



RESEARCH
PROGRAM ON
Dryland Systems

CGIAR Research Program on Dryland Systems
West African Sahel and Dry Savannas Flagship
2014 Performance Monitoring Report

Submitted: 30 January 2015

Food security and better livelihoods
for rural dryland communities

The CGIAR Research Program on Dryland Systems aims to improve the lives of 1.6 billion people and mitigate land and resource degradation in 3 billion hectares covering the world's dry areas. Dryland Systems engages in integrated agricultural systems research to address key socioeconomic and biophysical constraints that affect food security, equitable and sustainable land and natural resource management, and the livelihoods of poor and marginalized dryland communities. The program unifies eight CGIAR Centres and uses unique partnership platforms to bind together scientific research results with the skills and capacities of national agricultural research systems (NARS), advanced research institutes (ARIs), non-governmental and civil society organizations, the private sector, and other actors to test and develop practical innovative solutions for rural dryland communities. The program is led by the International Centre for Agricultural Research in the Dry Areas (ICARDA), a member of the CGIAR Consortium. CGIAR is a global agriculture research partnership for a food secure future.

For more information please visit:

drylandsystems.org

© 2014



This publication is licensed for use under the Creative Commons Attribution-Noncommercial-Share Alike 3.0 Unported Licence. To view this licence, visit <http://creativecommons.org/licenses/by-nc-sa/3.0/>. Unless otherwise noted, you are free to copy, duplicate, or reproduce and distribute, display, or transmit any part of this publication or portions thereof without permission, and to make translations, adaptations, or other derivative works under the following conditions:

-  **ATTRIBUTION.** The work must be attributed, but not in any way that suggests endorsement by the publisher or the author(s).
-  **NON-COMMERCIAL.** This work may not be used for commercial purposes.
-  **SHARE ALIKE.** If this work is altered, transformed, or built upon, the resulting work must be distributed only under the same or similar license to this one.

I. CRP PERFORMANCE MONITORING REPORT FOR CALENDAR YEARS 2014 AND 2015

1.1. PREAMBLE

CRPs produce two main categories of reports¹:

- (i) Detailed documentation on progress at research theme/location/component and sub-component level to CRP leadership. This information is the foundation that establishes the credibility of the reports in category (ii). It is prepared by CRP staff and submitted to the CRP leadership and is an important reference for (ii).
- (ii) Annual performance monitoring report at CRP level, from CRP Director and Lead Center to Consortium Office.

The template provided in this document refers to the report in category (ii) whilst its supporting data refers to the information in category (i). Report (ii) is submitted by the CRP Director to the CSO by March 10, 2015 and covers progress during calendar year 2014. Its maximum expected length is 10 pages (plus annexes).

The CRP report provides a strategic overview of where the program stands in terms of progress towards its targets. It focuses on outputs and outcomes and, if relevant, explains changes in future directions. It covers results achieved, regardless of sources of funds used to produce the results (i.e. windows 1, 2, 3 where relevant and bilateral). Different measures of progress have to be monitored over the life cycle of a CRP through different instruments. A given CRP is therefore expected to report every year on those items mentioned below that are relevant to its position in its own life cycle.

Verification of the reliability of the information provided will occur through:

- the external evaluation of the CRPs, commissioned by the Independent Evaluation Arrangement and the leadership of the CRPs;
- the external evaluation of the performance monitoring and reporting system commissioned by the CO at regular intervals (2-3 years);
- the peer review of the individual CRP reports will continue to take place, including by the CO;
- all supporting documents and data bases (report (i) mentioned above) will be available through web links.

¹ A CRP can also produce an annual report of activities to communicate to a large audience and donors. This is entirely voluntary and up to each CRP. Such annual reports are therefore not part of these templates.

1.2. TEMPLATE FOR REPORTING

This template has eight sections and two annexes.

A. MESSAGES (1 ½ page)

In the Wa-Bobo-Sikasso action transect, the CRP has been inching towards more integrated systems approaches at a theoretical and planning level, including an increasing recognition of the integrative potential of geographical convergence and of the leveraging potential of boosting the production of quality fodder. This encouraging development has however not yet led, at each field site, to the activation of a compelling set of integrated co-learning activities around a few priority entry points. Additionally, activity implementation was significantly hampered by administrative delays with most partner contracts signed after the start (in several cases: after the end) of the cropping season, notably at ICRISAT. As a consequence, a significant part of progress is attributable to bilateral efforts in spite of under-reporting of key systems-oriented W3 projects such as Africa RISING or DGIS. Major progresses and challenges include:

Continued collection and analysis of baseline data towards understanding of systems and social targeting of interventions, including:

- New evidence of the availability, but limited use, of a large diversity of crop, tree and animal species with a large portion of these species managed by few farmers on small areas while a few species (millet, maize, sorghum, cotton) are grown by many people on medium to large areas. Agricultural biodiversity (ABD) and dietary diversity (DD) surveys administered in 3 Ghana and 3 Mali villages indicated that only 4 food groups are used by both farmer categories, from 9 (7) food groups available for adults (children). Now, the challenge is to *embed interventions that promote access and use of nutrient rich local foods by women and children in a systems intervention, distinct from (and complementary to) the types of research-in-development that the AN4H CRP deploys (IDO 3)*.
- Increased evidence that in mixed crop-livestock systems, crop residue is becoming a major source of animal feed. Evaluation of feed resources in the Sikasso region (Mali) showed that crop residues accounted for 20 to 35% of ruminants' (cattle, sheep and goat) diet while grazing natural pasture accounted for 40 – 55%. Naturally occurring and collected fodder accounted for 10 to 15% of the ruminants' diet and purchased feeds accounted for 3 to 10% of the animal diet on annual basis. Now, the challenge is to *develop interventions that increase crop annual biomass production per area, and fodder value chains and monitoring systems that track and enhance the availability, quality, storage and digestibility of crop residue products (IDOs 4, 6)*.
- The main sources of household food insecurity in the Burkina Faso and Mali sections of WBS are unpredictable rains, price of crop and livestock inputs, human health impacting household labor and diverting revenue, and social relations affecting access to land and labor. Households poor in livestock holdings and lacking cultivable land (notably female-headed ones) are more vulnerable to food shortages. Diversification of livelihood strategies of the rural households in dryland areas is essential to food security. Now, the challenge is to *develop equitable sets of socially differentiated interventions that also target poor farmers and improve the nutritional state of the entire household, including its living assets (IDOs 3, 4)*.
- Development of socio-economic, biophysical models for rainfall and runoff volume relations and dug-out size estimation for water storage, including mapping, optimal design and building using animal power in the Ghana section of WBS (Yendi-Lawra). Development of prototype implements including reversible moldboard plow for bund construction by draft animals,



prototype seeder that reduces tillage requirements, prototype tool carrier to suite a ridge-till system for runoff management and moisture capture, and an applet for describing the schematics for soil and water balances in dryland systems. Now, the challenge is to *develop a coherent, transect-wide framework for whole-farm bio-economic and tradeoff analyses to assess the comparative or synergistic advantages of water harvesting structures and mechanization implements* (IDOs 4, 5, 6).

- Conduct of land health assessments using the LDSF sampling and randomization framework and data collection on farming systems to link land cover change and agricultural systems productivity, as well as ground truthing of a land use land cover change analysis at 856 locations for the action and satellite districts of WBS, providing evidence of significant diversity in cropland availability across the transect and within the districts. Now, the challenge is to *map farm size and recommend domains for targeting of annual and perennial biomass and fodder production activities across the action transect, as a function of available land health, land and tree resources per capita* (IDOs 4, 1).

Deployment of networks of multi-local, on-farm trials that promote co-learning and contextualization of interventions, including:

- In on-farm trials on the use of dual-purpose crops and post-harvest mechanization for intensified stover and crop residue production, involving 25 farmers in 6 villages of the Koutiala District, Mali (including the DS field site of Kani), improved hybrid sorghum varieties were tested with multiple crop management options (e.g. intercropping maize-cowpea, sole sorghum with different fertilizers applications...). Samples were collected to test digestibility of the stems, and yield was assessed. A stems chopper arrived in the region, and still needs to be put to use. Feeding trials are planned for the coming months. Similar activities in the upper West region of Ghana (Wa) were initiated but impaired due to administrative delays. Inadequately monitored trials on dual-purpose sweet potatoes and sorghum were nevertheless carried out. Now, the challenge is to *improve the seasonal sequencing, routine delivery and numbers of dual-purpose, processing and feed trials as a co-learning activity about fodder value chains* (IDOs 4, 6).
- Three hundred (300) participatory fertility trials deployed on-farm on cotton, maize, millet, peanut, sorghum and monitored on-the-ground and with UAVs indicated that towards peak biomass, intra-specific variability in canopy height and fractional cover are as large as inter-specific variability, illustrating large genotype-by-environment-by-management interactions and effectively hampering automated crop recognition through simple remote sensing methods in smallholder systems. In terms of fodder production, sorghum expresses the highest sensitivity to variability in soil conditions. For all crops fodder samples are used to develop high throughput screening methods for digestibility through near infrared spectroscopy, including automatic estimation of leaf vs. stem biomass. Now, the challenge is to *improve crop separability with textural profiling, and to optimize soil fertility management with imagery for highest biomass returns* (IDOs 4, 6).
- Working with networks of farmer innovators and using farmer experts (men and women) as trainers can lead to a widespread adoption of agroforestry innovations through collective action and co-learning. A set of activities has been conducted focusing on: i) agro-ecological intensification of sorghum and pearl millet-based production systems in the Sahel through agroforestry: linking farmers' knowledge to process-based science agro-ecological Intensification, ii) sustainable intensification of cereal-based farming systems, iii) fodder trees species for enhancing production of the Sahelian Agroforestry systems, iv) enhancing food and water security for rural economic development, iv) diversification, improvement and conservation of native tree species in parkland agro-forests, v) community mobilization and

establishment of innovation platform. These activities contribute to the first four DS CRP's IDOs which target direct impact on wellbeing and sustaining natural resources base. They partly contribute to the IDOs related to market, service delivery and policy reform as well as DS program strategy on gender and youth as well as awareness raising and capacity building. The launching workshop of the implementation phase of "Agro-ecological intensification of sorghum and pearl millet-based production systems in the Sahel through agroforestry: linking farmers' knowledge to process-based science" (ICRAF-McKnight project) took place on 6-8 January 2014 in Ouagadougou, Burkina Faso. The 19 participants included national scientists, NGOs and representatives of farmers from Burkina Faso and Mali as well from ICRAF Sahel Office. The following deliverables were achieved: (i) a revised and commonly accepted theory of change, (ii) monitoring and evaluation tools developed, (iii) workplan for each partner elaborated, and (iv) methodological approaches for field activities developed. After the launching, the workplans developed were presented, discussed and validated at village level in the two countries involving TreeAid, UDPN and INERA in Burkina Faso, and AMEDD, GRAADECOR, Cooperative Djiguiya and IER in Mali. For the baseline, a total of 147 households of three villages around Nobéré and 50 around Dougoumousso were surveyed. Four field trials have been conducted in Burkina Faso and Mali.

