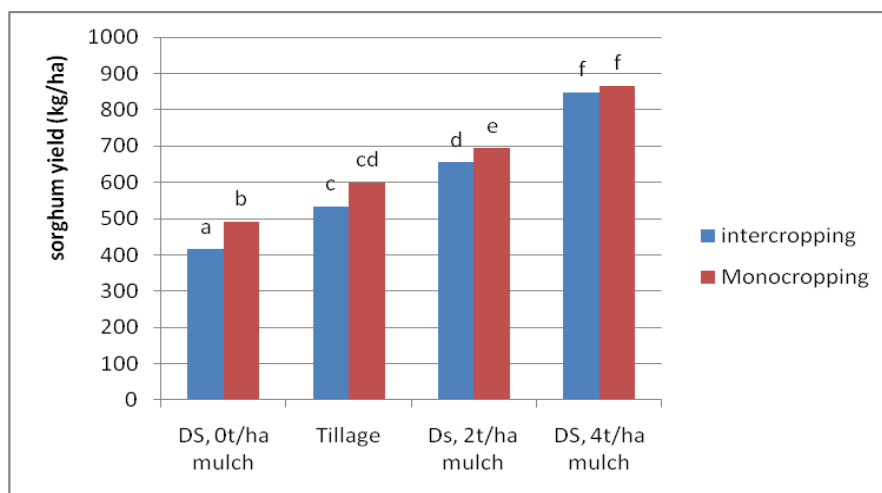
CA principles	Sorghum yield	Labour	Gross product	Labour productivity	Return of investment
Organic soil cover	76,0	18,6	76,0	183,3	236,0
Direct seeding	- 17,7	9,6	- 17,7	- 45,3	- 40,1
Crop association	- 10,9	46,2	110,1	105,5	116,9
Direct seeding + crop association	- 30,7	41,5	73,3	53,5	56,8
Direct seeding + organic soil cover	44,8	30,0	44,8	54,9	101,4
Direct seeding, soil cover and crop association	41,6	71,5	173,2	158,4	219,9

Globally, it came out that the effect of each principle of CA on sorghum production is different. Contribution of combined effects was higher than those of the specific effects.

Organic soil covers is the CA principle having the highest impact on sorghum yield, labour productivity and return in investment. This due to the fact that the study was conducted in a semi-arid area where the rainfall is low with several drought periods during the rainy season. Soil cover has increased labour because farmers had to spend additional time about (10 days / ha) to collect straw and other biomass to cover the soil.

Crop association tends to increase labour requirement per hectare, particularly for seeding and harvesting. Crop association also causes a decrease of about 11% of sorghum yield, but this decrease was not statistically significant. The reduction of sorghum yield caused by intercropping is lower when the amount of mulch for ground cover is high (Figure 2). On the other hand, crop association increases land and labour productivity.

Direct seeding applied solely without the two other CA components had a negative effect on both technical and economic results except for labour where a slight reduction of about 10% was noted. Poor results of direct seeding were attributed to the fact that farmers were not using herbicides to control weeds thus having a lot of difficulties to control weeds. Furthermore, the effect of capping with is severe in the study area causes a poor emergence and growth of plants on plots where direct seeding was practiced. However, it came out that results obtained under direct seeding can be significantly improved if organic soil cover is practiced.



Means between treatments in the same study field followed by different letters differ significantly at $p < 0.05$.

Figure 2: Variation of sorghum yield (kg/ha) in intercropping and monocropping and according to the amount of amount of much for ground cover

These preliminary results tended to confirm the importance of applying simultaneously the three CA principles. These results will be consolidated and validated through further research and in other agroecological area.

FOUR CA-BASED CROPPING SYSTEMS IDENTIFIED AND DEVELOPED

Based on survey, studies and action research carried out, the SCAP implementation team has identified four main CA-based cropping systems (CA-CS):

- CA-CS 1: CA featuring native shrubs;
- CA-CS 2: direct seeding on crop residue, cereal intercropped preferably with edible cover crops
- CA-CS 3: direct seeding with/without herbicide on cereal straws or biomass of cover crops; Cereal intercropped or in rotation with fodder crops
- CA-CS 4: Direct seeding on mulch, cereal grown in rotation with improved fallow plots / fodder crops

Outlines of these four systems are presented in Table 11. CA-CS 1 and CA-CS 2 are designed preferably for semi-arid zone, where the low rainfall is a limiting factor for biomass production and diversification of cover crops. In this zone population density is very high, food insecurity is frequent, hence the cover crops selected by farmers are edible legumes mainly cowpea and peanuts. The population density, and hence the pressure on land, is very high, that is the reason crop association is preferred to crop rotation. Most farmers do ploughing, but it is a shallow ploughing. They also practice direct without application of herbicide.

CA-CS 3 and CA-CS 4 are quite similar as they are designed in area with average to high rainfall. Crop production is diversified including cash crop such cotton, rice and maize unlike in semi-arid area. CA-CS 4 is very specific to area with high rainfall and a low population density.

Table 11: Main characteristics of CA-CS identified

	CA-CS 1	CA-CS 2	CA-CS 3	CA-CS 4
Soil tillage	Direct seeding /ripping	Direct seeding /ripping	Direct seeding + herbicide	Direct seeding + herbicide
Material for organic soil cover	Biomass of shrubs (<i>Piliostigma reticulatum</i> , <i>Guiera senegalensis</i> , <i>Hyphaene thebaïca</i>)	Mulch of cereal eventually complemented with biomass of shrubs or grass	biomass of cover crops + straws of cereal	Biomass or cover crops + grasses
Main crop	Millet / sorghum	Sorghum / millet	Maize, sorghum, cotton	Rice / maize
cover crops / associated crops	Cowpea / peanuts	Cowpea / peanuts	Fodder crops (brachiaria, mucuna, dolichos etc.) / edible legumes	Fodder crops (brachiaria, pigeon pea, stylosanthes sp., mucuna, dolichos)
Crop association / rotation?	Association	Association	Association / Rotation	Rotation
Average accessible soil cover rate	30 – 60%	50 – 70%	80 – 100	100%

CA-CS 1: CA featuring native shrubs

This CA- based cropping system is designed of semi-arid areas with very low rainfall (< 500mm) and high population density. The production and conservation of biomass in this area is a core issue because of the low rainfall and the high pressure of livestock. The amount of cereal straw available on the soil at the beginning of the cropping season is very low. Fortunately, biomass of existing native shrubs (*Piliostigma*, *Guiera*, Doum Palm) can be mobilized together with crop residue for soil cover. However, it came out that this biomass could not be enough to insure 100% soil cover, a level of 40 to 60% can be easily reached by farmers.

A study was conducted in two villages in the province of Bam (PDRD zone, Burkina Faso) on farmers' management of *Piliostigma reticulatum*, a native perennial shrub of the family Caesalpiniaceae, commonly used by farmers (Annexe 14-2, Zerbo D). It was shown that the coppicing of these plants, usually early in the rainy season, could provide quantities of biomass up to several tons of kg DM / ha, with densities of shrubs around 300 bunches per hectare on average, up to 800 bunches in some cases. The amount of biomass produced per clump varies between 50 and 200 g according to its architecture, and the best estimate of the biomass produced seems to be obtained with the surface of the crown of the tuft.

In the same lines, two experimentations were conducted with the University of Niamey (Niger) on the effects of *Guiera senegalensis* and doum palm (*Hyphaene thebaïca*) on millet production in the area of PPILDA in Niger (Annexe 14-3, Dan Lamso). These studies showed the effect of native shrubs both on the production of millet and also on soil properties. Millet sown in clump of *Guiera senegalensis* or doum palm has a higher yield than if grown out of the clump (Table 12).

Table 12. Production of millet in and out Guiera and Hyphaene clump in Niger

	Treatment	Millet yield (kg/ha)	Difference (kg/ha)	Millet Straw (kg/ha)	Difference (kg/ha)
Doum palm	Control	440		2,000	
	Clump	1,597	+ 1 157	5,661	+ 3,661
Guiera	Control	300		2,680	
	Clump	494	+ 194	3,114	+ 434

The effect of tufts of palm doum and to a lesser extent of Guiera on soil also seems important regarding organic carbon and phosphorus, which are concentrated near the clumps, while the pH is slightly higher. It would be interesting to repeat these experiments to confirm the results.

This CA-CS needs to be further developed and consolidated with answers to the following key questions: what should be the optimum density of shrubs on the plot considering the issue of competition for water and nutrients? What should be the spatial arrangement to facilitate the implementation of cropping operations? How to increase rapidly the density of these shrubs?

CA-CS 2: direct seeding on crop residue, cereal intercropped preferably with edible cover crops

Like the CA-CS described above, this second CA-based cropping system is designed for semi-arid areas but with a rainfall slightly better than in the first case (600 – 800 mm /year). Here, crop residues are the main materials used for soil cover, these residues can be eventually complemented with shrubs biomass or grasses collected on other plots. With all these materials it can be possible for farmers to insure a soil coverage rate of 50 to 70 %. In this area, some farmers are already practicing soil cover, managing to keep up to 3t of crop residue /ha. This system was assessed and validated in Yilou (Burkina Faso). An overview of comparative results of a full CA system and the conventional farming from a research conducted (Annexe 14.1 - Bougoum Harouna) in that village are presented in Table 13.

Table 13. Brief comparative results of CA and conventional agriculture in Yilou

	Conservation agriculture	Conventional Agriculture
Sorghum Yield (kg/ha)	846.5	592.7
Production of straw (t/ha)	5.2	3.9
Gross Total production (Fcfa/ha)	286,129	104,718
Labour (MDE* / ha)	69.8	40.7

MDE = Man day equivalent

CA-CS 3: direct seeding with/without herbicide on cereal straws or biomass of cover crops; Cereal intercropped or in rotation with fodder crops

This CA-CS is designed for areas with an average rainfall for about 800 to 1,200 mm/year, this rainfall is a quite enough for the production of wide variety of cover crops that can be all also use human or animal feeding. A rate of 100% soil coverage is possible as the rainfall enable a good production of biomass.

The pressure on land is not very high because of a medium population density. Farmers can decide either to practice crop association or crop rotation. It was noticed that farmers prefer to practice crop association with edible crops (cowpea, peanuts) and choose crop rotation for fodder crops like *mucuna* or *brachiaria* which they consider difficult to manage or having a negative impact on cereal production when cultivated in association. Soil tillage is common practice. Given the good rainfall, herbicide has to be applied for weed control when direct seeding is practiced. However, the vision is in the mid-term to find other alternatives to herbicides for weed control.