In the Kano-Katsina-Maradi action transect, the CRP major progress include:

- Establishment and operationalization of the three innovation platforms in Kano state in the KKM action site was a major step in the innovation system approach as a proven tool for successful transfer of technology and knowledge sharing along wheat value chain among all stakeholders toward a more integrated, effective and connected service delivery institutions underpinning system intensification (IDO 6). Within the IP sites, emphasis were placed for 1) fast-tracking innovative and participatory technology testing, validation, on-farm popularization and promotion of proven wheat based technologies along the wheat value chain; 2) implementing an accelerated wheat seed increase through establishing functional community-based farmers' seed multiplication and supply scheme. In addition, farming system survey was initiated within the three IP sites to assess the status and threats to agro-biodiversity following the on-going intensification to recommend measures for promoting in situ conservation of dryland agro-biodiversity.
- The main sources of household food insecurity in KKM transect are unpredictable rains, social relations in terms of access to land, price of crop and livestock inputs, human health as this reduces household labor and diverts household revenue to care for sick members, and access to market. Households that are poor in livestock holdings and those that lack cultivable land are more vulnerable to food shortages. Households headed by women are particularly more vulnerable to food insecurity as they often do not own livestock and do not have access to cultivable land. Diversification of livelihood strategies of the rural households in dryland areas is essential to food security.
- Multi-stakeholders meetings were facilitated in the 3 field sites (Bebedji, Kano state, Nigeria; Zango, Katsina state, Nigeria; Gazaoua, Maradi, Niger) in KKM action site in April/May 2014 and subsequent follow-up meetings were organized. Stakeholders involved in the platforms include farmers, input marketers, processors, scientists, extension groups, local authorities and traditional leaders. The meetings focused on the constraints and opportunities for intensification of crop and livestock systems.
- Nine hundred and fifty-one (951) demonstrations were established in 438 villages in 73 local government areas in 16 states in Nigeria. This was conducted harnessing funds from the Nigeria Groundnut and Sorghum Value Chains.

- Preliminary results from experiments carried-out in Niger and Nigeria on stepwise substitution of maize by sorghum in poultry feed indicated that sorghum is a cheap substitute for maize in poultry diets in Nigeria. <http://www.thepoultrysite.com/poultrynews/34025/nigeria-find-sorghum-a-favourable-alternative-to-maize-in-poultry-feed>
- Through the multi-stakeholders meetings, the training needs of the communities were ascertained at the Katsina, Kano and Maradi transect. One salient gap identified during stakeholders' consultation was lack of technologies to improve the use of green and dry fodder. Dry fodder choppers were available in the region but they did not chop green fodder. As a result, a green and dry fodder chopper was introduced in the region and training was conducted. <http://drylandsystems.cgiar.org/content/innovative-machines-better-crop-livestock-farming>.
- In order to build the capacity in the West African region for NIRS equation calibration, a total of 338 samples from Niger and 88 samples from Nigeria were initially sent to ILRI Patancheru. The same set of samples in duplicate is being sent to ILRI Nigeria and ICRISAT Mali.
- Multi-stakeholders' meeting was facilitated in one field site (Ouahigouya) in KKM action site in May 2014 and subsequent follow-up meetings were organized. Stakeholders involved included representatives from non-governmental organizations, regional and local government, traditional leaders, decentralized technical and extension services, technical support staff, cooperative and community-based organizations. The meetings focused on the constraints and opportunities for intensification of production system including livelihood diversification (ICRISAT Happenings 16 May 2014, 1623).
- For demonstration of an innovation chopping green and dry fodder which is not practiced in West Africa in general and particularly in the KKM site, three mobile choppers were fabricated for chaffing of green and dry fodder.
- Communities engagement in striga and soil fertility management activities targeting agricultural intensification but also in rainfall monitoring in the transect.
- Participatory evaluation of striga management, and microdosing conducted through demonstration tests and farmer field schools in Niger and Burkina.
- Better articulation of cereal-based farming system with a strong tree component as more and more actors are calling for climate-smart agriculture, improved productivity and smallholder farmer resilience
- Working with networks of farmer innovators and using farmer experts (men and women) as trainers can lead to a widespread adoption of agroforestry innovations through collective action and co-learning
- Within cereal-based system itself, research partnerships lead to better and more appropriate innovations (technical, institutional, informational), and to higher, faster and more sustainable adoption or adaptation.

B. IMPACT PATHWAY AND INTERMEDIATE DEVELOPMENT OUTCOMES (IDOS) (1/4 page)

Provide a web link to the overall CRP Impact Pathway and theory of change (including gender dimension) and list the CRPs' IDOs and their associated targets and indicators. Provide a web link to the baseline data of the CRP.

C. PROGRESS ALONG THE IMPACT PATHWAY

The CRP should complete Table 1, in Annex 1 and provide a narrative (C.1 to C.3), referring to those indicators from the table in Annex 1 that are relevant to the CRP.

C.1 Progress towards outputs (2 pages)

In the Wa-Bobo-Sikasso action transect, key progress towards outputs include:

- A methodological framework is developed for assessment of agricultural biodiversity and dietary diversity at community and household levels (IDO 4).
- The development of research protocols and their implementation pave the way to achieving the outputs on evaluating the tree-crop interaction, managing the existing biomass and developing new agroforestry practice. Combined findings will help later producing the guidelines document. For the project staff of Mali, the technician (Souleymane Koumaré) from ONG GRAADECOCOM has been trained to the measurement of biophysical parameters of trees and crops as well as in soil sampling techniques in Mali. A baseline survey of a total of 147 households of three villages around Nobéré and 50 around Dougoumousso was administered. Four field trials were conducted in Burkina Faso and Mali (IDO 4).
- Data and crop samples have been collected for the exploration of dual-purpose crop and post-harvest mechanization for intensified stover and crop residue production. The samples need to be sent to the lab for analysis. Harvest results will be analyzed shortly (last harvest was in December 2014). Set-up on the feeding trial is under discussion and imminent (March 2015).
- Conducted assessment of vulnerability and risk of smallholder farmers in WBS – Mali (Kani and Farakoro field sites in Sikasso region) and Burkina Faso (Mahon and Sayaga field sites in Bobo region). Group and individual interviews were conducted over 4 months (February to May 2014) in WBS field sites to collect basic information on risk perceptions, variation in vulnerabilities to risks and strategies to reduce socioeconomic vulnerability.
- Prepared a comprehensive report of the evaluation of existing and potential feed resources in mixed crop-livestock systems in Sikasso region of Mali. Submitted an article on evaluation of feed resources in mixed crop-livestock systems of Sudano-Sahelian zone of Mali to Animal Science Journal. The article is presently under review after receiving comments from the reviewers. Published a paper on livestock feed markets in West African Sahel in « *Revue d'élevage et de médecine vétérinaire des pays tropicaux* » Volume 67. Prepared a comprehensive report on strengths and weaknesses of existing local conventions (by-laws) governing natural resources management in Sikasso region.
- Conducted surveys to analyze the immediate and long-term causes of conflict over natural resources use and to identify options to reduce conflicts and associated problems. Group discussions and individual interviews were carried-out in the six study communities in Sikasso region of Mali addressing inventory of available natural resources, relations among different social groups, causes of conflict over natural resources and the strategies to resolve the conflicts. The group discussions involved key stakeholders in conflict management with the local administrative authorities. In addition, eight Non-Governmental Organizations (NGOs) working on conflict management in the study districts (cercle) were interviewed on their roles and capacity. Training was conducted in Sikasso region on conflict management.
- Project outputs on making dugouts for storing rainwater will be scaled-up in Northern, Upper West and Upper East regions of Ghana through bilaterally funded projects. More work will focus on dugouts construction, installing shallow wells for small-scale irrigation and construction of

various forms of water harvesting structures. A conference paper/journal manuscript will be prepared and submitted in 2015. Rainfall-runoff relationships have been determined from farmer-collected data at two sites for a maize field (with crop) and a fallow “bush block” pasture. Evaluation of the rainfall-runoff model was done in December 2014. Implements for improving land preparation were constructed and delivered to the community. Follow-up meetings will be done in 2015 to see progress in using the implements to achieve further expansion of cultivated area and do further testing for adaptability and acceptability among the farmers. Further, we developed tools for demonstrating the soil water balance, accounting for water inputs (rainfall and irrigation) and water losses (deep drainage, evapotranspiration and runoff).