Table 14. Cereal production (kg/ha) when grown in mono-cropping and in association with cover cops in FFS plots in Kompianbiga

		Cereal		
		Maize	Sorghum	Millet
Mono-cropping		2,550	1,396	700
Intercropping with cover crop	Cowpea	2,375	1,250	636
	Peanut	-	1,065	705
	Brachiaria Sp.	2,185	1,132	602
	Mucuna Sp.	1,935	921,5	563
	Pigeon Pea	2,615	-	755
	Crotalaria	2,522	1,438	797

CA-CS 4: Direct seeding on mulch, cereal grown in rotation with improved fallow plots / fodder crops

This cropping system was developed for PADER/BGN zone (Guinea). In this area the pressure on land is still relatively low allowing farmers to practice fallow. However the duration of fallow period is decreasing, from 12 years a decade ago to less than seven years actually. Hence farmers are considering that fallow is no more very efficient for the improvement of soil fertility. Building on the already existing practice of fallow, the introduction of CA within the framework of SCAP privileged crop rotation rather than crop association. The average annual rainfall is beyond 2,000 mm allowing the development of a wide range of cover crops and more generally a good production of biomass for soil cover. Despite animal wandering, it is possible to reach a ground cover rate of 100%. Weed control is a serious challenge hence herbicide is actually used when direct seeding is practiced.

SCAP installed demonstration and research plots in Guinea on various aspects of this CA-CS including direct seeding of rice under mulch; pigeon pea intercropped with rice; improvement of fallow plots with pigeon pea and *Stylosanthes sp.* It wasn't possible to carry out a full assessment of this system because field activities were conducted in Guinea only during two cropping seasons (2010 and 2011). In 2009, it wasn't possible because of unfavourable political situation. Nevertheless, participatory assessment conducted showed that farmers are interested in the

systems that they already mobilizing for fodder production but also, as mean to improve soil fertility.

ADOPTION OF CA-BASED CROPPING SYSTEMS

A study was conducted on the pre-adoption of CA-based cropping systems in three villages (Kompienbiga, Louargou and Natiaboani) of SCAP sites in the PICOFA area (Burkina Faso). The methodology used was the binary choice model.

It came out that though farmers do appreciate CA-CS where the three principles are implemented simultaneously, they tend to adopt CA principles separately rather than simultaneously (Annex 3). The adoption of all the three CA principles increased continuously throughout the project lifetime (Figure 3). This trend shows that activities conducted in FFS and research plots make farmers more knowledgeable of the benefits of CA principles but also on how to manage challenges emerging when they are implemented. According to projections, the percentage of farmers planning to adopt the practice of ground cover should significantly increase during the 2012 cropping season. This evolution can be attributed to the fact that farmers have started acknowledging the usefulness of soil cover all the more since rainfall was very poor in 2011 with a deficit up to 30% in some villages. Globally, the adoption rate varies according to the CA principles (Figure 4). In 2012, the increase in area under crop association is low compared to that of direct seeding or organic soil cover.

In farms, the percentage of cultivated area under CA has evolved from 0.2 % prior to the project to 15.4% (about 0.6 ha) in 2012. This figure should have been higher if there were no issue regarding the production and conservation of biomass on the ground. Farmers who are facing this challenge have opted for an intermediary system including the two other principles of CA (direct seeding and crop association). This is the reason why in 2012, the proportions of the area under direct seeding + crop association is 25.2% while the area under full CA will be 15.4%. Figure 5 also shows that there are some farmers who at the moment are adopting crop association only.

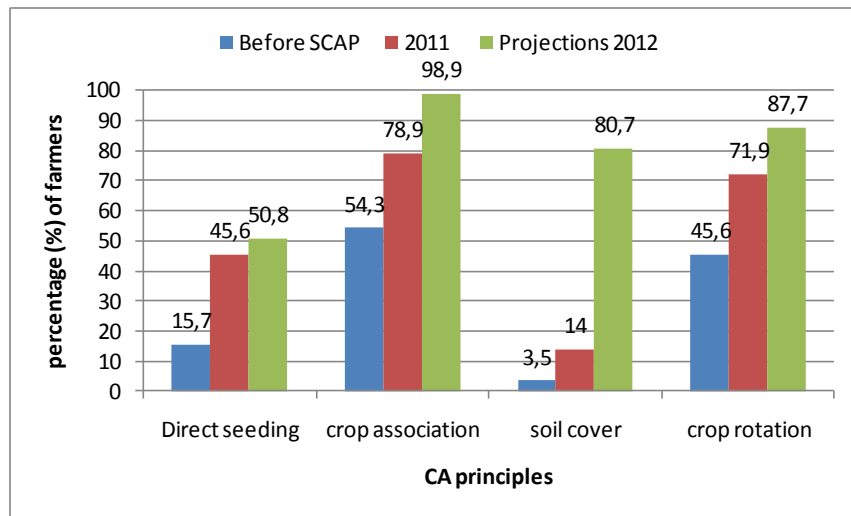


Figure 3. Evolution trend of number farmers practicing different CA principles throughout the project lifetime

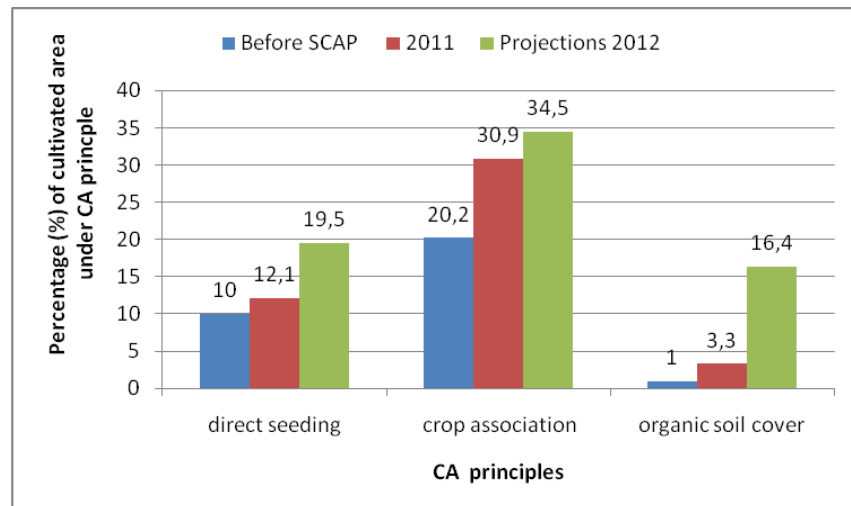


Figure 4. Evolution trend of number farmers practicing different CA principles throughout the project lifetime

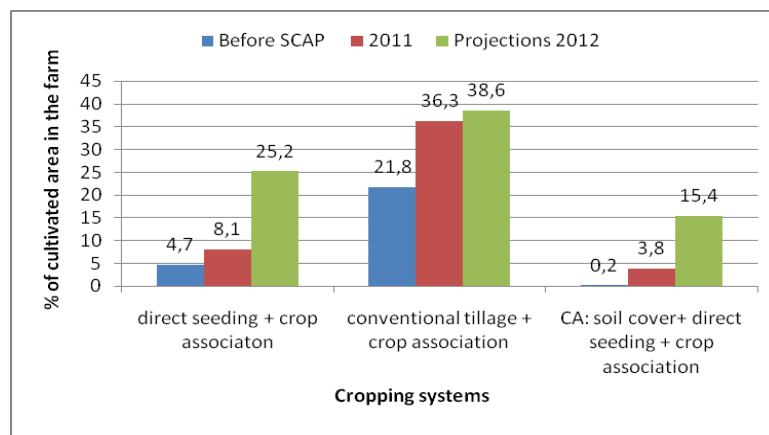


Figure 5. Evolution of proportion of CA-based cropping systems in farms throughout SCAP lifetime

Results of the logit regression showed that the decision of farmers to adopt AC depends on five main factors: the area of the cultivated land, the number of cattle, the percentage of degraded land, the existence of a support for the implementation of soil conservation techniques and the attendance in CA-farmers field school activities (Annex 3)..

- Farm area (-): it affects negatively and significantly the probability of adoption of CA. This result can be understood by considering the adoption costs of CA (effort to keep straw on the plots and/or to collect additional straws for soil cover, procurement of herbicides etc.). The higher the area cultivated, the more farmers will consider adoption of CA as costly.
- The number of cattle (+) is positively correlated with the decision of farmers to adopt CA. Thus, all things being equal, the probability for a producer to adopt the AC is even more important that the farmer has a large number of cattle. In rural areas the number of cattle is a sign of wealth. Hence a producer with a large number of cattle can cope with the initial costs associated with the adoption of the CA. Moreover CA may enable farmers to improve fodder supply for livestock particular through the introduction of fodder crops either via intercropping of crop rotation.
- The percentage of degraded land (-). This indicates that the adoption of CA is a decreasing function of the proportion of degraded lands. A higher percentage of degraded land on the farm tends to discourage farmers to adopt the CA. This result is not in line with expectations, but it is understandable in a sense where a high proportion of degraded land requires significant investments for farmers to change for CA. Hence, without support of project of other agricultural development organization, the farmer will not be able to bear these costs, which reduces the probability of adoption of CA. In addition, if the cost of adopting CA is higher than the cost of acquiring new land, the producer will logically prefer to acquire new land.
- The existence of a support for the implementation of soil conservation techniques (+). Thus, the adoption of CA is an increasing function of assistance for soil conservation. Undoubtedly, increased assistance to farmers for soil conservation increases their likelihood of adopt of CA.
- Frequent attendance of FFS activities (+). All things being equal, the probability of adoption of CA for a farmer is even more important than he participate frequently to FFS activities. Attendance of field school activities reflects the farmer's desire to test new techniques and receive information necessary to address the depletion of its soil; this attendance is also necessary to have a good mastery of CA, its benefits but also strategies to address challenges emerging from its implementation.

3.2. COMPONENT 2: FARMERS INNOVATORS

DESCRIPTION AND OBJECTIVE

Agricultural innovation can arise either from a completely indigenous process, engaged by autonomous farmers that may need support, ideas or suggestions, or from an externally facilitated process like an action research driven project. Moreover, in a context where there is a shortage of advisory services, the uptake and dissemination of locally adapted CA innovation lie mostly on the effective participation of farmers in the building of the innovation. In the SCAP implementation Strategy, Farmers' innovators and their networks were considered as key partners in the testing and assessment of CA options, but also in the preliminary dissemination of results and evolving knowledge from the tests carried out. Once trained and empowered they can train and backstop new and future CA adopters hence contributing to sustain and pursue the dynamics even when the project will end.

The objective of this component was to **foster networking among farmer-innovators as a means of adapting and accelerating the widespread use of suitable innovative and locally adapted CA-based farming systems.**

Three main activities were conducted in the framework of this component : (i) identification and documentation of farmers' innovations and innovators networks; (ii) selection and implementation of CA tests and demonstrations with farmers' innovator and, (iii) strengthening and linking farmer innovators to enable them champion CA/SLM up/out scaling

ACHIEVEMENTS

Existing CA/SLM innovations in West and Central Africa were documented through a literature review and case study in Northern Cameroon where an AFD funded CA project is implemented since a decade. Furthermore, an analysis of the efficiency and sustainability of existing farmers' innovator network in the dissemination of SLM technologies was conducted. Farmers innovators identified in SCAP area were trained and supported to run CA demonstration and experiment on their own plots. Inter and intra-village training visits were organized to enable farmers share experience and develop their network.

SUB-COMPONENT 2.1: TO IDENTIFY, UNDERSTAND AND DOCUMENT FARMER INNOVATIONS AND INNOVATOR NETWORKS

A survey was conducted in the PDRD area (Burkina Faso) on SLM innovation managed by community based organizations (CBOs), Non-Governmental organizations (GOs) and Governmental organizations. Innovations identified can be ranked into three main domains: (i) agroforestry techniques; (ii) water and soil conservation and (iii) good agricultural practices. These technologies have been developed by farmers either alone and on their own initiative or with the support of external stakeholders (development projects, NGOs, research). Farmers' innovators stressed that though they are often socially respected in their communities, their innovations are recognized by members of their communities only when an external organization (research, NGO etc.) show interest on these innovation and starts working for their promotion. Though a farmer can be consider as very innovative, its innovation usually disseminates locally only with the support of interest of an external stakeholder.

Existing farmers' innovations and CA/SLM development projects experiences in WCA and particularly in North Cameroon was reviewed in the framework of collaboration with CIRAD. The result of this review (Annex 18) showed the importance of the linkage and harmonization between on-station research and research demonstration carried out on-farm. The latter are directly managed by the farmer but with the support of a technician. It came out that it is mainly the reduction of the gain of productivity of primary biomass which differs between results obtained on-station and on-farm. An improved level of secondary production (grains) is generally similar or even higher than that obtained on-station. Furthermore, productivity herbicide is slightly lower on-station than on-farm.

Tasks	• Output	Results
Identify and document innovations developed by farmer and development project	<ul style="list-style-type: none"> document synthesizing the SLM and CA-related experiences in WCA 	<ul style="list-style-type: none"> A survey of existing farmers' innovations CA, SLM experiences was conducted (particularly in North Cameroon) in the framework of a collaboration with CIRAD
Carry out an inventory of SLM technologies and Farmer innovation managed by CBOs/NGOs/GO	<ul style="list-style-type: none"> Inventory of SLM technologies and farmers innovations managed by CBOs/NGOs/GOs 	<ul style="list-style-type: none"> Survey and analysis of SLM technologies and farmers innovations managed by CBOs/NGOs/GO in PDRD zone was carried out

SUB-COMPONENT 2.2: TO STRENGTHEN AND LINK FARMER INNOVATOR AND THEIR NETWORKS TO ENABLE THEM CHAMPION CA/SLM UP/OUT SCALING

The initial schedule to pilot at least two “best bet” proposals for enabling sustainable service provision for innovator networks has been modified. In fact, it appeared that a good knowledge on innovator networks, their strength and weaknesses are prerequisite for the identification and piloting of best bet proposals. Moreover, the option taken by SCAP to strengthen existing networks rather than create new ones. While strengthening these networks, SCAP worked to induce a platform of knowledge sharing at ground level.

Hence, a study was carried out on farmers' innovators (also operating as farmer trainers) and their networks and more particularly on the efficiency and sustainability of this network as an approach for the dissemination of technology. The Association of Farmer Innovator of Zondoma (APIZ) in PDRD area (Burkina Faso) was used for a case study (Annex 21?). Results of the study showed that generally farmers' innovators are men. The low representativeness of women is due the fact that the latter don't easily have access to land. Women don't want to invest is something on which they have no control. Only widows are entitled to land ownership. Furthermore, few women have time to do training or backstopping of other farmers, because the lack time, social recognition and means of transport for the follow-up of trainees.

Farmers' innovators (FI) often act as farmers trainers; hence their services are sometimes hired for the dissemination of innovative farming practices in their communities. Their service offer consists in the training of other farmers on techniques of water and soil conservation, post harvests, production of organic manure and agroforestry. These topics are rarely determined by beneficiaries of FI services, but rather by support organizations (SO) including research, NGOs

and development projects that bring technical and financial backstopping to FI. SO consider FI as a means of rapid dissemination of innovations, they don't yet see FI as a channel to capture farmer's demands.

Though FI/trainers network seemed efficient and competitive, in comparison to existing approaches, for the out-scaling of some technologies that do not require a high level of education, they are not yet sustainable (Table 15). FI network are facing difficulty to adapt themselves their service offer because of their wait-and-see attitude, their low level of education, the unilateralism of their relations with SO and the unwillingness of their customers to pay for the services they seek.

Table 15. Assessment of the sustainability of the Famers trainers approach

	Poor	Good
Economic profitability	xx	
Social benefit		Xxx
Autonomy	xx	
Competitiveness	x	X

Caption: x = weak; xx= medium; xxx = high

In SCAP project, farmers considered as innovator were farmers who were already practicing one or several CA principles prior to the start of the Project. This was for instance the case of farmers who were already practicing direct seeding or soil cover mostly in the drier part of SCAP area (PPILDA and Northern PDRD area). Furthermore, farmers "experimentators" that are farmers conducting experiment on their own plot and earlier adopters who start transforming their practices by introducing one or two CA principles were considered as farmers innovators. One example is M. Paul Sawadogo in Yilou who start keeping crop residues in half/moons pits. SCAP brought the necessary support to these farmers to enable them go further with the innovations and to share their experience with other farmers in the communities. Training visit including in Northern Cameroon and local villages in Burkina Faso, Niger and Guinea were organized to enable farmers discuss and share idea with their counterpart living in other areas. To date, the number for farmers' innovators is about 200. To keep the dynamics, a SCAP newsletter and dedicated webpage was created. Furthermore, the following measures were suggested for the improvement of the efficiency and sustainability of farmers' innovators network: increase sensitization for development organizations and the State so that they better recognize the potential of farmers innovators network and find means to facilitate capacity building and wider access of FI to knowledge; development of suitable strategy and modalities for the integration of FI network in a pluralistic advisory framework.

Tasks	Outputs	Results
Strengthen and link farmer innovator and networks to regional and Continental Networks	<ul style="list-style-type: none"> Existence of SCAP Newsletter and dedicated webpage 	<ul style="list-style-type: none"> One SCAP dedicated webpage for knowledge sharing was developed
Innovative mechanisms for the sustenance of networks is developed	<ul style="list-style-type: none"> Report on the assessment of farmers innovators network conducted List of propositions to improve the sustainability of farmer innovator network 	<ul style="list-style-type: none"> An analysis of the efficiency and sustainability of farmers innovators/trainers network was conducted

ANALYSIS OF RESULTS

Survey of existing farmers' innovations and review of SLM/CA experiences in the WCA Sub-region provided valuable information for the designing and testing of CA-based cropping systems in the framework of SCAP. They also help to better explain to farmers and stakeholders that CA is not necessarily a standalone technology, rather its efficiency relies also on the existence or its suitable integration with other SLM innovations and good farming practices. SLM innovations technologies managed by CBOs, NGOs and GOs are diverse, but they are often more determined by the technical and financial partners of these organizations rather than by the beneficiaries. The use of top-down approaches during past decades makes it difficult to farmer innovators to emerge and their innovations to be better be recognized and used within their communities. However, the poor dissemination of local innovation by local population doesn't necessarily mean that the latter underestimates the usefulness of the technology. Rather, this situation tends to highlight the issue of packaging and channel for the dissemination of local innovations.

The analysis of the role of farmers' innovators networks confirmed its potential role in the dissemination of SLM technology but also highlighted limitations and challenges these networks are facing. These results will be very useful for the installation/strengthening of CA famers' innovators networks.

CONCLUSION AND RECOMMENDATIONS OF COMPONENT 2

Farmers' innovators and their network have an important role to play in the development and dissemination of CA based cropping systems. Activities conducted under this component aimed at fostering networking among farmer-innovators as a means of adapting and accelerating the widespread use of suitable innovative and locally adapted CA-based farming systems.

Review and surveys conducted show that there are several endogenous and project driven CA/SLM innovations in WCA. These innovations can served as a basis or complement for the introduction of CA all the more as the latter is not considered as a panacea but rather as an interesting technical alternative that can be locally adapted to contribute to SLM. The weakness of existing innovator network highlight the necessity to have local and community driven network

where members are committed and their innovations better recognized locally. Though specific CA farmers' network has not yet been created, SCAP has fostered networking between farmers. Farmers who participated in SCAP operations constitute a nucleus of CA network that will grow as gradually as farmers will be more knowledgeable of the benefits but also on adequate strategies to manage challenges emerging from the implementation of CA. Hence there is necessity to monitor and support the dynamics that is created. In that respect, the following recommendations are formulated:

- to monitor and conduct a follow-up of early adopters of CA systems to better understand adoption pattern and bring appropriate support to strategies they are developing to manage the integration of CA in their farming practices, and incidentally how they use CA principles to transform their practices and design new cropping systems;
- to explore the possibilities for farmers to make in-kind payment for the service/training they often received from farmers innovators and their networks;
- to organize frequently contests at village, district or even national levels to identify and assessed CA/SLM innovations developed by farmers with or without external support;
- to better recognize the potential role of farmer innovator networks in the provision of agricultural advisory services and hence elaborate a strategy for their integration in a pluralistic agricultural advisory framework.

3.3. COMPONENT 3: KNOWLEDGE MANAGEMENT AND SHARING

DESCRIPTION AND OBJECTIVE

The design, adaptation, improvement and scaling of CA based systems require the existence of a dynamic and efficient innovation systems involving farmers and all the stakeholders. Farmers and more generally stakeholders of the agricultural sector often have specific, useful and proven knowledge, developed from their own experience, observations or collaboration with external actors. In a context of the promotion of a multidimensional innovation as CA, it is important to take into account as much as possible specific contributions of different actors so as to insure the suitability of the innovation. Also, capturing and harnessing stakeholders' assessments and perceptions are important to finalize and refine CA-Systems being developed. This requires that possibility be given to them to be more knowledgeable on CA but also to express themselves on the added value of the technology as compared to their usual farming practices. In fact, given the difference between CA and conventional agricultural, CA requires for farmers a new learning process; it can be adopted only if farmers are well aware of its benefits and develop suitable strategy to manage potential constraints that might emerge from its implementation. Hence it is important to capture and share progressively with appropriate tools and approaches evolving knowledge from the process of building CA-CS and also capture and analyse feedback from farmers. Furthermore, sensitization and engagement of organizations working on the general topic of SLM in the promotion of CA are necessary to foster the uptake and dissemination of CA and for the continuation and sustainability of the momentum created by SCAP Phase I.