- Comprehensive landscape soil and ecosystem health assessment was conducted in 2 districts of Northern Region of Ghana and 2 districts in the Upper East Region of Ghana. This was complemented with agronomic surveys that related to overall crop productivity. The final product was a land use and land cover change assessment and will be followed up by one peer-reviewed journal article (currently in preparation). Several metrics and protocols were developed for soil sampling, tree counts, infiltration measurement and overall ecosystem health. In addition, a comprehensive agronomic survey protocol was developed. Extensive on-ground sampling, measuring and assessment of landscape attributes such as land cover and land use, nature of soils and water resources, was conducted. Efforts were taken to conduct measurements at sites that had prior Africa RISING data being collected on variation of soil moisture regimes in farmers’ fields, thus adding value to the overall land degradation surveillance framework (LDSF).
- Trials were installed on 48 farms in Mali (with ground and UAV coverage), 105 farms in Nigeria (with end-of-season biomass and yield measurements only). In Mali, between 3 and 6 overpasses were made by UAVs. A comprehensive data collection protocol was developed in English and French, with connection to the MANOBI S.A. mInventory™ mobile platform and supplementary ODK forms. A .sqlite database was developed and data was overlaid on top of 8,700 km² of new cloud-free DigitalGlobe imagery acquired on 16 different dates during the May-November period. Distribution of data processing and analysis responsibilities between ICRISAT, UCL, WUR, UDS have been discussed in January 2015. Deployment of an imagery, subscription-based land tenure information service targeting 50,000 farmers was initiated with a background report on current statutory and customary developments in rural land tenure in Mali and the ongoing extraction of wall-to-wall parcel databases from imagery for the communes of Kolonigue, Koningue and Nafanga.

In the Kano-Katsina-Maradi action transect, key progress towards outputs include:

- Establishment and operationalization of three wheat value chain innovations platforms in Kano State (Kadawa, Alkamawa, Bagwai) has been effective for bringing together relevant stakeholders involved in wheat production, processing and marketing. Village-based technical symposiums were organized to raise the awareness of farmers and stakeholders participating at different IP sites. More emphasis was placed in terms of formalizing IP governance at community levels, roles and task sharing among stakeholders (such as timely supply of inputs, access to credits, village level IP business plan and joint monitoring evaluation).
- On-farm trials/demonstrations were organized on 4 farmers’ fields in each of the 2 communities in Sudanian-Savanna zone of Nigeria and Sahelian zone of Niger to demonstrate resistant varieties of cowpea, fertilizer application and crop rotation on control of striga.

- Nine hundred and fifty one (951) demonstrations were established in 438 villages in 73 local government areas in 16 states in Nigeria. This was conducted harnessing funds from the Nigeria Groundnut and Sorghum Value Chains.
- Experiments were carried-out in Niger and Nigeria on stepwise substitution of maize by sorghum in poultry feed. The objectives of the experiments were to: a) compare the replacement value of the different sorghum varieties for maize in broiler diets; b) to come up with recommendable inclusion level(s) of different sorghum varieties in broiler diets and c) to evaluate the cost benefit of replacing maize with different varieties of sorghum in broiler diets.
- Conducted assessment of vulnerability and risk of smallholder farmers in KKM (Milli and Gourdjia in Maradi, Niger; Ishiyawa and Yakubawa in Zango local government of Katsina state and Kofa and Anadariya in Bebedji local government of Kano state, Nigeria). Group and individual interviews were conducted over 4 months (February to May 2014) in KKM field sites to collect basic information on risk perceptions, variation in vulnerabilities to risks and strategies to reduce socioeconomic vulnerability.
- Stakeholders' meetings were facilitated in the 3 action sites (Bebedji, Kano, Nigeria 29th April, 2014; Zango, Katsina, Nigeria 30th April, 2014 and Gazaoua, Maradi, Niger Republic 2nd May, 2014) which resulted in the engagement of farmers in demonstration tests of groundnut varieties Samnut 23 and 24 in Bebedji. In addition, farmers were linked to seed, agro-chemical companies and commodity brokers in Katsina. Registration of farmer groups to source inputs through governmental agencies in Maradi was also done. These meetings also resulted in scientists exploring the replacement of maize with sorghum in poultry feed with trials initiated in Kano and Maradi. They allowed enhancing of knowledge, expand network along with technology oriented practical demonstrations on food-feed crops, innovation of green and dry fodder chopping using machines; use of grinders for feed block making, animal traction and manure management.
- In the poultry feed experiment in Niger, 240 farmers were involved and different combination of feed options targeting replacement of maize in the diet by sorghum. The results show that birds fed corn-based, sorghum-based or corn-sorghum-based diets had similar growth performance and carcass characteristics. Thus, tannin free sorghum had nutritional value comparable to that of corn and in West Africa local sorghum is a good alternative for poultry feeds when grains price are similar.
- With the same experiment involving different combinations as compared to Niger in Nigeria, the preliminary results indicated that sorghum-based diets give comparable weight gain in 0-4 weeks.
- Dual-purpose crops-cereals, oilseed and legumes were also tested for integration of crop-livestock system. Samples of pearl millet varieties straw, groundnut and cowpea varieties haulms and sorghum varieties were tested in Niger and Nigeria. These residues were used in sheep fattening experiments as fodders were chopped where necessary. In addition, socio-economic data were also collected particularly at Sadore where it was observed that the main activity of inhabitants is agriculture associated with livestock. In addition they used to work at ICRISAT as laborers because of the proximity of the Center. The most important crop cultivated in the village is millet followed by cowpea. Sheep and goat are the major animals raised in the village. It was also reported that 82% of the farmers in Sadore village followed stall-feeding practices, only 18 % of the farmers sent their sheep for grazing.

- In Nigeria the following activities were conducted as consequence of the stakeholders' meetings organized in early April:
 - on-farm trials\ demonstrations was organized on 4 farmers' fields in each of 2 communities each in Sudan (Nigeria) and Sahel (Niger) to demonstrate resistant varieties of cowpea, fertilizer application and crop rotation on control of striga;
 - nine hundred and fifty-one (951) demonstrations were established 438 villages in 73 LGAs in 16 states in Nigeria. This was conducted harnessing funds from the Nigeria Groundnut and Sorghum Value Chains;
 - twenty-five trainings and field trips were organized for 868 men and 214 women participants (farmers, extension agents, processors, and scientist) and 3 field days were organized;
 - Training on improved processing technology of groundnut to women farmer/processor groups organized;

in September 2014, follow-up meetings of the stakeholders' meetings organized in April were conducted independently in Bebedji and Zango respectively in Nigeria.
- Two sets of trials one each for sorghum-groundnut and millet-groundnut intercropping systems were established in two locations each were also conducted. Trials were successfully conducted and full range of data collected. Data Analysis is ongoing.
- Participatory evaluation of striga management, and microdosing was conducted through demonstration tests and farmer field schools in Niger and Burkina Faso.
- Integrated system involving rainwater harvesting technologies, leafy vegetables and high value trees tests conducted in 88 new villages in addition to the 97 villages covered in 2013 in Niger. A total of 288 successful tests were conducted and 31 successful FFS that involved more than 620 farmers of which more than 100 were women.
- A network of 90 direct reading rain gauges installed in two regions of intervention of the CRS/ICRISAT food security project in Niger in addition to an automated Campbell scientific weather station. One such station was installed in the RDS KKM site in Filly in addition to a network of 10 direct rain gauges. Three automated Campbell scientific weather stations were also installed in the KKM sites in Nigeria.
- Prepared a comprehensive report of the evaluation of existing and potential feed resources in mixed crop-livestock systems in dryland areas of Niger and Nigeria.
- A study to identify and characterize promising livestock value chains were carried-out in the drylands of Kano-Katsina-Maradi transect. The study focused on smallholder diary value chain, beef value chain, sheep and goat value chain. Enumerators were trained on the procedures, practical sessions and use of survey tools. The survey instruments included village level tools (village assessment tool and producers tool), inputs and services suppliers assessment tool, livestock traders' assessment tool, feed sellers' assessment tool, processors and retailers' tools, consumers questionnaire, veterinary services tool and livestock transporters. The study was carried-out between August and November 2014.
- A methodological framework is developed for assessment of agricultural biodiversity and dietary diversity at community and household levels.
- Analysis of the fodder quality of varieties of pearl millet, groundnut, cowpea, sorghum, maize and groundnut collected from field and on-station trials using NIRS technique. For calibration of NIRS equations for use in West Africa, a total of 338 samples from Niger and 88 samples from Nigeria were initially sent to ILRI Animal Nutrition laboratory in Patancheru and the same set of

samples in duplicate is being sent to ILRI Nigeria and ICRISAT Mali for analysis using NIRS technique.

- Several small-scale mechanical implements and machines were sourced and introduced to smallholder farmers in dry savanna of Nigeria in 2014. These included animal drawn combine planter, motorized multi-crop thresher, manual thresher and hammer mill.
- Participatory evaluation of striga management, and micro-dosing conducted through demonstration tests and farmer field schools in Niger and Burkina.
- Integrated system involving rainwater harvesting technologies, leafy vegetables and high value trees tests were conducted in 88 new villages in addition to the 97 villages covered in 2013 in Niger. A total of 288 successful tests were conducted and 31 successful farmers' field schools that involved more than 620 farmers of which more than 100 were women.
- Weather and rainfall monitoring: a network of 90 direct reading rain gauges installed in two regions of intervention of the Catholic Relief Services RS/ICRISAT food security project in Niger in addition to one automated Campbell scientific weather station. One such station was installed in the KKM action site in addition to a network of 10 direct rain gauges. Three automated Campbell scientific weather stations were also installed in the KKM sites in Nigeria.
- Six new heat tolerant varieties have been identified and selected as potential candidates for official approval of release by the National Variety Release Committee in 2014 and 2015 seasons. Of these, two of the candidates ("Norman" and "Reyna") were officially released in 2014 based on their outstanding merits in terms of grain yield (5.0-6.0 t/ha), tolerance to heat stress, desirable grain quality and resistance to the prevailing rust diseases.
- Five research activities were conducted in areas of stabilizing wheat yields through better water, soil, and crop management, efficient diseases and pest control; and promoting sustainable wheat-based systems through conservation agriculture and crop rotation that protect natural resources.
- Following the integrated system approach, more than 650 IP participating farmers who adopted the newly introduced wheat based technologies increased their farm level wheat productivity 4-6 t/ha, significantly superior to 1-2 t/ha average of traditional varieties.
- 23.43 tons of initial seeds (basic and certified seeds) of newly released varieties were produced through an accelerated seed multiplication scheme (Kadawa: 11,000 kg, Bagwai: 6950 kg, Alkamawa: 5480 kg) by involving seed producers and community-based seed enterprises.
- Farming system survey was initiated within the three IP sites to assess the status and threats to agro-biodiversity for promoting in situ conservation of dryland agro-biodiversity.
- Synthesis and analysis of current knowledge on the potential of trees/shrubs to improve nutrient and water availability for sorghum and millet was produced.
- Prepared a comprehensive review of pasture and fodder production and productivity for small ruminants in the Sahel.
- Created learning platforms and awareness-building and technical support mechanisms to increase innovation and adoption of practices for sustainable intensification of cereal-based farming systems in the Sahel in Nobere on the central plateau of Burkina Faso.
- Prepared a comprehensive report on value chains and financing mechanisms (formal and informal) for agro-pastoral activities for DGIS project in Mali, Burkina Faso and Niger.

- Conducted a survey and prepared a comprehensive report on innovations, access to and control over natural resources for DGIS project in Mali, Burkina Faso and Niger.
- Prepared a comprehensive review on conducive policy for scaling innovation and analysis of non-wood tree products with potential for development for DGIS project in Niger.
- Tested on-farm tree-crop interaction assessment using different tree species and cereal varieties.
- Established fruit tree mother blocks trials in five villages (Mali) for increased availability and accessibility of improved planting material (trees, shrubs) for rural cooperatives and their union for setting a food bank.
- The development of research protocols (for ICRAF-McKnight project) – and their implementation pave the way to achieving the outputs on evaluating the tree-crop interaction, managing the existing biomass and developing new agroforestry practice. Combined findings will help later producing the guidelines document. For the project staff of Mali, the technician (Souleymane Koumaré) from ONG GRAADECOM has been trained to the measurement of biophysical parameters of trees and crops as well as in soil sampling techniques in Mali. A total of 45 farmers (including 10 women) of UDPN were trained on natural assisted regeneration and compost production whereas the training on tree management involved 42 farmers of which 10 were women in Burkina Faso. For each of the three training topics a technical guide has been produced in French; they are being translated into local language for the trainees.

C.2 Progress towards the achievement of research outcomes and IDOs (2 pages)

- The training on natural assisted regeneration led to the establishment of plots where this technique was applied giving a total area of 46.75 ha with a total 711 individuals of local species dominated by *Vitellaria paradoxa*. This is showing a start of change in the behavior of farmers, the main beneficiaries (IDOs 4, 6).
- Existing crop and food diversity available to local communities in Koutiala in Mali is known. Farmers' crop species that are rich in nutrient and adapted to local conditions but are neglected because of low market value are identified (IDO 4).
- Farmers are enthusiastic about new dual-purpose crop varieties and post-harvest mechanization for intensified stover and crop residue production. Requests for provision of additional germplasm have been registered for the coming year (IDOs 4, 2).
- In the Mali section of WBS, feed related interventions have been identified to improve livestock productivity and efficient nutrient cycling in the crop-livestock systems; the capacity of key natural resources management actors was strengthened to better manage conflict over natural resources use (IDO 4).
- Innovative public-private partnerships involving private partners (MANOBI S.A., Pixela S.A.R.L.), NGOs and development projects (AMEDD, KNARDA), research organizations (IER, CDA/BUK, ICRISAT), farming communities and national regulatory agencies (e.g. National Space Research and Development Agency, Nigeria) are collaborating to develop sustainable business models for next-generation farm information services (IDOs 4, 6).
- Enhance community-level knowledge exchange, collective action and co-learning: at DGIS site in Niger local communities in five rural communes (including men and women) worked together to identify promising innovations for enhancing food and water security.

- Strengthening farmers capacity: farmer-to-farmer training on community based agro-forestry practice called Farmer Managed Natural Regeneration, men and women farmers trained on tree nursery and food bank management in established rural resource centres.
- Feed related interventions have been identified to improve livestock productivity and efficient nutrient cycling in the crop-livestock systems in KKM transect.
- The project adopted “Innovation Platform” as an efficient framework for generation, diffusion and promotion of impactful wheat-based technologies/innovations along the value chain. This approach is proved to be an effective tool in promoting communication, interaction and cooperation among stakeholders (agricultural research, education, extension, farmers, private sector and policy makers) through jointly diagnosing challenges and devising sustainable solutions for generation of innovation and impact. During 2014, the three already established IP sites in Kano were fully operationalized. The impressive performance of the newly introduced heat-tolerant wheat-based technologies with yields of 4-6 t/ha – significantly more than 1-2 t/ha average of traditional varieties – convinced policy makers and generated a key policy shift in Nigeria. Accordingly, wheat has been included as a priority in the Nigerian Government's Agricultural Transformation Agenda (ATA) and domestic production is targeted as a solution for curbing ever-growing import dependence and for ensuring food security. The Government of Nigeria has launched a national target to scale-up the best practices, increase the wheat area from the existing 70,000 ha to 340,000 ha, and reduce the national wheat importation by 45% in the coming five years. Speaking at the wheat farm field day event held at Kadawa IP site in March 2014, Nigeria's Minister of Agriculture and Rural Development, Dr. Akinwumi Adesina, described the government's plans for boosting demand for domestic wheat. “I want to assure our wheat farmers of a number of things: we can guarantee a minimum price for your wheat, we will provide access to processing equipment, we will support land management, irrigation pumps, as well as subsidized inputs. And we are making it mandatory for millers to take Nigerian wheat.” <http://www.icarda.org/blog-content/%5Bnode%3ABlog%20type%5DImproved-wheat-production-and-productivity-solution-nigerian-import>.
- Enhance community-level knowledge exchange, collective action and co-learning: at DGIS site in Niger local communities in five rural communes (including men and women) worked together to identify promising innovations for enhancing food and water security.
- Strengthening farmers' capacity: farmer-to-farmer training on community based agro-forestry practice called Farmer Managed Natural Regeneration, men and women farmers trained on tree nursery and food bank management in established rural resource centers.

C.3 Progress towards Impact (1/4 page)

D. GENDER RESEARCH ACHIEVEMENTS (1 page)

- The methodological framework adopted to assess agricultural biodiversity and dietary diversity is gender disaggregated. Capacities of national researchers were enhanced for the implementation of gender-oriented research. The use of this method benefits from women's vision and thoughts about development and use of existing crop, tree and livestock diversity. Specific attention is paid to women for assessing dietary diversity locally available and to determine food composition (IDOs 3, 6).

- Gender-disaggregated analyses were reported for the CRP DS baseline household surveys on the two transect action sites. The DS CRP gender strategic research and integrative research plans for 2014-2016 were conceived in coordination with other DS Flagship gender focal points. Guidelines were developed to integrate gender into DS Biophysical Scientists Research by (1) abstracting general guidelines based on the biophysical research domains: livestock, water, and seeds (2) working with respective biophysical scientists to understand their needs and obstacles for integrating gender, (3) finding ways with gender specialists to integrate gender issues into biophysical scientists' research based on practical experiences. Tools were elaborated, and field partners were identified to collect data on the strategic gender research on gender equity in decision-making, access to and control over household and non-household labor in DS. The main objective was to provide scientific-based evidences to supporting and improving gender equity in decision-making and in access to and control over labor and related resources. This research is still to be completed in the two transect action sites (IDOs 3, 4, 6).
- Several activities were conducted in Ghana where men, women and youth participated, although we did not specifically disaggregate the participants by gender. In Burkina Faso, more work was devoted to the establishment of the Water Users' Associations (WUA). Consultations with General Directorate of Water Resources (DGRE) at the Burkina Faso Ministry of Water and at the General secretariat for the Integrated Water Resources Management were conducted in 2014. Interviews with five water specialists and water management officers were carried-out in Ouagadougou (Ministry of Water, DGRE, and National Water Council). The water specialists provided the legal documents on the organization of the water sector. The main challenge was political instability in Burkina Faso, which disrupted the work of a consultant on gender on the DS CRP after the coup. Thus, the gender disaggregation component in Burkina Faso could not be finalized as well.
- One farmer exchange visit was organized in the Upper West Region of Ghana where both male and female farmers were chosen to participate in learning landscape health assessments. Here both men and women farmers were involved, but a complete gender disaggregated assessment was not carried-out. We intend to examine impact of gender on landscape management for studies to be conducted in 2015.
- Joint site visits with CIP, ICRAF, ICRISAT, Bioversity, CIRAD, CSIR-SARI, and local partners helped establish trials to evaluate orange-fleshed sweet potato varieties as a nutritious crop for household food and as a feed for animals. On-farm (mother-baby) trials were established at Yagtuuri, and in Jirapa District. Participating farmers purchased small quantities of seed to try on their farms. A mother plot was established for demonstration and nutrition awareness.
- A project was written with local partners including iDE, INERA, and CSIR-SARI to be implemented at Dryland Systems action sites (among others) in Burkina Faso and Ghana. Project entitled *Jumpstarting orange-fleshed sweet potato in West Africa through Diversified Markets* focuses on nutrition outcomes for women and young children (combating vitamin A deficiency) through market-led approaches. Varieties and seed systems are critical components. Impact pathways (theory of change) was developed with partners at each action site, and WAS & DS CRP-DS gender and impact specialist participated in the meeting in Burkina Faso to ensure integration of this project into DS M+E framework.
- Of eighty-seven farmers trained on various technical themes pertaining to agro-forestry and integrated soil fertility management (natural assisted tree regeneration, composting), twenty trainees were women.