All these concerns and considerations justify the need of this Component 3 focused on knowledge sharing with the **objective to expand the range of technical options from which communities and farmer innovators can choose, through sharing knowledge on NRM and conservation agriculture practices, including practices used in other communities and even in other regions.**

Activities conducted to achieve this objective included the assessment of existing networks and knowledge sharing mechanisms, development of institutional partnerships to foster knowledge sharing and dissemination of CA, participatory learning sessions, generation and synthesis of CA knowledge and participation at CA related learning events.

ACHIEVEMENTS

A preliminary survey conducted showed that though organizations working of SLM do communicate, knowledge flow among them is still very weak. Some professional networks exist but they are not functional. SCAP initiated activities to foster knowledge sharing on CA an SLM in general. SLM stakeholders were sensitized on CA. Further discussions and negotiations leaded to the introduction of CA in activities of some organizations contributing to the dissemination of the technology. Learning sessions organized with FFS members and farmers' innovators to make farmers more knowledgeable and eager to share their experience hence learning from each other and providing useful information for the technology being developed. Evolving knowledge were captured, they are progressively synthesized and shared through the participation of the Project Staff to CA related events and development of promotional materials.

SUB COMPONENT 3.1: TO BUILD INSTITUTIONAL MECHANISMS TO SUSTAIN KNOWLEDGE SHARING, FOSTER INNOVATION AND SCALING UP IN THE REGION

The suitability and scaling of CA systems /related practices rely of the involvement and ownership of institutions working on SLM and agricultural development in general. SCAP worked to make these organizations more knowledgeable on CA. Moreover activities were conducted to foster knowledge sharing and partnerships suitable for the uptake of CA in the region. Existing networking and knowledge sharing mechanisms among stakeholders were assessed resulting in the necessity to set an innovation platform for knowledge management CA. primary activities achieved in this framework included mainly the strengthening and partnering with institutions to foster knowledge management and sharing on CA practices and techniques.

Tasks	Outputs	Results
Networking dynamics for SLM/CA in WCA consolidated	<ul style="list-style-type: none"> list of MoUs and partnerships agreements signed with organizations working on SLM/CA list continental / sub-regional initiatives/project developed on CA 	<ul style="list-style-type: none"> 8 MoUs and partnerships agreements were signed were signed with SLM/CA organizations including IFAD loan projects, Research, Universities and NGOs; Two consultation meetings for SLM/CA stakeholders to foster synergies and networking were organized ; Partnerships and collaborations developed with Research and development organizations (CBOs, NGOs etc.) about the research and development activities on CA
Partnerships and structures built to facilitate dialogue between key players	<ul style="list-style-type: none"> List of MoUs and contract signed with partners N° of CA related seminars and symposium attended by SCAP team 	<ul style="list-style-type: none"> Stakeholder exchange visits were organized resulting in collaborative MoUs and/or contract signed with key players Members of SCAP implementation Team participated in 23 CA-related workshops / conferences and seminars convened by stakeholders for sharing experiences

Assessing networking and knowledge sharing mechanisms among SLM/NRM stakeholders

At the beginning of its activities, SCAP organized consultation meeting with SLM/NRM stakeholders. Further meetings were conducted particularly in Burkina Faso in PDRD and PICOFA areas with the global objective to identify and assess existing networking mechanisms and to foster knowledge sharing and collaboration among stakeholders. More specifically, the objectives were: (i) to enable different NRM stakeholders to get better know each other, to share their respective experiences (activities carried out, implementation approach, results and lessons); (ii) conduct primary identification of potential joint activities and possibilities to include CA in the basis for collaboration and partnerships and; (iii) analyse format and modalities of more collaboration between actors. Forty five participants representing NGOs, Farmers organizations, Rural Development projects, services of ministries of Agriculture and of Environment attended

the meeting (Annex 23). All participants to these meetings acknowledged that sustainable NRM is an arduous and long term job that can only be carried out successfully if all actors involved collaborate and develop more synergy and knowledge sharing in their activities. Collaboration and information sharing between stakeholders was confirmed to be very poor.

Some networks or consultative board/frameworks exist, but are not functioning well. They are facing several difficulties including: lack of participation of members, poor circulation of information, suspicion between members, lack of finance, inadequate human resources to animate the network. Hence, it appeared important that SCAP worked to induce a multi-stakeholder CA platform of knowledge sharing at ground level. The platform should be accessible to State services (agriculture, environment) as they have a key role to play in NRM. Nevertheless, as the installation of such platform is rather a lengthy process, the strategy used was to start by developing contractual arrangements with organization ready or eager to include CA in their activities.

Strengthening and partnering with institutions to foster knowledge management and sharing on CA practices and techniques

Contractual arrangement for the development partnership about the promotion of CA were made first of all with IFAD loan projects which are the primary implementation partners of SCAP, but also progressively with other stakeholders who were interested in SCAP experience. Eight MoUs and partnerships agreements were signed.

IFAD loan projects. Training of trainer course on CA, FFS and PPM&E²⁵ was organized in Karatu Tanzania, from 22nd – 30th September 2009. Eight participants from SCAP and its four IFAD loan project partners attended the course. The course objectives included: (i) to impart knowledge and skills on conservation agriculture (CA), farmer field school (FFS) approach, and project planning monitoring and evaluation (PPM&E) to SCAP National Facilitators; (ii) develop processes that will enable farmers to capture interpret and report on CA effects to livelihoods and the environment; (iii) empower the National Facilitators with participatory, interactive and analytical skills that will build farmers' capacity to investigate production systems, identify problems, test possible solutions and eventually adopt the practices most suitable to their farming systems and (iv) develop, in a participatory way, approaches that will enable rapid and efficient scaling up of CA to targeted communities. An adequate and comprehensive program was elaborated to meet these objectives (Annex 10)

Discussions were held in each of the three countries between SCAP and its main national partners that are PDRD and PICOFA in Burkina Faso, PADER/BGN in Guinea and PPILDA in Niger. The objectives were to develop a work plan and agree on how to organize for the smooth and successful implementation of activities, what should be the contribution of each party regarding activities to be undertaken for the adaptation, adoption and scaling of CA in their specific areas. Memoranda of Understanding (MoUs) and implementation protocols (IP) were signed accordingly. Through these MoUs and IPs it was possible to mobilize public extension staff in SCAP activities and hence enhancing the linkage with the Ministry of Agriculture which despite some difficulties remains a core actor is the dissemination of agricultural innovations. The collaboration with IFAD projects enabled the creation of a CA momentum in their specific area so that presently, at the end of SCAP phase I CA activities are still ongoing on the field supported

²⁵ Participatory Planning, Monitoring and Evaluation

directly by these projects or by the Ministry of Agriculture who have renew or even expand the experience via the forth coming phase of IFAD projects (PDRD and PICOFA in Burkina Faso; PPILDA/PASADEM²⁶ in Niger) or through activities in some pilot villages as in Burkina Faso.

Research organizations, NGOs, farmers' organizations and other stakeholders. In the same framework, MoUs and research contracts were signed the case of INERA in Burkina Faso and University of Niamey. The collaboration with INERA was in the framework of a study funded by SCAP on the effects of the interaction between tillage pattern and intercropping and on sorghum production while the research conducted with University of Niamey was on effects on *Guiera Senegalensis* and *Hyphaene thebaica* on soil properties and millet production. These collaborations gave the opportunity to engage or to strengthen activities of these organisations on CA.

Furthermore exchange visits were initiated with NGOs and Communities based organizations for partnerships for the promotion of CA. Organizations with whom discussions are already formalized or well advanced include Catholic relief Services (CRS) which is an NGO and, the Union des Groupements pour la Commercialisation des Produits agricoles de la Boucle du Mouhoun (UGCPA/BM) a farmer organization.

- CRS. Contacts with Catholic relief Services (CRS) started in November 2009 and were focussed a long term partnership between ACT and CRS based on SCAP experience. These discussions were held in the framework of the preparation of the Programme Families Achieves Sustainable Outcomes (FASO) a five year programme leaded with CRS and implemented with local field partners in three of the thirteen Administrative Regions of Burkina Faso. These discussions resulted in the decision to include CA in the FASO programme as the main mean to achieve targets of the NRM component of the Project. Hence since 2010, ACT is providing a technical backstopping to CRS for the promotion of CA in the area of Programme FASO. Activities conducted so far using the experience and approach of SCAP include: (i) training of 60 field staff and agriculture officers of CRS and its partners on conservation agriculture and its application in the Sahel agro-ecological and socio-economic context, 300 farmers (including 85 women) were trained on agroforestry techniques and conservation agriculture with trees; (ii) participatory elaboration, implementation and assessments of CA demonstration and action research protocol. These research and demonstrations are conducted by farmers' innovators on their own plots. This partnership is scheduled to run till 2015 and will definitely contribute to the enhancement of the dissemination of CA in Burkina Faso.
- UGCPA/BM. Concluding discussions are actually on with UGCPA about a tripartite partnership between UGCPA, FARM Foundation²⁷ and ACT) for the development and implementation of CA in the region of Boucle du Mouhoun in Burkina Faso. Currently one of the major farmers' organizations in Burkina Faso, UGCPA is interested in CA as a mean to help his members to develop and implement sustainable farming practices. FARM Foundation as one of the key partner of UGCPA is supporting the idea. The

²⁶ Projet d'appui à la Sécurité alimentaire et au Développement de la région de Maradi

²⁷ FARM : Fondation pour l'Agriculture et la Ruralité dans le Monde

beginning of the implementation this partnership is scheduled for the 2012 cropping season.

- Others. Discussions were initiated and still on with several other Research organisations, NGOs and farmers' organisations including mainly : SOS Sahel; Réseau MARP, Confédération Paysanne du Faso and the International Centre for Soil Fertility and Agricultural Development (IFDC) with who negotiation was engaged for a partnership about i) the use (type, quantity, time, relationships with soils covers and associated crops) of fertilizer in CA-based systems and; ii) warrantage (access to credit) as a mean to strengthen farmer's networks and groups and to foster their linkage with markets of inputs and products.

Conservation agriculture learning events

Members of the SCAP team participate to several meetings or workshops related to SCAP objectives. It was the occasion to present SCAP activities, to bring the contribution on the topic of the meeting and to share experience with other professionals working on the same topic. The main meetings or workshops SCAP team attended are: (i) The African Conference on Agriculture, Food security and Climate Change, it was organized by African Union on 6-8, September 2010 in Addis-Ababa, (Ethiopia); (ii) the CA SARD²⁸ end-of-project workshop organized by ACT and FAO on 24-26 March 2011 in Kenya; (iii) the 5th African Agriculture Science Week & FARA General Assembly. It was held in Ouagadougou from 19th to 24th July 2010. Theme was "*African Agricultural Innovation in a Changing Global Environment*"; (iv) First Intercontinental Meeting of the Global Forum for Rural Advisory Services (GFRAS) and the 16th Annual Meeting of the Neuchâtel Initiative held in Viña del Mar (Chile) from 2nd to 5th November 2010; (v) International Workshop on Integrated Management of Soil Fertility in Cultivated Ecosystems (GIFSEC), organized in Garoua (Cameroon) from 23rd to 25th November 2010 by PRASAC²⁹ and CIRAD with the main objective to define a scientific programme on the theme of "integrated management of soil fertility" with the membership and participation of all stakeholders of African Savannas and; (vi) the international training workshop on scientific tools and methods for the analysis of the root system of annual or perennial crops grown in association. This workshop was co-organized by SCAP together with CIRAD, INERA and CNRST from 20 to 24th September 2010. SCAP funded the participation of three scientists, one field technician and one student who was doing his internship in SCAP at the period of the training.

The comprehensive list of CA related events attended by SCAP team is presented in Annex 28. Some presentations made during these events are actually under finalization to be published in scientific journals or as promotional materials. In the meanwhile, arising lessons and results of the SCAP are progressively posted to a dedicated webpage at <http://www.act-africa.org> for sharing with wide audience.

²⁸ Conservation Agriculture for Sustainable Agricultural and Rural Development

²⁹ Pôle Régional de Recherche Appliquée au Développement des Systèmes Agricoles d'Afrique Centrale

SUB-COMPONENT 3.2: TO ESTABLISH AND MAKE FUNCTIONAL AN ACTIVE KNOWLEDGE MANAGEMENT BASIS FOR DISTILLING, LEARNING AND DISSEMINATING LOCAL AND EXOGENOUS KNOWLEDGE

Learning sessions and exchange visits with farmers; participation of SCAP Implementation Team at CA related events and synthesis and generation of knowledge on CA with the engagement of students were conducted to foster learning, knowledge capturing and distilling.

Tasks	Outputs	Results
Evolving knowledge and experiences on CA application captured	<ul style="list-style-type: none"> N° of learning session organized N° of tools developed for data collection and assessment of cropping systems tested and capturing of lessons learned by farmers 	<ul style="list-style-type: none"> FFS facilitators and farmers trained in the monitoring, evaluation and learning (M&E/L) exercise Two grids including one for follow-up and data collection and, the second for the assessment of tested CA systems was developed and used in FFS groups learning meetings were conducted weekly in FFS groups A study was carried out on farmers' assessments of tested CA systems Report on Farmers assessments of CA-systems
Relevant CA information and experiences from the region compiled, synthesized and disseminated	<ul style="list-style-type: none"> Report on relevant information on CA in the region Publication and promotional materials 	<ul style="list-style-type: none"> A synthesis on CA innovations and adoption processes in the sub-region and particularly in Northern Cameroon where CA experience is more ancient and is gaining momentum was produced SCAP results being finalized and packaged for dissemination.

Participatory learning processes with farmers other stakeholders.

At the beginning of the cropping season all CA treatments implemented in FFS and farmer innovators individual plots were developed and validated jointly with the respective farmers. Also, FFS-group facilitators have been trained on the Agro-ecological System Analysis (AESA) which includes three main steps: observation, analysis and synthesis and discussion. During the cropping season, FFS members were meeting weekly on the communal plots for the follow-up of the crops but also for a progressive analysis using AESA of each treatment.

A grid for data collection, developed with farmers, has been distributed to all sites. It includes several type and comprehensive information such as type of cropping operation, labor, time spent on the plot and types and cost of inputs for each treatment (Annex 29) At the end of the cropping season all data collected were processed and used for further analysis and synthesis of CA-systems tested. Results of these assessments were completed with surveys conducted to individual farmers both for members and non-members of FFS groups. One of the major expected outputs is to increase knowledge of farmer on CA, but to also identify indicators used by farmers to evaluate CA.

Participatory learning and assessment sessions were conducted throughout the cropping season and after harvesting. Two main activities were realized: i) the agro-ecosystem system analysis (AESA) exercise conducted during the cropping season and, ii) the global evaluation meeting organized after harvesting.

The agro-ecosystem analysis. In all FFS groups constituted, farmers were organized in subgroups according to the number of tested CA systems. Each subgroup was assigned to carry out the follow-up of a specific treatment. Further to classical cropping operations such as weeding, the follow-up consisted mostly in the realization of AESA during weekly meetings. Generally, AESA exercise started three weeks after the emergence of the plant. AESA exercise enables farmers to carry out progressive and preliminary assessment of CA systems compared to their traditional farming practices. Among other appreciations farmers made there are: a better weed control on CA plots due to crop association, the soil moisture which was still very important even after the stop of rain etc. Farmers also started noting some of the challenges related to the implementation of CA such as competition between the cover crop and the main crop. Through the AESA farmers have started knowing more about CA, but most importantly perceiving that the implementation of CA requires new management skills and hence a new learning process.

General assessment and learning sessions. After harvesting, assessments and learning sessions were organized to carry out a comprehensive evaluation of activities implemented and harness data and information necessary for the consolidation of CA techniques tested and to discuss with farmers strategies for the next stage of introduction of CA in their farming practices. A process for the realization of these assessments and learning sessions was elaborated and presented to FFS facilitators (Annex 30) The process includes three main steps:

- i) Analysis of the systems tested in subgroups: In each sites, famers organized into subgroups were asked to conduct a thorough analysis of the system they followed, identifying and ranking main advantages and constraints. During this exercise, farmers also reflected on possible solutions to overcome constraints they identified.
- ii) Presentation and general discussion: results of each subgroup were presented in plenary to the whole group giving the opportunity to other famers to know more about the systems tested by different, but also to share their opinion and appreciation of the system. Then there was a general discussion during which farmers were asked to rank different systems tested from what is more interested and “affordable” for them to the one which looks quite difficult to master and with low value addition compared to their problems and usual farming practices. The objective of the ranking was not to attribute an award to the best subgroup, but to see what are the tested systems that appear to better meet the concern of farmers;
- iii) Strategy for the introduction of selected CA in farming practices. The objective here was to incite farmers to reflect and develop a strategy to introduce CA practices in their farming practices: which crop can be intercropped and how? What cover crop to grow in association or solely but within a crop rotation plan? What strategy to keep crop residues on the plot. In most cases it came out that farmers tend to prefer to grow in association only edible cover crops. They would prefer to grow solely a cover crop which is edible only for livestock or not edible at all..

Indicators and appreciations emphasized during assessment and learning sessions were used for monitoring and fully taken into consideration for the improvement and consolidation of tested systems. A comprehensive study was conducted on farmer's assessments of CA tested systems. Results showed that farmers are primarily interested in socio-economic benefits of CA (timely installation of crops, diversification of production, labor saving etc.) than the improvement of soil properties that usually happen rather in the mid and long terms.

Inter and Intra -village exchange visits

Inter-village exchange visits were organized to sensitize more farmers about CA and also to enable those already testing CA in different villages to share their experiences and assessments. During the visit, host farmers presented to visitors CA demonstration and action research activities they implemented, preliminary lessons and difficulties they experiences. Then, there was discussion with visitors who asked several questions to have further information and compare what they have seen to either their traditional farming practices or in some cases to CA systems they tested in their own villages. In most cases, exchange visits resulted into request to extend CA activity in additional villages during the next cropping season. The main challenge for the dissemination will be the facilitation and follow-up of new CA-FFS groups and farmers innovator. The plan adopted was to support and give further training to some farmers to enable them become facilitators for new groups.

The objective of intra-village visit was to enable CA-FFS group members to present and share their experience from what they are doing with their colleague farmers living in the same village but not yet member of the FFS-groups. In fact, some farmers are still waiting to be convinced, to more about CA before engaging themselves in FFS-groups. Intra-village visits were also a good opportunity to discuss some CA-related decisions which need a collective commitment such as the redefinition of rules for access and management of natural resources and more specifically of crop residues.

Synthesis and generation of Conservation agriculture knowledge through institutional collaboration and student internship:

A synthesis on CA innovations and adoption processes in the sub-region and particularly in Northern Cameroon where CA experience is more ancient and is gaining momentum was produced was conducted in collaboration with CIRAD. Furthermore, several calls were launched during SCAP lifetime for the selection of students who will carry out their internships in SCAP. These students' internships have an important place in the SCAP implementation strategy. They are considered both as a way to carry out efficiently activities but also to improve awareness and train potential staff that will be useful for dissemination and promotion of CA in the region. Moreover, important amount of data, useful and innovative knowledge were generated through these students' researches. These findings are actually being compiled and packaged in different format for dissemination and publications.



Photo 1: Some of the high powered delegates who visited the SCAP sites on 10th Oct 2009 (Photo: ACT, 2009)



Photo 2: The Governor of the North Region of Burkina Faso and the Coordinator of PDRD (at her left) during the visit in Bourbo a SCAP site in the PDRD area (Photo: ACT).

3.4. COMPONENT 4: CAPACITY BUILDING

DESCRIPTION AND OBJECTIVES

Capacity building is a core condition to ensure a smooth and efficient implementation of the project and also the further dissemination of SCAP results and more generally of the scaling of CA in WCA. The tasks of building and scaling CA-based systems involved individuals but also and more especially organizations; hence it is important to conduct capacity building activities for both.

The **objective** of this component was to **strengthen institutional mechanisms, including the consolidation of ACT, as a means of fostering knowledge-sharing and community-led assessment of CA practices in the region.** Activities conducted to achieve this objective include the strengthening of networking capabilities of ACT with especially the opening of an operational ACT- WCA branch, training of project staff and students, strengthening and involvement of farmers' organizations in the implementation of the project.

ACHIEVEMENTS

The implementation of SCAP led to the consolidation of ACT and its installation in western and Central Africa, hence contributing to the achievement of its pan-African mandate to disseminate CA all over Africa. ACT –WCA office is opened and fully operational both administratively and technically. SCAP has contributed to the training of students. 19 students were engaged and trained. Almost all of them have defended their theses and are now enriching the local human resource and expertise on CA. Refresher training course were conducted for the SCAP implementation team on key interventions areas. Farmers groups had been empowered and participated in the realization of activities, they constitute a nucleus for the dissemination of CA in their communities.