- Men and women committed to establishment of innovation and learning platform (Diagnostic/planning meetings to identify the opportunity to introduce high yielding fodder and fruit tree species in 5 villages in Mali).
- ICRAF-McKnight – twenty out of 87 trainees were women. A young technician has been trained for his Masters degree.
- Contributing in developing guidelines for Integrating gender into Dryland Systems Biophysical Scientists' Research by (1) abstracting general guidelines based on the biophysical research domains: livestock, water, and seeds (2) working with respective biophysical scientists to understand their needs and obstacles for integrating gender, (3) finding ways with gender specialists to integrate gender issues into biophysical scientists' research based on practical experiences.
- Conceiving with of other DS Flagship gender focal points, the gender strategic research and integrative research plans for 2014-2016.
- Elaborating tools and identifying field partners to collect data on the strategic gender research on gender equity in decision-making, access to and control over household and non-household labor. The objective was to provide scientific-based evidences to supporting and improving gender equity in decision-making and in access to and control over labor and related resources. This research is still to be completed in the two transect action sites targeting 270 men and 310 women in each site.
- In supporting global climate change resilience in Mali, a total of 477 household representatives including 284 women and 193 men were identified and are willing to establishment of at least one agroforestry practice on their farm. The most demanded species by women are papaya 82% (of the total request), leafy vegetable species such as Moringa 83% of the total request (1545 plants), orange 71% of the total demand (2156 plants), and Tomi G 74% of the total demand (2024). Men are more interested in Eucalyptus (100% of the total demand 5266), *L. inermis* (99% of the total expressed needs of 14760 plants), and *Ziziphus mauritiana* (100% of the total needs of 1463 plants). Planting materials are being produced to respond to this demand-driven agroforestry technologies diffusion.
- In addition, a special attention has been taken during the need assessment to ensure that man-made changes in increasing the resilience to climate change within the selected community will be the result of the involvement of all actors, including women. More attention was paid to including more women and youth as main actors in the implementation strategy in 2015. Youth (including men and female) will also be involved in nursery training and management as well as training on group dynamic and team leadership within the framework of rural resource centers (RRCs).
- Gender sensitive activities through livelihood diversification and income generating activities: more specifically, the food banks of moringa and baobab being established in women fields to ensure their sustainable leafy vegetable production throughout the year to insure nutritional security in the household in the 14 target communities/villages in Mali.
- Training was delivered on three topics to the benefit of the members of local NGOs and advisory services (UDPN) in Burkina Faso. A total of 45 farmers (including 10 women) were trained on natural assisted regeneration and compost production whereas the training on tree management involved 42 farmers (including 10 women) both in French and local language.

- Women (19) and men (42) were capacitated in group dynamic and leadership in Burkina Faso and Mali to enhance collective actions. Participants of each pilot village have elaborated their workplans for the planned activities.
- Four demonstrations were organized for women farmer groups in Kano and Katsina states in Nigeria, and the members were trained on improved agronomic practices and low input technologies of seed treatments for increased productivities. A total of 214 women were trained.
- Contributed to analyzing and reporting on gender desegregated baseline household survey in KKM action transect.
- Developing tools and identifying field partners to collect data on the strategic gender research on gender equity in decision-making, access to and control over household and non-household labor in DS. The main objective was to provide scientific-based evidences to supporting and improving gender equity in decision-making and in access to and control over labor and related resources. This research is still to be completed in the two transect action sites.
- Under SARD-SC Wheat Value chain funded by African Development Bank, strong partnership has been established with National Agricultural Research Institutes (Institute for Agricultural Research, Zaria, Lake Chad Research Institute (LCRI), Maiduguri, Ahmadu Bello University, Zaria), Medium Scale Millers, local NGOs (SG 2000 and others), FARA, Federal and States Ministries of Agriculture (ATA) and other CGIAR Centers (ICRISAT, IITA, AfricaRice, CIMMYT, IFPRI) for the implementation.

E. PARTNERSHIPS BUILDING ACHIEVEMENTS (1 page)

Partnerships developed in 2014 included:

- Facilitation of interactions between IWMI and other CGIAR centers such as ICRISAT, ICRAF, ILRI and IITA in West Africa, and national organizations in Ghana including Business and Development Consultative Committee (BADECC), University of Development Studies in Tamale and Water Research Institute (WRI) and Animal Research Institute (ARI) of the Council for Scientific and Industrial Research (CSIR) (IDOs 4, 6).
- CIAT-led project activities involving several partners: WASCAL, The Water Resources commission of Ghana (WRC), Regional Planning and Coordination Unit (RPCU) as well as the University of Development Studies (UDS), Kwame Nkrumah University of Science and Technology (KNUST) and the Soils Research Institute (SRI) of Ghana (IDO 4).
- As part of the implementation phase of the “Agro-ecological intensification of sorghum and pearl millet-based production systems in the Sahel through agroforestry: linking farmers’ knowledge to process-based science” project: partnership between the World Agroforestry Centre (ICRAF) and national research partners (Institut d’Economie Rurale of Mali and Institut de l’Environnement et de Recherches Agricoles of Burkina Faso), development partners (AMEDD: Association Malienne d’Eveil au Développement Durable), other local partners: GRAADECOM in Mali and TreeAid in Burkina Faso, and local farmers’ organizations: Union Départementale des Producteurs de Nobéré (UDPN) in Burkina Faso and Cooperative Djiguiya in Mali. Public local extension agents are also involved in the program execution.
- Innovative public-private partnerships involving private partners (MANOBI S.A., Pixela S.A.R.L.), NGOs and development projects (AMEDD, KNARDA), research organizations (IER, CDA/BUK, ICRISAT), farming communities and national regulatory agencies (e.g. National Space Research

and Development Agency, Nigeria) are collaborating to develop sustainable business models for next-generation farm information services (IDOs 4, 6).

- There is more openness and collaboration between ICRAF (Flagship coordinating centre) and sister centers involved in WAS&DS IRT (ICRISAT, ILRI, CIAT, IWMI, Bioversity, CIP, SSA-CP, ICARDA) strengthened through multiple meetings and task forces. A strong partnership is emerging also with NARS from focus countries (Burkina Faso, Ghana, Mali and Niger) as well as different development partners including extension services, NGOs (Care International, World Vision, GRAADECOCOM, TreeAid, Tipalga, Oxfam, AMEDD, Sahel-Eco, Réseau Marp, etc.).
- New partnership was forged with Women Farmer Advancement Network (WOFAN) in Nigeria, specifically targeting women farmers and processors. Several trainings were organized for women farmers and processors on the use of multi-purpose motorized groundnut oil mills, manual groundnut decorticators, and groundnut fryers, as well as multi-crop thresher and hammer mills.
- The work on evaluation of crop varieties for fodder involved cooperation among many CRPs – Dryland Systems, Dryland Legumes, Dryland Cereals and Livestock & Fish.
- All the on-farm activities on integrated crop-livestock intensification options were conducted in collaboration with farmer federations in Niger with MOORBEN and FUMA Gaskiya, and with farmer groups under the agreement with CRS Niger. In Burkina Faso the activities were carried under a contract signed with the association Filly Wemanegre involved in community development approaches with focus on land recuperation and environmental services.

F. CAPACITY BUILDING (1/2 page)

- Farmers' capacities in variety selection and seed multiplication are strengthened in Ouahigouya in Burkina Faso, San in Mali, and Aguié in Niger (Indicators 13 & 14). Several trainings were organized as part of capacity building for seed producers and farmers' groups. A total of 2,013 farmers and extension agents were trained (712 participants in Mali, 797 in Niger, and 504 in Burkina Faso), about 20% of the participants are women.
- A training workshop on management of conflict over natural resources use was conducted in Bougouni and Koutiala in Sikasso region of Mali in November 2014. The objectives of the workshop were: i) to build the capacity of the key natural resources management actors (farmers, herders, hunters, women, youth, technical services and local administrative authorities in methods and approaches for sustainable management of natural resources; ii) to develop the capacity of the key actors in participatory analysis of conflict and innovative approaches to manage and/or prevent conflicts. The participants at the training workshop included 32 men and 9 women.
- A total of 48 farmers from northern Ghana were trained on improved water management in March 2014 focusing on soil water balance and water productivity. This was facilitated by IWMI and a non-governmental organization BADECC. IWMI trained 4 male interns on water management focusing on food security, water resources management/IWRM, sustainable agriculture, and water management, and crop production.
- Numerous project partners were trained on land degradation surveillance framework (LDSF) in order to capture the major transitions within the landscape. In addition, partners were trained in other skills such as soil sample preparation and use of handheld GPS devices for preliminary implementation of field sampling work. Two CIAT technicians from the Soils Research led the field team. The survey was supervised by partners from the Kwame Nkrumah University of



Science and Technology (KNUST) and the Soils Research Institute (SRI). Four (4) apprentices (KNUST: 2; CSIR/SRI: 2), and 2 Agriculture extension staff (MoFA Tolon district office) joined the team. The MoFA staff were principally hired to facilitate sensitization of local communities but were also involved in field activities for 4 days. During the trainings the attendants were briefed on the background of LDSF, its applications and approaches for describing and estimating landscape attributes with reference to the field guide. The total number of people trained from the target sites was 16, only one woman was involved, the ratio of men to women was 15:1.

- Eighty-seven participants were trained on various technical themes (natural assisted tree regeneration, composting) and a young technician has been trained for his Masters degree. Implementing the on-farm trials is also used to improve the skills of all actors in ecological intensification of the production systems. A total of 45 farmers (including 10 women) of UDPN were trained on natural assisted regeneration and compost production whereas the training on tree management involved 42 farmers of which 10 were women in Burkina Faso. For each of the three training topics a technical guide has been produced in French; they are being translated into local language for the trainees.
- Twenty field agents (women: 4) were trained in crop data collection using coordinated ground and UAV measurement campaign protocols.
- Twenty-five trainings and field trips were organized on improved agronomic practices and low input technologies of seed treatments for 868 men and 214 women participants (farmers, extension agents, processors, and scientists) and 3 field days were organized.
- One week training workshop (from 27th to 31st October, 2014) was organized in Kano, Nigeria for participants from national research institutes, universities, extension services, NGOs, international research institutes and private sectors from Benin, Niger, Mali, Burkina Faso and Nigeria. The objectives of the training workshop was to train participants on crop-livestock integration and the use of innovation platform to enhance knowledge and technology dissemination along the context of better use of crop residues, manure management, mechanization for better feeding practices. Participants were trained in the use of food-feed crop combinations so as to address seasonality, producing better quality and more quantity of grain and fodder, improving soil fertility and the efficient use of locally available materials as livestock feed for increase in income of stakeholders. In total 41 trainees (11 women, 30 men) from the 5 countries participated in the training program.
- Farmers' capacities in variety selection and seed multiplication are strengthened in Ouahigouya in Burkina Faso and Aguié in Niger. Several trainings were organized as part of capacity building for seed producers and farmers' groups involving 797 farmers in Niger, and 504 in Burkina Faso. About 20% of the participants were women.
- In the framework of the CRS/ICRISAT food security program, training sessions were organized on integrated striga and soil fertility management technologies, on market garden and seed production technics and refreshment training on integrated approach of water and nutrient management in water harvesting technologies. The training workshops involved 217 participants of which 16 women.
- Capacity building of farmers around the concept and implementation of farmers' field school were also organized in Niger as in the CRS program as well as in Kaya in Burkina Faso.
- Four hundred and fifty (450) stakeholders including women farmers and young wheat professionals are trained on system innovation approach; 650 farmers trained on wheat production packages in farmers' field schools and 1332 stakeholders, mainly farmers, including

women, attended the several on-farm demonstration field days organized in three IP sites of Kano.