SUB-COMPONENT 4.1: TO CAPACITATE ACT TO FUNCTION AS A CA – NRM NETWORKING PLATFORM IN WEST, CENTRAL AND REST OF AFRICA

Settlement and expansion of ACT Network in Western and Central Africa

The registration process of ACT in Burkina Faso as an international for non-profit NGO was launched in early august 2009. The procedure went slowly but successfully. The Minister of Territorial Administration and Decentralization of Burkina Faso signed the decree n°2009/104/MATD/SG/DGLPAP/DOASOC of 31st December 2009 authorizing ACT to carry out its activities in Burkina Faso. Further to this authorization, the settlement process of ACT in West and Central Africa continued and was finalized in June 2010 with the signing of a Convention with the Government of Burkina Faso via its Ministry of Finance. Thanks to this Convention, ACT is benefiting now of several favourable conditions for the development of its activities. Some of these conditions include custom tax exemption, eligibility to VAT registration and exemption.

ACT acquired office premises at offices at 80, rue Soeur Delphine, Ouagadougou Burkina Faso. The office was adequately equipped allowing the staff to carry out activities in good conditions and to develop new initiatives alongside or complementary to SCAP.

Further to SCAP project ACT has been highly involved in designing and submission of several CA-related project proposals covering WCA. To date, four of the proposals have been successful,

and ACT is actually participating in their implementation, hence strengthening its installation in West and Central Africa. The three projects are:

- Agro-ecology based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa: East (Kenya, Tanzania), West (Mali, Burkina Faso) and Southern (Zimbabwe, Mozambique, Madagascar) Africa.
- Conservation Agriculture in AFRICA: Analysing and Foreseeing its Impact - Comprehending its Adoption (CA2Africa): Burkina Faso is hosting the WCA platform.
- Conservation agriculture with trees (CAWT): Ghana, Kenya, Tanzania and Malawi

Tasks	Outputs	Results
To open and make operational an ACT WCA branch and functioning	<ul style="list-style-type: none"> • ACT office premises acquired • N° ACT WCA technical and support staff • Registration Certificate of ACT in Burkina Faso • N° of financial and technical backstopping missions provided to ACT WCA by ICRAF and ACT headquarters • N° of technical and accounting reports produced and submitted • N° of ACT Executive Committee and Board meetings held 	<ul style="list-style-type: none"> • ACT WCA has its registered offices at 80, rue Soeur Delphine, Ouagadougou Burkina Faso • ACT WCA Regional Representative and three support staff have been recruited • ACT is registered as a not-for-profit NGO in Burkina Faso and is operating in WCA from this base. • The Financial and Administrative systems in ACT WCA have been setup and are operating efficiently. • ACT Executive Secretary and Finance Manager backstopped ACT WCA branch through missions • Four annual ACT Board meetings and four Executive Committee meetings were held between 2008 and 2011
Office equipment procured	<ul style="list-style-type: none"> • N° and type of equipment procured • N° of project vehicle procured 	<ul style="list-style-type: none"> • 6 Computers and accessories; 2 printers, 1 photocopier, 1 fax, 1 multi-media projector were procured • One vehicle (Toyota Land Cruiser Prado 11 GJ 5946 IT) has been procured

Furthermore, the ACT Executive Secretary, Monitoring and Evaluation Officer and Accounting Manager are supporting ACT WCA and SCAP on technical and financial issues. They conducted several missions to Ouagadougou and participated in the preparation, implementation and documentation of some technical and administrative activities.

ACT Executive Secretary was in Ouagadougou in April 2010. He participated at the training sessions of FFS facilitators on CA and FFS approach and had meetings with the SCAP team about the implementation of the project. The ACT Accounting Manager came to backstop the ACT WCA Administrative Assistant who is also the ACT WCA Accountant Officer in May 2010.

Engage and train students

During his lifetime SCAP has engaged 19 students including 1 PhD, 11 MSc and 7 BSc. Their recruitment followed a selection process. Most of the students were coming from Burkina Faso

and Niger. It was not possible to have interns in Guinea because of the discrepancy between the beginning of the cropping season and the date at which students start their internships.

Engaging student was a strategy to implement project activities and to generate and/or document and analyse CA-related knowledge in SCAP area. Researches they conducted cover three main areas which encompass the three primary components of SCAP: cropping systems, innovator farmers' networks and knowledge management and sharing. Their researches and studies help to have a better understanding of both technology and process issue, hence allowing to carry out necessary adjustment in the technology and to prepare forth coming phase of up scaling of results.

They were coming from five universities: (i) Abdou Moumini University of Niamey / Niger (1 MSc I and 1 MSc II); (ii) University of Ouagadougou, Burkina Faso (2 MSc II); (iii) University of Montpellier, France (1 PhD); (iv) University of Bobo Dioulasso / Burkina Faso (6 MSc I and 7 BSc) and, (v) 2IE Ouagadougou /IAMM Montpellier France (1 MSc II). To date almost all the students' researches have been terminated except the PhD which is still ongoing and will be terminated in 2014.

Meetings were held with students' academic supervisor to discuss student's proposals, to have comprehensive information about academic requirements regarding internships and also to explore possible rooms for further collaborations with University so as to introduce CA in training modules/curricula. In the University of Bobo Dioulasso, a training module has been dedicated to CA in new MSc Programme launched in 2011.

Students who did their internships in SCAP have enriched the existing local human resources and expertise on CA. this expertise can be mobilized for further research activities and/or the dissemination of CA both at national and sub-regional level. Furthermore, some graduated students are eager to continue and complete their researches through a PhD research.

Tasks	Outputs	Results
Engage and train students	<ul style="list-style-type: none"> N° of PhD and MSc students supported Report of studies undertaken in at least three CA fields of Cropping systems, Knowledge Management and Innovator network Number of innovations developed 	<ul style="list-style-type: none"> 19 students (1 PhD, 11 MSc and 7 BSc) were selected, in liaison with SCAP STAT and host Universities, based on endorsed criteria and supported with fellowships. All of the studies have been concluded except the PhD. Studies have been undertaken in Cropping systems (10 students), Knowledge Management (4 students) and Innovator networks (5 students). New knowledge has been generated including: the proof to simultaneously apply the 3 CA principles for optimal crop productivity, profits, and sustenance of the system.

Table 1. List of researches and studies conducted in SCAP via academic internships

Field	Research topic	Diploma
Cropping systems	• Analysis of specific and cumulative effects of CA principle on sorghum production	MSc I
	• Farmers' management of biomass of <i>Piliostigma reticulatum</i>	MSc I
	• Influence of native shrubs <i>Hyphaene thebaica</i> on soil fertility and production of millet in Niger: perspectives for integration of shrubs in CA-systems	MSc II
	• Influence of native shrubs <i>Guiera senegalensis</i> on soil fertility and production of millet in Niger: perspectives for integration of shrubs in CA-systems	MSc I
	• Cattle fattening in the Gnagna Province (Burkina Faso) : Possibilities for the introduction of CA practices	BSc
	• Integrated crop-livestock farming systems in Kompienbiga (Burkina Faso) : perspectives for the introduction of CA	BSc
	• Characterization of farming systems of Gori (province of Gnagna) : opportunities and challenges for the promotion of CA	BSc
	• Characterization of farming systems of Yilou (province of Bam) : opportunities and challenges for the promotion of CA	BSc
	• Characterization of farming systems of Kompienbiga (province of Kompienga) : opportunities and challenges for the promotion of CA	BSc
	• Characterization of farming systems of Bargo (province of Passoré): opportunities and challenges for the promotion of CA	BSc
Innovator Farmers network	• Potential of Conservation Agriculture in Western and Central Africa	MSc II
	• Diversity and sustainability of NRM stakeholders networks in Burkina Faso	MSc I
	• Efficiency and sustainability of farmers' trainers approach for the dissemination of Managed Natural Regeneration (NMR) in the district of Gourcy (Burkina Faso)	MSc I
	• Participation of women in CA related demonstration and action research	BSc
Knowledge management and sharing	• Ex-ante evaluation of the effects of the adoption of CA on the functioning, technical and economic performance of farms	MSc I
	• Farmers indicators of assessments of CA systems in Northern and Eastern Region of Burkina Faso	MSc I
	• Adoption of conservation agriculture systems in the Eastern region of Burkina Faso	MSc II
	• Analysis of farming practices in Aguié: opportunities and constraints for development of CA systems	MSc II
	• Analysis of biomass flows and fertility transfers in the village: opportunities for a functional crop-livestock integration	PhD (ongoing)

Conduct refresher training for SCAP staff on key intervention areas

Eight members of SCAP Staff participated in training course organised on CA; FFS approach; and Participatory Planning, Monitoring, Evaluation and Learning. The training took place in Karatu (Tanzania). Furthermore, the SCAP implementation participated in a study visit in North Cameroon. The study tour in northern Cameroon is part of the activities that SCAP developed to gather useful and interesting ideas and material to feed his toolbox during the current phase of co-building of CA-based cropping systems that will be disseminated once assessed and validated with farmers. The tour was also intended to allow SCAP farmers and field technicians involved in the implementation of operations to be more knowledgeable of benefits and challenges of CA practices in an area with characteristics fairly similar to those of SCAP site.

Furthermore, training courses on CA and FFS approach were organized for the frontline agricultural extension/facilitators for long term capacity building. Other training sessions on the participatory assessment of CA cropping systems were organized for FFS facilitators and SCAP focal person in IFAD loan projects.

Tasks	Outputs	Results
Conduct refresher training for SCAP staff on key intervention areas	<p>N° of staff trained on CA, FFS approach, Monitoring and Evaluation</p> <p>N° of international study visits to CA sites conducted</p> <p>N° of seminars and backstopping missions organized for ACT staff on financial management procedures and reporting</p>	<ul style="list-style-type: none"> • Training course was organized for 8 SCAP Staff on CA; FFS approach; and Participatory Planning, Monitoring, Evaluation and Learning. • Three members of the SCAP Team and four field staff participated in a study visit in North Cameroon • Two back stopping missions were carried out by ICRAF to ACT WCA and 3 missions by the ACT Finance and Administration Manager

SUB-COMPONENT 4.2: TO ENHANCE FARMER GROUPS, ASSOCIATIONS AND NETWORKS CAPABILITIES AND FUNCTIONING IN PROJECT IMPLEMENTATION

Farmers either individually or via their groups/networks have been involved in the implementation of some SCAP activities. This is particularly the case of the production of seeds and seedling. Seeds of millet, sorghum and cowpea were supplied by farmers' organisations. Also, the production seedlings of *Gliricidia sepium* (6,000), *Piliostigma reticulatum* (7,000), *Bauhinia rufescens* (2,000), *Acacia nilotica* (2,000) were subcontracted to nursery farmers.

Based on ACT and other stakeholders' networks innovator farmers and members of FFS groups established in the framework of SCAP had the opportunity to with their colleagues of other CA-related projects in the region (ABACO, CA2Africa, Programme Faso), hence launching personal relationships and further network for knowledge sharing. In October 2011, FFS groups and innovator farmers of Yilou and Sindri villages hosted their colleagues of Koumbia (400 km far)

who come to discuss with them on their experience in the implementation of CA. This network will be expanded as ACT is engaged via contracts with some international and local organizations (CIRDES, CRS, UGCPA) in the promotion of CA in WCA. Also, 215 farmers members of FFS groups have been trained and actually disseminating CA in their communities contributing to the strengthening of CA networks initiated by SCAP.

Furthermore 11 farmers, leaders of farmer groups (from Burkina Faso, Guinea and Niger), four technicians and three members of the SCAP Team participated in a study visit in North Cameroon. 215 farmers, members of FFS have been retrained and are disseminating CA in their communities

Farmers' organisations participated at the two workshops organised in Ouahigouya and Fada N'Gourma with farmers organizations and other actors of NRM to exchange experience on SLM and seek possibilities for partnerships.

Tasks	• Outputs	• Results
WCA CA networks (based on ACT and other stakeholders) consolidated	<ul style="list-style-type: none"> No. of FFS linked to region and ACT network No. of FFS networks linked together N° of workshops to discuss role for farmers associations in implementation of SCAP 	<ul style="list-style-type: none"> Further to SCAP, ACT is participating in several other CA and NRM initiatives in WCA (ABACO, CAWT, Bio Carbon Fuel, Programme FASO/CRS) 11 farmers, leaders of farmer groups (from Burkina Faso, Guinea and Niger), 4 technicians and three members of the SCAP Team participated in a study visit in North Cameroon ACT has signed MoUs and contracts with key stakeholders for the promotion of CA Two workshops were organized in Ouahigouya and Fada N'Gourma with farmers organizations and other actors of NRM 215 farmers members of FFS have been retrained and are disseminating CA in their communities



Photo 3: Participants at the training visit of farmers of Koumbia (Burkina) in Yilou, a SCAP village (Photo: ACT, 2011)

3.5. COMPONENT 5: MANAGEMENT OF THE PROJECT

The objective of this Component was to ensure that the project is managed in conformity of agreed targets.

Achievements

The project agreement was signed on July 2008. Inception and kick-off meetings were organized to introduce the project to all stakeholders and elaborate a suitable implementation strategy. All components of the project governance system were and operated adequately. Project staff with complementary background was recruited. They work to implement technical and administrative activities, but also to ensure a good coordination of the operations, reporting and monitoring of the project performance. Frequent discussions and coordination meeting were held with project stakeholders. Technical and financial progress reports were produced. A Scientific and technical Advisory Team was constituted and provided suggestions and feedback for a smooth and efficient implementation of the project. Farmers participated in the monitoring of project performance through annual assessment meetings organized in all sites. Mid-term review and external evaluation of the project were planned but postponed because of mishaps.

SUB-COMPONENT 5.1: TO CONDUCT STEERING AND COORDINATION MEETINGS

Institutional arrangements

The SCAP is a regional multi-stakeholder programme whose key implementation players are ACT, CIRAD, ICRAF and representatives of the four national IFAD-Loan projects. The governance set-up to support and facilitate Project management and implementation involved three main units namely: The African Conservation Tillage Network (ACT) Secretariat; Project Scientific and Technical Advisory Team; and Project Implementation Team - all established and functioning with specific but complementary responsibilities.

ACT, through its Secretariat based in Nairobi-Kenya has been responsible for overall coordination and project management functions. The ACT Secretariat took responsibility for overall Project delivery according to stipulated time-frames; ensure the production of quality work and the consistency and compatibility of outputs with regard to the Project purpose and goals.

ICRAF's functions included the due and timely performance of all obligations ascribed to it as the formal recipient of the IFAD grant for the SCAP project. During the Project's first phase, ICRAF, additional to its roles and responsibilities as a Project core partner, provided necessary administrative and financial management support to ACT, in ACT's efforts to mainstreaming and strengthening its capabilities as a continental/regional institution on promotion of conservation agriculture, and hence able to eventually engage with IFAD directly on the management and implementation of future Projects.

The Project Implementation Team was directly responsible to the ACT Secretariat through the ACT Executive Secretary for the actual field level administrative and technical and scientific management of the Project. At the village level, the project was implemented through the individual Farmer Innovators and Farmer Field Schools (FFS) by Ministries of Agriculture staff

under guidance and supervision of the IFAD-financed host projects. Project monitoring, evaluation and some training are done by the Implementation Team led by ACT. The project has also been building CA scaling out capacity to a number of different target groups including mainly farmers, agricultural advisors and decision makers in the departments of agriculture.

Project Staff

The Project Implementation Team was composed of a Project Manager (Dr Patrice Djamen), a member of staff of ACT, and two professional staff including one from CIRAD (Dr Rabah Lahmar) and one ICRAF (Dr André Babou Bationo) seconded to the Project. The three functioned with responsibilities across the three target countries. The team was supported by representatives of the four partners IFAD financed projects³⁰, who were mandated to integrate related SCAP activities within their programmes. SCAP field staff has increased in relation with the inclusion of additional sites and the option to use FFS approach in all villages. Further to the four SCAP focal persons already involved in the implementation of field activities, SCAP mobilized 21 field staff as FFS facilitators: 4 in PADER/BGN area, 8 in PDRD, 5 in PICOFA and 4 in PPILDA. This staff received top up allowances from SCAP according to the number of villages they support. Three support staff was also recruited to assist the project implementation team. These support staff include an Admin Assistant (Judith Koudougou), an Accounts Assistant (Angeline Dabiré) and an office attendant / driver (Etienne Sankima).

Inception and kick-off meetings

SCAP grant agreement was signed in July 2008. An inception meeting was organized in Rome in April 2008 with IFAD and key partners including ACT, CIRAD and ICRAF. The kick-off meeting of the project was held in Ouagadougou in December 2008. This meeting was the occasion to present the project more comprehensively to actors and key implementation partners, and also to define outlines and modalities for the implementation. The meeting was organized into four main sessions: (i) overview of SCAP; (ii) vision of the team SCAP: objectives, implementation strategy and governance; (iii); entry points for the co-building of CA-based cropping systems and; (iv) contribution of NARS, universities and policy makers in the design and scaling of CA-based cropping systems. At the end of the meeting, there was unanimity that thought the implementation of the SCAP and the achievement of its objectives represent a challenge, there is hope taking into account the existing expertise and willingness of stakeholders to work together for sustainable management of natural resources and improved livelihoods of smallholder farmers in West Africa and Central.

Coordination meetings

After the launch of SCAP, specific meeting and discussions were held with key stakeholders to agreement on the implementation pattern and more precisely on the contribution and commitments of each of the two parties. Memoranda of understanding were signed between SCAP and all IFAD loan projects. Each cropping season a specific implementation agreement stating activities to be carried, collaboration modalities and contributions of all parties were signed between SCAP and field partners. These agreements were very useful in the implementation and coordination of activities.

³⁰ SANKARA Souleymane of PDRD Burkina Faso; BARRY Issa of PICOFA Burkina Faso; Sékou SANO of PADER/BGN Guinea; and Mahamane ADAMOU of PPILDA Niger.

Frequent meetings were held in each site to discuss about the implementation of the project. On April 2010 a global SCAP coordination meeting was held Fada N’Gourma in the premises of PICOFA. Top officers of all the four IFAD projects attended. Three main points which formed the agenda of the meeting are: (i) lessons of activities implemented during the first cropping season (2009); (ii) discussions of activities planned 2010 and; (iii) elaboration of suitable implementation strategies so as to carry out successfully activities planned and thus contributing to the achievement of SCAP objective. After discussions, it came out that 2009 was mostly a year of administrative arrangements and sensitization of stakeholders and initiation of activities. Field activities were launched in three of the four projects.

Tasks	Outputs	Results
Stakeholders well-coordinated	<ul style="list-style-type: none"> • Copy of duly signed Grant agreement • Report of the inception and kick-off meeting • N° of Report of coordination meetings organized • N° of MoUs & implementation agreements signed with project partners • Lists of implementation protocol between SCAP and its field partners 	<ul style="list-style-type: none"> • SCAP grant agreement signed • An inception workshop with project stakeholders was conducted • Two SCAP steering committee meetings were held at the launch of the project (Dec. 2008) and at mid-term of the project (April 2010). • ACT signed two MoUs with CIRAD and ICRAF • Four MoUs and annual implementation agreement signed between SCAP and four IFAD loan projects • Coordination meetings between implementation team and national partners were held

The coordination meeting was the occasion for SCAP and its partner to discuss and find a suitable answer to this crucial question: How to make the collaboration between SCAP and the IFAD projects a real win-win relationship? It is worth to point out that at the moment of the meeting most of SCAP partners were facing financial difficulties and they were really concerned about the eventuality of having to disburse funds to sponsor activities in the framework of SCAP. After discussions, it came out that they can contribute to the activities without spending directly money. Their contribution will be mostly in kind, for example the mobilization of a vehicle for the transportation of inputs or equipment to FFS groups. They put the vehicle at disposal and SCAP pays for the fuel. They facilitate the introduction of SCAP to other stakeholders operating in their area. Another linkage is to provide some basic requirements for CA operations e.g. construction of stone ridges or zaïs already supported by IFAD projects. Finally, the latter via their operational setting can help the dissemination of SCAP activities and in return, SCAP brings new techniques to improve what these projects are already doing in the domain of SLM. SCAP also contribute to the documentation and knowledge sharing of developed SLM experiences.

The coordination meeting was the opportunity to discuss the issue of insufficient follow-up of field activities in most sites by field staff during the first year (2009). The cause was not lack of interest of SCAP partners. Rather the issue was due to the fact that most field staff dedicated to the implementation and follow-up of activities though quite good in facilitation and participatory approaches did not have an agricultural background and were sometimes already overloaded with

other activities of their projects. The resolution for 2010 was to select preferentially agricultural technicians and engage them officially with clear terms of reference.