- ICRAF supported the national scientists, particularly for the students, in collecting crop and tree data and creating database to run APSIM and WaNuLCAS models.
- In total 141 farmers including 50 females and 90 males from five localities are involved in testing fodder crops and trees in cereal-based systems. Additional training for seed production, fruit tree grafting, and farmer managed natural regeneration (FMNR), best practices for fuel wood production.
- Training of trainers including lead farmers, extension agents as well as local development agents on how to set up improved local fruit and food agroforestry banks.

G. RISK MANAGEMENT (less than 1/2 page)

The major risk that may hinder expected delivery of results by the CRP, and mitigation actions taken to manage these risks are (by decreasing order of importance):

Major risks identified

Various constraints affecting research in development operations, including conjectural (e.g. lack of enabling policy environment, terrorist activity), regular (e.g. rainfall variability), and exceptional (e.g. Ebola outbreak which created fear for scientists meeting and travelling to some study sites, Political instability in the Sahel region regularly restricts overland travel by key research staff from CGIAR centers and their local partners)

Mitigation actions taken

Links to other CRPs strengthened where they provide policy leverage (e.g. CCAFS). More aggressive delegation of field activities towards national partners, which itself entails significant transaction costs and a shift in scientists work time from research to research management.

H. LESSONS LEARNED (1 page)

Analysis of variance from what was planned:

- Estimate the overall level of confidence/uncertainty of the indicators provided in Annex 1.
 - Description, if relevant, of research avenues that did not produce expected results, and description of actions taken by the CRP, such as new research directions pursued and their expected outputs and outcomes.
 - Lessons learned by the CRP from its monitoring of the indicators and from its qualitative analyses of progress.
- (ICRAF) The sensitization of farmers to avoid burning crop residue and tree litter before starting a new crop season is a success with farmers involved in the project in Burkina Faso but not yet in Mali. Also farmers are really engaged in composting crops residues and tree litter but there is a water constraint to be solved. The water constraint is also applicable to tree planting on earth bunds in addition to plants protection challenge during the dry season. Due to this reason only 18 farmers really engaged took part to this trial. They will be trained and assisted for the success of the bunds re-vegetation.
 - (IWMI) Most of the milestones in 2014 were achieved according to the set targets. The only set back was related to two consultants who did not complete their assignments due to delays in getting contract agreements. It is hoped that in 2015, the CRP will attempt to expedite the



recruitment process of consultants. The irrigation dugouts prepared between September and November 2014 have not shown the benefits yet due to the absence of rains. In 2015, we look forward to productive use of the dugouts in storing water for crop and livestock production. The Drylands Systems CRP involved colleagues in the social sciences in the implementation, monitoring and evaluation of the project. We plan to scale-up those efforts in 2015.

- (CIAT) We need to link better with other system-related CRPs that have sites in close proximity to those in the Africa RISING program such as the Water Land and Ecosystems Program, this will allow cross-shared lessons as well as with the Humid Tropics CRP. Need for on-ground presence: apart from some water related studies with IWMI, linkage with other dryland CRP activities has been minimal and to this effect, CIAT has arranged for hiring of a research assistant to help facilitate field activities, partnership engagements and integrate closely with other CRP work. In order to make the study more holistic, future studies of this nature should include data collection that goes beyond landscape assessments but also include pests and diseases constraints in order to explain productivity gaps. On a positive note, the periodic monthly meetings within the team have enhanced internal project communication on on-going activities, protocols and field work plans. Moving forward, we would like to maintain this and it will be made easier with the research assistant coming on board.
- (ICRISAT) use of sorghum for stepwise substitution of maize in poultry feed is feasible and could be more advantageous in non-maize production area.

Annex 1: CRP indicators of progress, with glossary and targets

CRPs Concerned by this indicator	Indicator	Glossary/guidelines for defining and measuring the indicator, and description of what the CRP includes in the indicator measured, based upon the glossary	Deviation narrative (if actual is more than 10% away from target)	2013		2014		2015
				Target	Actual	Target	Actual	Target
KNOWLEDGE, TOOLS, DATA								
All	1. Number of flagship “products” produced by CRP	<ol style="list-style-type: none"> 1. Field days and several newsletter articles published on https://intranet.iwmi.org/iwmi-today.aspx and in WMI Africa Nimdea Newsletter (6 in total) 2. Guidelines for Integrating gender into Dryland Systems Biophysical Scientists Research (in press) 3. Video on “Climate smart agriculture needs more than just farmer managed natural regeneration” in Tominian, Mali. 4. Dry season cultivation of groundnut in rotation with wet season cultivation of rice or as alternative where farmers are not able to plant wheat early or have limited NPK fertilizer. The demonstrations of this system has led to the inclusion of groundnut in the dry season program of the Nigeria Federal Ministry of Agriculture and Rural Development. 				9	9	

All	2. Number (from 1) of flagship products produced that have explicit target of women farmers/NRM managers	<ol style="list-style-type: none"> 1. Multipurpose motorised groundnut mill 2. Groundnut roaster 3. Degrande A. and D.D.A Arinloye (2014)., Gender in agroforestry: Implications for Action-Research, in F. Bojang, A. Ndeso-Atanga (Eds) Enhancing gender equality in the management of Africa's natural resources, Nature & Faune Journal, Volume 29, Numéro 1, 7-12. SSN: 2026-5611 http://www.fao.org/3/a-i4334e.pdf 4. Degrande A. et D.D.A Arinloye (2014), La parité hommes-femmes dans le secteur agroforestier: Incidences pour la recherche-action, in F. Bojang, A. Ndeso-Atanga (Eds) Améliorer l'égalité entre les sexes dans la gestion des ressources naturelles de l'Afrique, La Revue Nature & Faune, Volume 29, Numéro 1, 7-12. ISSN: 2026 – 5824 http://www.fao.org/3/a-i4334f.pdf 5. Farmer managed natural regeneration practice and the Video on “Climate smart agriculture needs more than just farmer managed natural regeneration” in Tominian, Mali 6. Women empowerment and household nutrition enhancing through application of integrated measure for land rehabilitation called “Bioreclamation of degraded land” 			5	5	
All	3. Number (from 1) of flagship products produced that have been assessed for likely gender-disaggregated impact	<ol style="list-style-type: none"> 1. Sissoko MM, Sibiry Traore PC, Binam NJ, Ademonla Arinloye D. 2014. Dryland Systems Household Surveys – West African Sahel and Dry Savannas. Report on Preliminary Data Analysis. ICRAF and ICRAF, Bamako, Mali. 			1	1	



All	4. Number of "tools" produced by CRP	<ol style="list-style-type: none"> 1. Questionnaire for Community Members (in Focus Group Discussion with Men and Women) to access gender equity in decision-making, access to and control over household and non-household labor 2. Questionnaire for labor service providers (paid agricultural, agroforestry and non-agricultural labor) including Men and Women, to access gender equity in decision-making, access to and control over household and non-household labor 3. Questionnaire addressed to agricultural and agroforestry products' collectors and processors including Men and Women, to access gender equity in decision-making, access to and control over household and non-household labor 4. Individual questionnaire addressed to Producers Men and Women to access gender equity in decision-making, access to and control over household and non-household labor 				4	4	
-----	--------------------------------------	---	--	--	--	---	---	--



		Based on the glossary, describe the types of outputs you include in this indicator						
All	5. Number (from 4) of tools that have an explicit target of women farmers	<ol style="list-style-type: none"> 1. Questionnaire for Community Members (in Focus Group Discussion with Men and Women) to access gender equity in decision-making, access to and control over household and non-household labor 2. Questionnaire for labor service providers (paid agricultural, agroforestry and non-agricultural labor) including Men and Women, to access gender equity in decision-making, access to and control over household and non-household labor 3. Questionnaire addressed to agricultural and agroforestry products' collectors and processors including Men and Women, to access gender equity in decision-making, access to and control over household and non-household labor 4. Individual questionnaire addressed to Producers, Men and Women, to access gender equity in decision-making, access to and control over household and non-household labor 5. Promotion of Agroforestry through the operation "a woman - a Moringa: these activities are focused on the promotion of agroforestry through the operation" a woman, a Moringa. Four thousand and eight-hundred (4800) women 				5	5	
All	6. Number (from 4) of tools assessed for likely gender-disaggregated impact	Glossary: Reports/papers describing the products should include a focus on gender-disaggregated impacts if they are to be counted						
All	7. Number of open access databases maintained by CRP	Primary publication data deposited in data verse repository						
All	8. Total number of users of these open access databases							

All	9. Number of publications in ISI journals produced by CRP	<ol style="list-style-type: none"> 1. Ayantunde, A.A, Blummel, M., Grings, E. and Duncan, A.J. 2014. Price and quality of livestock feeds in suburban markets of West Africa's Sahel: Case study from Bamako, Mali. <i>Revue d'élevage et de médecine vétérinaire des pays tropicaux</i> 67 (1):13-21. 2. Ayantunde, A.A., Asse, R., Said, M.Y. and Fall, A. 2014. Transhumance pastoralism, sustainable management of natural resources and endemic ruminant livestock in the sub-humid zone of West Africa. <i>Environment, Development and Sustainability</i> 16:1097-1117. 3. IWMI: We published a conference paper and prepared two journal papers in 2014 for the Drylands Systems and WLE CRPs. 4. Bjornsen, H., Hernandez-Santana, V., Liebman, M., Bayala, J., Chen, J., Helmers, M., Ong, C.K., Schulte, L.A., 2014. Targeting perennial vegetation in agricultural landscapes for enhancing ecosystem services. <i>Renewable Agriculture and Food Systems</i> 29, 101-125. 5. Bayala, J., Sanou, J., Teklehaimanot, Z., Kalinganire, A., Ouedraogo, S.J., 2014. Parklands for buffering climate risk and sustaining agricultural production in the Sahel of West Africa. <i>Current Opinion in Environmental Sustainability</i> 6, 28-34. 6. Coulibaly, Y.N., Mulia, R., Sanou, J., Zombre, G., Bayala, J., Kalinganire, A., van Noordwijk, M., 2014. Crop production under different rainfall and management conditions in agroforestry parkland systems in Burkina Faso: observations and simulation with WaNuLCAS model. <i>Agroforestry Systems</i> 88, 13-28. 7. Ky-Dembele, C., Tigabu, M., Bayala, J., Oden, P.C., 2014. Inter- and intra-provenances variations in seed size and seedling characteristics of <i>Khaya senegalensis</i> A. Juss in Burkina Faso. <i>Agroforestry Systems</i> 88, 311-320. 8. Tobella, A.B., Reese, H., Almaw, A., Bayala, J., Malmer, A., Laudon, H., Ilstedt, U., 2014. The effect of trees on preferential flow and soil infiltration in an agroforestry parkland in semiarid Burkina Faso. <i>Water Resources Research</i> 50, 3342-3354 9. Arinloye, D.D.A., Pascucci, S., Linnemann, A.R., Coulibaly, O.N., Hagelaar, G. and Omta, O.S. 2014 Marketing Channel Selection by Smallholder Farmers. <i>Journal of Food Products Marketing</i>, 1-21. 10. Degrande A. and D.D.A Arinloye (2014), Gender in agroforestry: Implications for Action-Research, in F. Bojang, A. Ndeso-Atanga (Eds) Enhancing gender equality in the management of Africa's natural resources, <i>Nature & Faune Journal</i>, 29, 1, 7-12. 11. Degrande A. et D.D.A Arinloye (2014), La parité hommes-femmes dans le secteur agroforestier : Incidences pour la recherche-action, in F. Bojang, A. Ndeso-Atanga (Eds) Améliorer l'égalité entre les sexes dans la gestion des ressources naturelles de l'Afrique, <i>La Revue Nature & Faune</i>, 29, 1, 7-12. 12. Doamba S, Savadogo P, Nacro HB. 2014. Effects of burning on soil macrofauna in a savanna-woodland under different experimental fuel load treatments. <i>Applied Soil Ecology</i> 81:37-44 13. Coulibaly-Lingani P, Tigabu M, Savadogo P, Oden P.C. 2014. Participatory forest management in Burkina Faso: members' perception of performance. <i>Journal of Forestry Research</i> 25 (3): 637-646. 14. Dayamba SD, Santi S, Savadogo P. 2014. Improving seed germination of Sudanian savanna-woodland species: effects of fire-related cues (heat and smoke) and sulphuric acid. <i>Journal of Tropical Forest Science</i> 26(1): 16-21 15. DOAMBA, S.W.M.F., Savadogo, P., Nacro, H.B. 2014. Rôle des feux de savane sur les caractéristiques biogéochimiques des sols en zone soudanienne du Burkina Faso. <i>International Journal of Biological and Chemical Sciences</i> 8 (2) p777-793. Yelemou B., Savadogo P., Traore S., Millogo-Rasolodimby J. & Hien V 2015. - Floristic diversity of <i>Ptilostigma</i> associations in relation to latitudinal gradient, soil and climate variables in Burkina Faso, West Africa. <i>Tropical Ecology</i> 56(1): 57-76 16. Savadogo P. 2014. Sahelian bocage: an integrated conservation agriculture with tree approach in Burkina Faso In <i>Trees and resilience: An assessment of the resilience provided by trees in the drylands of Eastern Africa</i> Edited by Jan de Leeuw, Mary Njenga, Bob Wagner and Miyuki Iiyama. ISBN: 978-92-9059-352. Nairobi, Kenya. ICRAF 166 pp. 				ILRI: 2 IWMI: 3 ICRAF: 12	ILRI: 2 IWMI: 3 ICRAF: 12	
-----	---	---	--	--	--	---------------------------------	---------------------------------	--



1,2,3, 4, 6	10. Number of strategic value chains analyzed by CRP	Various stages of the value chains, commodities and inputs identified (for tree and agricultural products) in the DGIS countries in West Africa							
1,5,6,7	11. Number of targeted agro-ecosystems analysed/characterised by CRP	The systems are largely mixed cropping systems, livestock systems and agroforestry systems				3	3		
1,5,6,7	12. Estimated population of above-mentioned agro-ecosystems								
CAPACITY ENHANCEMENT AND INNOVATION PLATFORMS									
All	13. Number of trainees in short-term programs facilitated by CRP (male)	<p><i>ILRI</i>: Training on conflict management in Sikasso region, Mali <i>IWMI</i> trained 4 male interns on water management focusing on food security, water resources management/IWRM, sustainable agriculture, and water management, and crop production.</p> <p><i>ICRISAT</i>: 868 trained in improved agronomic practices, seed treatments and farm mechanization in Kano and Katsina, Nigeria - 30 trained in a course on integrated crop-livestock systems in Kano, Nigeria - 88 technicians and field agents of CRS trained in Integrated striga and Soil Fertility Management technologies - 650 farmers trained on wheat production packages in farmers field schools <i>ICRAF</i>: at least 2320 producers (1370 men, 950 women) from each of the three DGIS focus countries in West Africa trained on integrated natural resources management.</p>				868 + 30 + 88+650 +2320 x 3 =	868 + 30 + 88+650 +2320 x 3 =		
						6276	6276		



All	14. Number of trainees in short-term programs facilitated by CRP (female)	<p>IWMI: Training on conflict management in Sikasso region, Mali (9 women)</p> <p>ICRISAT: 214 women trained in improved agronomic practices, seed treatments and farm mechanization in Kano and Katsina, Nigeria</p> <ul style="list-style-type: none"> - 11 trained in a course on integrated crop-livestock systems in Kano, Nigeria - 7 women technicians and field agents of CRS trained in Integrated striga and Soil Fertility Management technologies - New partnership forged with Women Farmer Advancement Network (WOFAN) to increase activities specifically targeting women farmers and processors. Several trainings were organized for women farmers and processors on the use of multi-purpose motorized groundnut oil mills, manual groundnut decorticators, and groundnut fryers, as well as multicrop thresher and hammer mills <p>ICRAF: 81 women trained on wheat production packages in farmers field schools in Burkina Faso</p> <ul style="list-style-type: none"> - 121 lead farmers including 87 men and 34 women received training on “warrantage and composting in an integrated approach” 				<p>9+ 214 + 11 + 7 + 81= 322</p>	<p>9+ 214 + 11 + 7 + 81= 322</p>	
-----	---	--	--	--	--	--	--	--

All	15. Number of trainees in long-term programs facilitated by CRP (male)	<ul style="list-style-type: none"> Five Msc level students stayed at ICRISAT as three month intern and worked on various issues related to agroforestry and tree crop integration <ul style="list-style-type: none"> Thesis 1: Genetic diversity and morphologic traits of date palm (<i>Phoenix dactylifera</i> L.) in the Sahelian part of Niger Thesis 2: Separating the effects of trees (<i>Faidherbia albida</i> and <i>Balanites aegyptiaca</i>) on selected crops performance and yield in Sahelian agroforestry-based cropping system Thesis 3: Effect of planting density and fertilization on growth and yield of okra Thesis 4: Combined Effect of mulch (<i>A. tumida</i> leaves) and inorganic fertilizers on soil chemical properties; water use efficiency and millet grain yield in semi-arid zone of Niger. Thesis 5: Re-forestation de terres dégradées au Niger: Effets de la technique du Zaï forestier sur les propriétés hydrologiques du sol et les performances agronomiques du mil Four PhD students from Burkina Faso working on restoration of degraded land and domestication of agroforestry species <ul style="list-style-type: none"> Doctoral thesis 1: Restoration of Degraded Rural Landscape in face of climate variability and for livelihood diversification Doctoral thesis 2: Variation among provenances morphometric traits of seed germination and seedling growth of species identified candidates for restoration and domestication Doctoral thesis 3: Modelling the hydrology of the planting pit used for <i>in situ</i> rainwater harvesting in re-afforestation schemes for climate change adaptation Doctoral thesis 4: Understanding the mechanism of the micro-dosing in crop performance, millet root growth dynamic and water use One PhD student in Ghana working on nutrient flows in small ruminant production systems in Northern Ghana 				5 PhD; 5 MSc 1 BSc	4 PhD; 5MSc 1 BSc	
All	16. Number of trainees in long-term programs facilitated by CRP (female)	<ul style="list-style-type: none"> One female PhD student from Burkina Faso working on restoration of degraded land and domestication of agroforestry species <ul style="list-style-type: none"> Doctoral thesis 1: Restoration of Degraded Rural Landscape in face of climate variability and for livelihood diversification One female PhD working in Mali on empowering local institutions for better management of natural resources in sudano-sahelian zone 					1 PhD 1 PhD; 1 PhD 1 BSc	