Further to the SCAP coordination meeting, other consultative discussions with representatives of SCAP implementation partners (ACT, CIRAD and ICRAF) took place. SCAP team has the opportunity to present and discuss its activities and plans with representative of ACT (Eng. Saidi Mkomwa), CIRAD (Florent Maraux, Robert Habib, Patrick Dugué, Jean-Marie Douzet) and ICRAF (Antoine Kalinganire, Frank Place, Zac Tchoundjeu).



Photo 4: Some participants at the SCAP kick-off meeting in Ouagadougou (Photo: ACT, 2008)



Photo 5: Participants at the SCAP coordination meeting (Photo: ACT, April 2010)

SUB-COMPONENT 5.2: TO PRODUCE PROGRESS REPORTS, MONITOR
PROJECT PERFORMANCE AND ADJUST

Semi-annual technical and financial progress reports were produced. Further one global report synthesizing achievements and progress of SCAP as on 30th June 2011. This report was presented to IFAD in September 2011 giving the opportunity to share preliminary results but also to have feedback and indications from IFAD on knowledge gaps that need to be filled not only when producing the final report of SCAP but also as a contribution to enhanced knowledge required for an efficient promotion of CA.

SCAP accounts were frequently audited and validated. Answers were given to all audit queries. The SCAP Mid-Term review and external monitoring and evaluation of SCAP were planned but postponed unfortunately due to insecurity in some host countries and other reasons. Nevertheless, during the live time of the project the Project Scientific and Technical Advisory Team (STAT) steered and supported the implementation of the Project by providing independent and professional review of the Project approaches and deliverables, as well as technical, scientific and managerial guidance. It also provided oversight in strategic thinking with regards to Project vision and related social, economic, technical and scientific as well as policy matters. The Scientific and Technical Advisory Team was composed of five members namely Prof Jacques Nanema (University of Ouagadougou), Dr Thio Bouma (Ministry of Agriculture, Burkina Faso), Dr Patrick Dugué (CIRAD Montpellier), Dr Zac Tchoundjeu (ICRAF, Cameroon, Yaounde) and Dr Abdoulaye Mando (IFDC, Togo).

Tasks	Outputs	Results
To produce financial and management reports	<ul style="list-style-type: none"> No. of reports produced N° Audit reports produced 	<ul style="list-style-type: none"> Five technical and financial progress reports were produced and circulated.
To monitor and improve project performance	<ul style="list-style-type: none"> Efficient use of project resources N° of evaluation sessions conducted with farmers Form the SCAP Scientific and Technical Team (SCAP STAT) and utilize their feedback to improve performance N° review and external evaluation conducted 	<ul style="list-style-type: none"> Annual implementation protocols between SCAP and its field partners AESA exercises and global assessment meeting carried out in all FFS groups SCAP Scientific and Technical Advisory Team constituting of five professional members was formed and providing suggestions for the implementation of the project MTR and external M&E were planned but postponed

During its meeting held in 2010 the STAT made several suggestions for the consolidation and finalization of SCAP achievements including the importance of a SCAP Phase II. The STAT considered that a lot of work has been done and that it would be good to consolidate and keep the dynamics created by elaborating and negotiating a second phase for SCAP. Furthermore, it will be useful to document and share results of activities that have been implemented till now. The partnership with IFAD loan projects is very innovative; it is suggested to assess this collaboration and to diversify partnerships in SCAP II.

Regarding methodological aspects, several propositions were made, among others: diversification and consolidation of the implementation setting (R&D, Action Research, Training and

Extension); creation of resource centres managed by farmers to ensure the sustainability of work started in FFS groups; carry out activity at the scale of the village to foster coordination and collective decision necessary to address issues such as management of cover crop, fodder and crop residues; diversification of trees species used in CA-based cropping systems; studies on the impact of agroforestry and CA techniques on soil characteristics and pests.

Farmers were also involved in the monitoring and assessments of activities and progress made by the projects. In all CA-FFS groups, AESA exercises were conducted frequently throughout the cropping season. Further to AESA, a participatory assessment of activities conducted were carried out with farmers giving the opportunity to the latter to express their feedback and suggestions for the improvement of both the systems being tested, the implementation approach and the overall objective of the project. Each year, main problem encountered were identified and adequate solutions elaborated. Table 16 presents an example of results of a participatory assessment conducted with farmers.

Table 16: Main problems identified and solutions proposed to solve

Difficulties	Solutions identified
Low motivation / abandonment of some FFS members and farmers innovators	<ul style="list-style-type: none"> • Comprehensive explanation of the demonstration / research protocols and commitments of each party before the start of operations • Increase the number of field visit for monitoring • Organize contests for the best CA farms / plots • Clearly explain the intervention process and that full benefits of the CA rather appear significantly in the medium and long term
Inappropriate plots	<ul style="list-style-type: none"> • Abandon inappropriate sites and find more suitable sites • To raise awareness and explain the criteria for site selection • Adapt systems to be tested depending on soil type
Natural hazards, inadequate and poorly distributed rainfall	<ul style="list-style-type: none"> • Avoid late planting • Sensitize producers on the importance of learning • Use of improved varieties adapted to agro-climatic conditions
Errors in the installation of protocols and filling of monitoring sheet	<ul style="list-style-type: none"> • Explain more demonstrations / research protocols • Organize missions early in the season • Organize further training of technicians on the filling of monitoring sheet • Identify and mobilize farmers trainers • Increase the number of field technicians
Low availability of straw	<ul style="list-style-type: none"> • Collect and store the straw after harvest • Tests on mulching should be operated only by the farmers who could either keep the straw in their fields or store a sufficient quantity • Develop and implement with farmers a test on the identification of the best methods of straw management • Organize awareness meetings in the village with all stakeholders
Late installation of crops	<ul style="list-style-type: none"> • Provide protocols and inputs on time • Raise awareness of producers on the importance of the tests they conduct and compliance with their commitments
Insufficient technical support	<ul style="list-style-type: none"> • Identify and train farmers trainers/ relay to assist field technician • Increase the number of field missions; • Plan and carry out more inter and intra-villages visits • Increase the number of technicians responsible for supporting producers



Photo 6: Farmers carrying out an AESA in El Guéza village / Niger (Photo: ACT)



Photo 7: Participants at the SCAP STAT meeting (Photo: ACT, September 2010)

4. CONCLUSIONS

1. Conservation Agriculture (CA) has gained wide interest among farmer groups, Development NGOs and Government institutions in West and Central Africa. The SCAP project has contributed significantly to this development. Adoption rates by farmers and diffusion of CA messages among extensionists differ by country but are generally higher in Burkina Faso.
2. The CA technology as defined by FAO is technologically consistent, innovative and promises a significant improvement in combining sustainability with productivity in agricultural production. The recommended use of permanent soil cover using crop residues or cover crops - the strongest and most fundamental component of CA – is also the main challenge for the semi-arid WCA. This is accentuated by the traditional free-range grazing practices of livestock more so because the livestock are mainly not those owned by the farming households but by other members from the community and beyond.
3. It is clear therefore that more effective programmes need to include livestock and production/preservation of more quantities of better quality livestock feeds in addition to involving whole communities - as opposed to groups of farmers within a community – to create awareness and consensus on durable and profitable interventions.
4. The extension of CA in the 31 intervention communities of Burkina Faso, Niger and Guinea has been successful and most targets of the project have been achieved or even surpassed, such as the number of Farmer Field Schools experimenting with CA, the percentage of farmers testing this technology on their land, and the increased knowledge by farmers about this new technology.
5. At the same time, farmers face several constraints in applying CA: lack of seeds limits the application of ground covering legumes; maintenance of soil cover in competition with communally grazed livestock; the limited availability of CA equipment – notably animal drawn planters; and initial inertia for partners to understand the benefits/complementarities of CA and collaborate to harness synergies.
6. The SCAP project has contributed to creating demand among farmers and local governments for support of CA; introducing CA to national agricultural policies, programmes and projects; strengthening capacity of the African Conservation Tillage Network (ACT) and making it a truly independent pan-African NGO; and contributing facts and the evidence to the on-going debates and opposition on the suitability of CA for smallholder farmers in Africa.
7. Nonetheless, Conservation Agriculture is concept (based on the 3 principles), whose implementation cannot be prescribed, but requires adaptation and internalisation by a distinct communities of farmers to tame and realise the optimally functional elements for their farming systems and ecology. The inherent capacity building needs of not only the farmers, but also the other supporting service providers (advisors, scientists, agro-dealers and politicians), demand fundamental changes in the way agriculture is done agriculture. The required change in mindset of all key players and the evolution of the optimal innovations take time and require a long-term development perspective. With the high interest of the WCA governments and various donors willing to invest in future CA projects, necessary continuity could be secured. SCAP has accumulated a wealth of knowledge and experience, from which future projects could profit. However, only a small part of it is to date assessed and documented.

5. PROPOSED WAY FORWARD

1. The triple win (food security – curbing land degradation – climate change adaptation/mitigation) attributes of conservation agriculture as successfully demonstrated by the SCAP adopters warrant further support by IFAD for scaling up adoption to reach more farmers and in many more WCA countries. This is also essential to ensure that the momentum of existing adopters is not wasted, but nurtured to increase to a critical mass of adopters capable of attracting private sector service providers. The Burkina Faso, Niger and Guinea Governments should support scaling up CA through the countries' climate smart agriculture investment programmes linked with ECOWAS and AU-NEPAD/CAADP.
2. The IFAD should support ACT and partners for an additional 5 years funded phase whose focus should be:
 - To document the success stories as CA scaling up models in Burkina Faso, Niger and Guinea.
 - Extended on-farm validation/experimentation is needed to quantify the variability of the CA adoption benefits with time, under different agro-ecologies, and different CA management options.
 - To build farmer and service provider capacity to tackle inadequately addressed challenges from the ended phase of SCAP and those likely to emerge as adoption intensifies and scales out.
 - Support establishment at the ECOWAS level, a climate smart agriculture task force to champion adaptation and massive adoption of conservation agriculture. Coordination, knowledge management, communication and peer review will be some of their key functions.
3. ACT, CIRAD and ICRAF should seek for partnerships to assess, synthesize, package and publish for wider sharing the findings of SCAP. The evidence-based project findings should assist in the advocacy and lobby for policy changes that support scaling up of CA /Climate Smart agriculture in WCA. Salient issues include: introducing CA in national extension systems; uptake of CA in curriculum of colleges and universities; attracting private sector and development partners' investment funding for CA.
4. Livestock keeping should be better integrated as part and parcel of future CA packages to be promoted in WCA to ensure that they are addressed as part of the solution to scale up beneficial CA rather than the problem. Furthermore, livestock would enable efficient utilisation of household labour for an equal part of the year when crop production is not taking place. Livestock would also provide much needed nutrition, power for traction and manure.

6. ANNEXES

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