1,5,6,7	17. Number of multi-stakeholder R4D innovation platforms established for the targeted agro-ecosystems by the CRPs	<ul style="list-style-type: none"> 1 innovation platform in Bebedji, Kano, Nigeria 2 innovation platform in Katsina, Nigeria 3 innovation platform in Maradi, Niger 3 innovation platforms on wheat value chains 4 multi-actor platforms established in Burkina Faso under BIODEV 				1 + 2 + 3 + 3 + 4= 13	1 + 2 + 3 + 3 + 4= 13		
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT									
All	18. Number of technologies/NRM practices	<ol style="list-style-type: none"> Chopping machine for green and dry fodder to reduce wastage Strategic application of mineral and organic amendment Optimal combination of hill applied mineral and organic fertilizers Optimal time of application of organic manure in <i>in situ</i> water harvesting for crop production. These technologies were tested in Niger and Burkina Faso. Millet-groundnut cropping systems: Millet varieties x groundnut varieties x row arrangement Sorghum-groundnut cropping systems: Sorghum varieties x groundnut varieties x row arrangement Seed treatment Legume-millet rotations for integrated striga and soil fertility control in Gasoua and Zango Legume-sorghum rotations for integrated striga and soil fertility control in Gasoua and Zango Animal drawn combine planter Conservation agriculture with minimum tillage, fertilizer use and crop rotation in sorghum-based systems Conservation agriculture with minimum tillage, fertilizer use and crop rotation in millet-based systems Groundnut roaster Integrated Crop and Pest Management technology/package in Kadawa, Kano Sustainable wheat-based crop rotation system in Kadawa, Kano 				21	21		



	under research in the CRP (Phase I)	<ul style="list-style-type: none"> 16. Strategic application of mineral and organic amendment 17. Optimal combination of hill applied mineral and organic fertilizers 18. Optimal time of application of organic manure in <i>in situ</i> water harvesting for crop production. These technologies were tested in Niger and Burkina Faso 19. Farmer managed natural regeneration 20. Established mother blocks of improved cultivars 21. Established food bank based on Moringa and baobab 						
All	19. Number (from 18) of technologies under research that have an explicit target of women farmers	The papers, web pages, blog stories, press releases and policy briefs supporting indicator #x must have an explicit focus on women farmers/NRM managers to be counted				9	9	

All	20. Number (from 18) of technologies under research that have been assessed for likely gender-disaggregated impact	1. Farmer managed natural regeneration 2. African market garden				2	2	
1, 5, 6, 7	21. Number of agro-ecosystems for which CRP has identified feasible approaches for improving ecosystem services and for establishing positive incentives for farmers to improve ecosystem functions as per the CRP's recommendations	IWMI: The systems are largely mixed cropping systems, livestock systems and agroforestry systems. The DGIS project works in three sites in one agro-ecosystem on improvement of delivery of a number of ecosystem services, first the soil moisture and fertility that underpin agricultural production, second the regulation service of transfer of water at the level of a catchment and third the provisioning services in the form of food, firewood and other tree products. The project is implemented 3 three semi-arid agro-ecosystems in three countries (Burkina Faso, Mali and Niger).				3	3	
1, 5, 6, 7	22. Number of people who will potentially benefit from plans, once finalized, for the scaling-up of strategies	By the end of the DGIS project 14000 households in each of the three countries will have benefited from the scaling of project interventions.				14000 x 3=42000	14000 x 3=42000	
All, except 2	23. Number of technologies/NRM practices field tested (phase II)	In 2014 Zai pits (rainwater harvesting) and drought tolerant crops (sorghum and millet) have been field tested in Burkina Faso and Niger				8	8	
1, 5, 6, 7	24. Number of agro-ecosystems for which innovations (technologies, policies, practices, integrative approaches) and options for improvement at system level have been developed and are being field tested (Phase II)	The systems are largely mixed cropping systems, livestock systems and agroforestry systems. The technologies being tested include the irrigation dugouts for improving soil and water storage for livestock and crop production.				3	3	
1, 5, 6, 7	25. Number (from 24) of above innovations/approaches/options that are targeted at decreasing inequality between men and women							

1, 5, 6, 7	26. Number of published research outputs from CRP utilised in targeted agro-ecosystems	<p>IWMI: We published conference and prepared two journal papers in 2014 for the Drylands Systems and WLE CRPs.</p> <p>None in 2014, but ICRAF managing the DGIS project stimulated the NGOs implementing the project to review lessons learned previously and elsewhere, this should be reflected in the characterization studies that are currently being finalized and will be available in 2015.</p>				3	3	
All, except 2	27. Number of technologies/NRM practices released by public and private sector partners globally (phase III)	<ol style="list-style-type: none"> 1. Multipurpose motorized groundnut mill 2. Groundnut roaster 3. Farmer managed natural regeneration 4. Established mother blocks of improved cultivars 5. African Market Garden 				5	5	
POLICIES IN VARIOUS STAGES OF DEVELOPMENT								
All	28. Number of policies / regulations / administrative procedures analyzed (Stage 1)	In 2014 several policies that impact on agricultural productivity and markets and value chains have been reviewed in the three focus countries in WCA within the framework of DGIS-ICRAF, results will be published in the characterization studies that will appear in 2015.						
All	29. Number of policies / regulations / administrative procedures drafted and presented forthat underwent the second stage of the policy reform process. The second stage includes public debate and/or consultation with stakeholders on the proposed new or revised policy / regulation / administrative procedure.						

	public/stakeholder consultation (Stage 2)	Clearly identify in this cell the type of policy, regulations and so on, and the geographical location of the consultations						
All	30. Number of policies / regulations / administrative procedures presented for legislation (Stage 3)	: ... underwent the third stage of the policy reform process (policies were presented for legislation/decree to improve the policy environment for smallholder-based agriculture). Clearly identify in this cell the type of policy and the country/region concerned						
All	31. Number of policies / regulations / administrative procedures prepared passed / approved (Stage 4)	: ...underwent the fourth stage of the policy reform process (official approval (legislation/decree) of new or revised policy / regulation / administrative procedure by relevant authority). Clearly identify in this cell the type of policy and the country/region concerned						
All	32. Number of policies / regulations / administrative procedures passed for which implementation has begun (Stage 5)	: ...completed the policy reform process (implementation of new or revised policy / regulation / administrative procedure by relevant authority) Clearly identify in this cell the type of policy and the country/region concerned						
OUTCOMES ON THE GROUND								
All	33. Number of hectares under improved technologies or management practices as a result of CRP research	The DGIS project started in 2014. After 5 years, about 500,000 hectares will be rehabilitated. Water productivity will be improved by 30% and the standard of living of about 70,000 famers (male and female) will be improved				500,000	500,000	
All	34. Number of farmers and others who have applied new technologies or management practices as a result of CRP research	The DGIS project started in 2014. After 5 years, about 500,000 hectares will be rehabilitated. Water productivity will be improved by 30% and the standard of living of about 70,000 famers (male and female) will be improved				70,000	70,000	

Annex 2: Performance indicators for gender mainstreaming with targets defined

Performance Indicator	CRP performance approaches requirements	CRP performance meets requirements	CRP performance exceeds requirements
1. Gender inequality targets defined	<p>Sex-disaggregated social data is being collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations</p> <p>Gender research on gender equity in decision-making, access to and control over household and non-household labors for 2014-2016</p>	<p>Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations</p> <p>And</p> <p>The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs)</p> <p>Tools developed for collecting sex and age disaggregated data on gender equity in decision-making, access to and control over household and non-household labor</p>	<p>Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations</p> <p>And</p> <p>The CRP has defined and collected baseline data on the main dimensions of gender inequality in the CRP's main target populations relevant to its expected outcomes (IDOs)</p> <p>And</p> <p>CRP targets changes in levels of gender inequality to which the CRP is or plans to contribute, with related numbers of men and women beneficiaries in main target populations</p> <p>Tools developed for collecting sex and age disaggregated data on gender equity in decision-making, access to and control over household and non-household labor</p>

<p>2. Institutional architecture for integration of gender is in place</p>	<ul style="list-style-type: none"> - CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy -CRP M&E system has protocol for tracking progress on integration of gender in research <p>Gender integrative research plan developed for 2014-2016</p>	<ul style="list-style-type: none"> - CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS and funds allocated to support their interaction. - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy - CRP M&E system has protocol for tracking progress on integration of gender in research <p>And</p> <p>A CRP plan approved for capacity development in gender analysis</p> <p>Gender integrative research plan developed for 2014-2016</p>	<p>CRP scientists and managers with responsibility for gender in the CRP's outputs are appointed, have written TORS and funds allocated to support their interaction.</p> <ul style="list-style-type: none"> - Procedures defined to report use of available diagnostic or baseline knowledge on gender routinely for assessment of the gender equality implications of the CRP's flagship research products as per the Gender Strategy - CRP M&E system has protocol for tracking progress on integration of gender in research <p>And</p> <p>A CRP plan approved for capacity development in gender analysis</p> <p>And</p> <p>The CRP uses feedback provided by its M&E system to improve its integration of gender into research</p> <p>Guidelines elaborated for Integrating gender into Dryland Systems Biophysical Scientists Research</p>
--	--	--	---



RESEARCH
PROGRAM ON
Dryland Systems

The CGIAR Research Program on Dryland Systems aims to improve the lives of 1.6 billion people and mitigate land and resource degradation in 3 billion hectares covering the world's dry areas.

Dryland Systems engages in integrated agricultural systems research to address key socioeconomic and biophysical constraints that affect food security, equitable and sustainable land and natural resource management, and the livelihoods of poor and marginalized dryland communities. The program unifies eight CGIAR Centers and uses unique partnership platforms to bind together scientific research results with the skills and capacities of national agricultural research systems (NARS), advanced research institutes (ARIs), non-governmental and civil society organizations, the private sector, and other actors to test and develop practical innovative solutions for rural dryland communities.

The program is led by the International Center for Agricultural Research in the Dry Areas (ICARDA), a member of the CGIAR Consortium. CGIAR is a global agriculture research partnership for a food secure future.

For more information, please visit
drylandsystems.cgiar.org

Led by:



In partnership with:

