



RESEARCH
PROGRAM ON
Dryland Systems

CGIAR Research Program on Dryland Systems
Central Asia 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:

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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 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 the 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 over the course of its own life cycle.

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

- An external evaluation of the CRPs, commissioned by the Independent Evaluation Arrangement and the leadership of the CRPs;
- An external evaluation of the performance monitoring and reporting system commissioned by the CO at regular intervals (2-3 years)

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.

- A 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.

1.2. TEMPLATE FOR REPORTING

This template has eight sections and two annexes.

A. KEY MESSAGES

Synthesis of success stories in Central Asia

Considerable deliberation and planning, in particular during the Target Region Implementation and Partnership (TRIP) workshop in Fergana, Uzbekistan, in 2013, paved the way and set the pace for work in 2014. The 2nd International Conference on Arid Land Studies (ICAL 2) on 'Innovations for sustainability and food security in arid and semi-arid areas,' an international conference, held in Samarkand, Uzbekistan, in September 2014, gave a renewed impetus to agricultural research cooperation in drylands. More than 220 experts, senior scientists from international research organizations, policymakers and other stakeholders from 24 countries led to the launch of multi-country collaborative projects on salinity management. (read more [here](#)).

With clear priorities and an agenda for the short to medium term and beyond, the Inter-disciplinary Research Team of the CRP Dryland Systems for Central Asia proceeded to build on and improve on many years of research and collaboration within the region. The priority agricultural production systems of the region have been defined and their key constraints in meeting the IDOs identified. A more integrated approach is now at the heart of every research-for-development effort and activity. The research portfolio aims to sustainably intensify production systems and thus mitigate risks and reduce vulnerability - particularly of women and youth throughout Central Asia.

By some estimates, over 70 per cent of the lands in the region are arid and semi-arid. Salinity, frost, heat, drought, and diseases are major constraints to crop production in Central Asia, severely affecting the livelihoods of rural households. This is the motivation for work on stress tolerant varieties which included an evaluation of more than 300 improved germplasm and varieties - of wheat, chickpea, mungbean, potato, sorghum, finger millet, alfalfa and perennial shrubs - which have the potential to meet the needs of multiple food crops for human consumption and livestock fodder. In 2014, the CRP-DS project was successful in identifying stress tolerant, improved varieties of some of these crops, which are expected to play an important role in coming years.

Salinity in Central Asia affects 15-20% of irrigated production systems. In consultation with regional authorities two options of dealing with this problem are being pursued: afforestation of saline patches and identifying salt tolerant varieties. In response, a research project was initiated by ICARDA in collaboration with the University of Bonn to develop saline-tolerant synthetic wheat. In 2014, a new high-yielding and stress-tolerant winter wheat variety was submitted to the State Variety Testing Commission in Turkmenistan, following four years of research and multi-location trials in Central Asia. The new variety, called 'Davlatli,' boasts resistance to salinity, frost, heat, and drought, the main abiotic stresses to winter wheat production in many parts of Central Asia, which can also be grown on previously bare land. It also meets the unique demands for baking quality within the region. Thus 'Davlatli' has the potential of making a significant contribution to regional food security. (read more [here](#)).

The dominant cropping system in the irrigated lands of Central Asia is the wheat-cotton rotation, which leaves land fallow during the late summer-autumn period following the wheat harvest. In an effort to intensify land use during this usually crop-free period, highly nutritious mungbean cultivation was successfully tested as a second crop in 2014, which produced income for participating farmers. As mungbeans are not state-controlled, this practice could substantially improve farm income, human nutrition, and soil health, as well as generate additional on-farm employment. A serious constraint to up-scaling this intensification strategy is the lack of an adequate mungbean seed supply. As a result, a set of farmers were engaged and trained in producing quality seed, a potentially highly profitable enterprise.

Seed supply is not only a constraint for mungbean producers. Newly developed high yielding varieties of cereals, legumes, potato, and fodders are not reaching poor farmers due to a lack of improved seed in the CRP-DS Action Sites in Central Asia. Farmers are therefore growing old varieties of these and other crops, and are unable to improve system productivity and income. To address this gap, identified with the IP, the CRP-DS launched a 'Seed System' program, in cooperation with NARS and selected farmers, to ensure that quality improved seed became more widely available. In 2014, this resulted in the initiation of a wheat seed production system.

Inadequate scientific capacity is a serious bottleneck in technology generation, transfer and adoption within the CRP-DS Action Sites in Central Asia. Therefore, activities centered around 'On-Farm Adaptive Trials' emphasized the capacity strengthening of young researchers, and men and women farmers. This is expected to positively impact implementation of the CRP Dryland Systems in Central Asia.

Highlights – key progress areas in 2014

Multiple stress tolerant varieties of wheat, chickpea, mungbean and potato offer crop diversification, food diversification, and higher income and employment options for both vulnerable areas and sustainable intensive agro-ecosystems: In 2014, the project activities successfully identified salinity and frost tolerant winter wheat varieties (<http://www.cac-program.org/files/410cb8d14a063597dceb5ee5c0835444.pdf>).

Heat-tolerant chickpea and mungbean varieties, and salinity- and heat-tolerant, high-productive clones of potato were also identified. Winter wheat-mungbean and winter wheat-potato annual crop rotations were successfully demonstrated, both in vulnerable areas (Aral Sea Region) and in sustainable intensive systems (Fergana Valley). Four participant demonstration farmers in the Fergana Valley of Uzbekistan were able to improve farm income considerably from winter wheat-mungbean crop rotations. (<http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>).

This was also realized in demonstrations in the Aral Sea Action Site of Uzbekistan and Sugd province in Tajikistan. Cultivation of mungbean as an additional heat-tolerant crop during the hot summer season after wheat harvest not only increases farm productivity, but also improves soil health, family nutrition, and on-farm employment.

Wheat and mungbean seed production: Approximately 451 tons of quality seed of eight new varieties of winter wheat, and around 80 tons of seed of six varieties of mungbean were produced (<http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>). Considering the USD 0.15 per kg higher payment for wheat seed compared to wheat grain, which farmers receive from seed processing plants, these farmers earned about USD 67,000 from the 451 ton wheat seed production. This income received from certified seed grade could be much higher if the farmers were able to produce higher quality grades, such as super elite and elite seed. Similarly, considering the USD 0.50 per kg higher price for mungbean seed over mungbean grains, participating farmers earned approximately USD 40,000 from the 80 tons of mungbean seed that were produced. Also, mungbean offers an excellent option to all wheat farmers as a second crop during summer after the wheat harvest. As a result, farmers will earn much higher profits from the adoption of wheat-mungbean rotations.

Farmers training in wheat seed production: Capacity development of farmers in quality seed production is vital if producers are to benefit from seed production. Since rural farmers lack proper technical knowledge of quality seed production, CRP-DS organized training on quality wheat seed production in four farming communities within the two Action Sites. This helped in the capacity strengthening of 208 farmers (194 men and 14 women) from the action sites in the production of quality wheat seed (<http://www.cac-program.org/files/ae9243f9d73935afd1208f410848b2f9.pdf>; <http://www.cac-program.org/files/28bb4dc8f66b474a70f95dc8a533f635.pdf>). This is expected to improve production and the availability of quality wheat seed in 2015, thereby contributing to higher income among seed-producing farmers, as well as helping to improve overall wheat productivity and food security in the action sites.

Innovation Platform. The CA target region uses an 'Innovation Platform (IP)' approach to engage a range of stakeholders into collective actions to identify and alleviate the constraints affecting productivity growth, and create the conditions that enable sustainable intensification and diversification. The IP proposed to work on improving access to quality seed, varieties, and breeds, as well as enhancing the accessibility of new technologies, data and knowledge, advisory services, and economic incentives that are needed to enhance the resilience of smallholder farmers and rural communities. The IP engages in participatory planning of multi-disciplinary research, and works with end-users and beneficiaries to test and scale out innovations, technologies, and research methods. IP workshops were held in Bishkek, Kyrgyzstan, on 8-11 December 2014, with 40 participants from research organizations, development partners and farmers to identify modalities for establishing IPs in Central Asian countries, opportunities and constraints to agricultural innovation and development in the different agricultural production systems, and the development of a joint strategy and action plan. <http://www.cac-program.org/files/51a5cf08f644039b7541dd0ce77b4e01.pdf>.

Knowledge Management in CACILM II

Land management in Central Asia has been a serious concern ever since the transformation of the region into the 'cotton bowl' of the Soviet Union. Subsequent migration greatly increased the population density and the pressure on agricultural land. The regional program CACILM II was initiated by the ADB to address these issues. DS contributes to the initiative by coordinating knowledge management, mining and organizing SLM information, and making this information available to a wide spectrum of stakeholders.

- *Consensus was reached on the target agro-ecosystems to study.* These are characterized by typical Agricultural Livelihood Systems (ALS), which are the basis for analysis within the Dryland Systems CRP. The project team for Knowledge Management in CACILM II, together with national partners in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, also reached a consensus on combined efforts for sustainable land management (SLM) and identified four dominant agro-ecosystems to represent the Central Asian (CA) region for integrated interventions. The rationale behind this approach was to tailor SLM technologies and approaches for similar areas, anticipating further up-scaling. Also, target agro-ecosystems are designed to reduce drastic differences between natural resource management systems existing in Central Asia, which represent important environments for human livelihoods. These agro-ecosystems comprise: (i) irrigated agriculture, covering a relatively small area of about eight million hectares, but at the same time providing the lion's share of the region's agricultural products; (ii) mountains, constituting over 90% of the area of Kyrgyzstan and Tajikistan; (iii) rangelands, constituting the largest portion of land resources in Kazakhstan, Turkmenistan, and Uzbekistan; and (iv) rainfed areas, considered separately to emphasize crop production systems outside irrigated areas.
- *Knowledge synthesis.* Major achievement of this sub-activity was the collection and demonstration of the most-promising SLM for up-scaling. The major emphasis here was given to existing knowledge within organizations, projects, and communities engaged in innovations for SLM, particularly those that are readily acceptable by small- and large-scale producers. Methods adopted by national teams included mainly desktop studies and

surveys of relevant information sources, as well as expert opinions. To describe collected SLM options, the project team adapted the World Overview of Conservation Approaches and Technologies (WOCAT) form into a short template that included principal information about SLM, including title, definition, description, location where implemented, land use problems that SLM is trying to address, environmental conditions suitable for application, author, and references. To promote selected technologies, a quick survey of agricultural advisory services is under way to identify effective paths to channel new innovations.

- *Increasing visibility.* Website (www.cacilm.org) development is complete for the knowledge management platform, containing information about ongoing activities and communication material to influence target groups (six target groups were identified). In addition to storing data and technical documentation, the knowledge platform captures and synthesizes useful findings, and initiates direct communication and engagement with key audiences. Ultimately, it aims to generate a behavior change among target groups, simultaneously raising awareness and informing countries, communities, and farmers of the proven practices and technologies they will need to reduce land degradation and secure a productive future. The initiative has established networking and knowledge sharing among national partners from five countries, alongside international and regional experts. In particular, joining the 'KLINK' initiative, formed by GIZ, will facilitate the exchange and sharing of knowledge across platforms in Central Asia. An MoU between three parties (GIZ, ICARDA, and SIRIUS, the developer of KLINK) has been prepared for signatures.
- *Challenge.* Among many initiatives and projects carried out in the region pertaining to SLM, the knowledge management dimension, particularly sharing and dissemination, seemed to be addressed in a somewhat restricted manner. 'Behavior change' needs to be nurtured within the country teams to help them face the new challenge of, not only creating and capturing knowledge, but also devoting time to 'dissemination pathways' and their implementation at the field level, as well as their impact in shaping necessary policy reforms.

Marginal Lands.

Field expedition survey missions, and the sampling and chemical analysis of water, soils and plants along a salinity gradient, has helped categorize marginal lands and identify 'hot spots' of high vulnerability in Karakalpakstan and Khorezm (<http://www.cac-program.org/files/583d70f344f11e03725f6f54ade4a642.pdf>). GIS/RS – base mapping of degraded land (location, extend, salinity levels at the borderline of old agricultural and sandy desert zones in Aral Sea Basin) have been completed for Khorezm (KRASS contribution: <http://www.cac-program.org/files/583d70f344f11e03725f6f54ade4a642.pdf>); shape files and benchmark site selection and characterization have been completed for Karauzyak district (report is currently under preparation). A large number of maps have been developed for marginalized and degraded lands in the Khorezm region by GIS specialists from KRASS (example maps can be accessed at : <http://krass.uz/ICARDA/CRP11/>). Rapid Appraisal, socio-economic household surveys and analyses, and the needs assessment of rural communities in Karauzyak district have also been completed (tree groups of target communities Karabuga farm: seven villages in the territory of the pastoral cooperative, one village within a private livestock pastoral farm, and one village near the forestry pastures (report under preparation) in Khorezm province, Yangiariq, Urgench and Kushkupir districts. In addition, 70 rural households have been interviewed. (<http://www.cac-program.org/files/583d70f344f11e03725f6f54ade4a642.pdf>)

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

C.1 Progress towards outputs

Outputs on improved resources and resource management (Irrigated System)

1) Evaluation of crop varieties for stress tolerance

- More than 200 improved germplasm of winter wheat were evaluated for tolerance to salinity and frost in 2014 (<http://www.cac-program.org/files/410cb8d14a063597dceb5ee5c0835444.pdf>).
- 12 winter wheat varieties were evaluated for frost tolerance in Sugd province, Tajikistan, Fergana Valley Action site (<http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf>).
- 13 yellow rust resistant winter wheat varieties were evaluated for yield performance in Fergana province, Uzbekistan, Fergana Valley Action Site (<http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf>).
- 12 clones of potato were evaluated on saline soil and under high summer temperatures in Chimbay district, Karakalpakstan, Aral Sea Action Site (<http://www.cac-program.org/files/20a056406a8ab59b66fd079791d4d8b3.pdf>).
- 11 clones of potato were evaluated under heat stress conditions in Fergana province, Uzbekistan, Fergana Valley Action Site (<http://www.cac-program.org/files/c8313339a8a6c9c9e68a579c64115d32.pdf>).
- Ten chickpea varieties were evaluated for heat tolerance in Khorezm Province, Uzbekistan, Aral Sea Action Site (<http://www.cac-program.org/files/86fd7b57c6012791276c0be8c7b24330.pdf>).
- Four varieties of mungbean were evaluated on saline soil in the Aral Sea Action Site in Uzbekistan (<http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>).
- Four mungbean varieties were evaluated in Fergana province, Uzbekistan, Fergana Valley Action Site (<http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>).

2) Seed production

- 81 ha of winter wheat, 1.6 ha of barley, and 1.1 ha of chickpea seed was produced using 13 new varieties (<http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>)
 - 66 ha of six varieties by eight farmers in seven districts of four provinces in two CRP-DS Action Sites in Uzbekistan.
 - 14.8 ha of two varieties by nine small farmers and one research institute in one CRP-DS Action Site in Sugd Province, Tajikistan.
 - 1.6 ha of barley seed (one variety) produced by ten small farmers and one research institute in Sugd, Tajikistan.
 - 1.1 ha of chickpea seed produced (two varieties) by nine small farmers and one research institute in Sugd, Tajikistan.
- 64.5 ha of mungbean seed produced (five varieties):
 - 2.0 ha of four varieties in Uzbekistan (<http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>)
 - 62.5 ha of two varieties in Tajikistan (<http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>)
- 14 potato clones planted in greenhouses for tuber production (<http://www.cac-program.org/files/a8ebfb751580dd589cf2d7025fb96ee.pdf>)
- 17 ha seed production of sorghum, pearl millet, alfalfa and perennial shrubs (<http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf>)

- 6.0 ha seed production of four varieties of sorghum,
- 1.0 ha seed production of one variety of pearl millet,
- 2.5 ha seed production of one variety of alfalfa
- 7.4 ha seed production of six species of perennial shrubs

3) Sustainable Land Management (SLM) technologies

- More than 50 most promising and ready to disseminate SLM technologies and approaches (SLM) were reviewed by national teams in five Central Asian countries (http://cac-program.org/files/cacilm/cacilm_rw_minutes_en.pdf). To collect SLM, the Kazakhstan team analyzed reports of research institutes that were completed over the last ten years within the 'national program of applied research in agriculture.' The Kyrgyzstan team managed to analyze a number of earlier projects conducted by various organizations in the country to extract SLM that showed high potential for dissemination. Organizations – such as GIZ, ICARDA, HELVETAS, and CIDA – as well as rural advisory services, NGOs, and several farmers were among the main sources of information. Moreover, research institutes under the Ministry of Agriculture and Melioration such as the Kyrgyz Research Institutes of Irrigation and Farming, and the National Agrarian University, contributed their own SLM. Of many previous projects implemented in Tajikistan, the most relevant was by the WOCAT team that compiled a large database of local SLM, particularly those originating from communities and small-scale producers, representing traditional knowledge. To complement what was collected earlier, the team added SLM technologies that were within the organizations under the Tajik Academy of Agricultural Sciences. The Turkmenistan team collected and described information for 20 SLM options that mainly dealt with irrigated agriculture. Most of the information was drawn from the Turkmenistan Academy of Sciences and the Academy's collaborating organizations. SLM from Uzbekistan were compiled from proceedings of an annual innovation fair held at the national level, as well as from research institutes under the Scientific Production Center of the Ministry of Agriculture and Water Resources. The national team also utilized other sources of information such as United Nations Development Program (UNDP) projects and the Small Grants Program of the Global Environment Facility (GEF). All teams also selected from the WOCAT database options that were found suitable for conditions across Central Asia.
- The prioritization of selected SLM was conducted at two levels: national and regional. Consultations with representatives of research institutes, farmers and farmers' organizations, NGOs and rural advisory services, and decision-makers, were carried out at national-level workshops organized in each country during January–February 2014 to present collected SLM. The set of 11 criteria (<http://cac-program.org/files/cacilm/SLM%20criteria%20evaluation.xlsx>) consulted and adapted from partner organization GIZ, used in their earlier projects and agreed by national teams, was used to prioritize and select several SLM per target agro-ecosystems for further discussion at the regional-level prioritization workshop. A regional-level workshop, held in 25–27 February 2014 in Almaty, reached a consensus on SLM for each target agricultural livelihood system (ALS), and the development of criteria to generate similarity maps for out-scaling SLM. The SLM approaches and technologies presented by country teams addressed a broad range of issues that are equally important in each ALS in various agro-ecosystem, and in the relevant countries. In order to reach agreement by each of the participating partners it was decided to form SLM packages consisting of core technologies for each target around one core technology to enable the adaptation of SLM packages to local conditions across the five countries (for details please see http://cac-program.org/files/cacilm/cacilm_rw_minutes_en.pdf).
- Similarity maps for five countries were generated. Based on the formulated SLM packages, the country teams agreed on a set of criteria to develop similarity maps. The similarity maps will be used to facilitate SLM dissemination by visually presenting potential areas for up-scaling, as well as to identify target areas to disseminate particular SLM packages in all four

target agro-ecosystems. The purpose of this regional-level similarity map generation exercise was to present data and procedures for fine-tuning at the country level. This exercise will be used in 2015 to organize GIS training to allow country teams to apply new skills for particular deliverables. Criteria could be revised by national experts to adjust and reproduce the similarity results. For more information please visit the following links for English and Russian versions (http://www.cacilm.org/system/files/CA%20Similarity%20report_eng.pdf) (http://www.cacilm.org/ru/system/files/CA_similarity_report_ru.pdf).

- Downscaled calibration models require bias correction to match historical modeled and observed data. One of the knowledge gaps identified by the national teams during the inception workshop was the impact of Climate Change on agriculture. To address these gaps, this activity aimed at assisting in the development of procedures for the calibration of downscaled climate change scenarios to CA. This activity also included training for national partners on downscaling procedures through an interactive workshop and explanation of the potential influence of future climate scenarios on agriculture, especially SLM. This should help their understanding of the downscaling of climate change scenarios to their region and to select SLM options that help farmers to adapt their practices. Historical data on the main meteorological parameters from 22 CA meteorological stations collected during previous ICARDA projects were compiled into a database and provided to the method's developer, Dr. Raghavan Srinivasan (Texas A&M University). Script was developed, helping to download data, and retrieve and compare parameters. For more information please see minutes of the training and the draft manual resulting from this activity (<http://www.cacilm.org/manual-cc-bias-correction>).
- A web-based 'knowledge platform' was established at www.cacilm.org. The project and stakeholders identified the main tasks for the website to establish a knowledge platform. The website is designed to serve as the synthesis and consolidation of best practices on SLM. These can be farmer innovations, examples of sustainable management of water, land and forest resources, sustainable farming methods, pasture use, improved livestock and crop production, and promising scientific developments concerning climate change. Champions, those that have achieved in their fields of specialization relevant to SLM, are also of interest for the website to cover and disseminate their successes. In addition, the experience of other countries, advanced in addressing SLM issues will also be included in internet resources of the project. Participating country teams agreed on a plan for publications. Firstly, it was agreed that SLM approaches and technologies that have been successfully piloted in countries and found suitable for widespread dissemination would be published. It was also agreed that any information disseminated would need to be simple and understandable. An initial website has been designed in two language versions (English and Russian) and tested. The website is named the 'Knowledge platform' with the aim to promote SLM in CA. Apart from general and basic information about the website and the project, a number of blogs and descriptions related to SLM approaches and technologies have been uploaded.
- A series of training events were also organized at the regional and national levels. National level events mainly comprised of field-days and round-tables to evaluate and demonstrate selected SLM technologies in each agro-ecosystem to decision makers and producers. Regional level events were conducted for capacity building in similarity mapping, climate change models bias correction, and knowledge sharing. In 2014, the total number of participants at over 24 events were 846, 27% of whom were women (621 men; 225 women). For more information on each event please visit <http://cac-program.org/projects/cacilm> and www.cacilm.org.

Outputs related to Water Use Efficiency. (Irrigated system)

Studies were initiated at K.Umarov Action Site, involving the evaluation of: (1) WUE of winter wheat/mungbean double cropping; (2) water and energy productivity for winter wheat and mungbean; (3) using SMS technology for irrigation scheduling at the pilot canal; and (4) WUE at household level.

- (1) Farmers over-irrigate winter wheat – irrigation applications exceed 6,000 m³/ha even under conditions when groundwater table is at 1.6-2.0 m depths. Irrigation water productivity is about 0.9 kg/m³, however real water productivity, including groundwater contributions, does not exceed 0.7 kg/m³.
Cultivation of mungbean after winter wheat harvesting showed that with one pre-sowing irrigation, and one irrigation during the crop season, farmers can get 1.4-1.5 t/ha. Water productivity may average 0.7 kg /m³ for mung bean, which is 3-4 times more expensive on the market as compared to wheat grain. Mungbean also contributes to improved soil fertility through the fixation of nitrogen. The studies indicated that farmers can apply cutback furrow irrigation and alternate furrow irrigation methods to increase WUE. The studies found that the timely sowing of mungbean, especially of new high-yielding varieties, without delay after harvesting of winter wheat was important. Low temperatures at the end of October may affect the crop and produce damage to crop yields.
- (2) Assessing energy productivity for winter wheat and mungbean showed that: 70-85% of energy inputs for cultivation of winter wheat is associated with Nitrogen fertilizer. Mungbean can be grown without the application of fertilizers, and moreover, it contributes to increasing Nitrogen content in the soil profile. Energy inputs for mungbean are mostly associated with fuel for soil tillage and electricity since farmers often pump groundwater for the irrigation of second crops
- (3) Using SMS technology for the pilot Bessarang canal demonstrated that farmers are willing to supply information on irrigation events, and the dates of previous and new irrigation required through SMS messages to WUAs – if WUAs and District Water Administrations are ready to supply the farmers with irrigation water on a timely basis. In 2014, the system of disseminating information to farmers and receiving information through automatic SMS messages was developed and tested at K. Umarov WUA. The next step is to link the irrigation scheduling procedure with SMS messages, planned for 2015.
- (4) A study of WUE at the household level was carried out in K. Umarov using a socio-economic survey method. While the results received are interesting and disclose many complications and lack of institutional arrangements for regulating water allocations, the data obtained has to be verified in 2015 through direct monitoring of water use by households.
- (5) The impact of the institutional setup of water management on WUE was investigated for two WUAs in Fergana province, K. Umarov and K. Azamjon, and one WUA in Andijan province, Tomchi Kul, along the Southern Fergana Canal. The data collected discloses water related issues which face WUAs located in the head and tail ends of the canal. Similar analyses were also initiated in B. Gafurov and J. Rasulov, districts within the Sogd Province of Tajikistan. The impact of establishing WUAs on WUE is to be further investigated.
- (6) Visits to various Water Users' Associations were carried out to shortlist those that represent larger areas in their neighborhoods. The activity selected sites for crop modeling and weather station network-based advisory system experiments, and background biophysical data were also measured. Hard copies of hydro module zone (HMZ) maps from Soviet times were gathered from local archives and sites were selected based on these maps. Five crop models for different cultivars of winter wheat were satisfactorily calibrated. Weather stations, TDRs and other equipment were purchased, and a two-week training event on crop modeling was held (DSSAT and AquaCrop). Once the snow starts to thaw, the weather station advisory system will be tested against the TDR-based soil moisture system for its accuracy, and to estimate soil moisture content. The calibrated crop models are providing Kc (crop coefficients) for the popular cultivars of wheat and cotton.

Outputs related to Marginal lands activities (Agro-pastoral systems)

Within adaptive trials for improved varieties to access vulnerable households to food sources, which are consistent with IDO3, four released varieties of quinoa and vegetable legumes were evaluated at Karabuga Farm (ICBA in collaboration with AVRDC). As a result, superior varieties/improved cultivars of topinambur, fodder beet, sorghum, pearl millet, mung bean, cow pea, soybean and faba bean were identified. A new salt- and drought-tolerant, early maturing pearl millet variety was also released and seed multiplication started at Khegeli Farm in Karakalpakstan. (<http://www.cac-program.org/files/97cad2721f4745d063db64cb45da1c1f.pdf>)

i. Outputs related to seed production:

- 6.0 ha seed production of four varieties of sorghum;
- 1.0 ha seed production of one variety of pearl millet;
- 2.5 ha seed production of one variety of alfalfa;
- 7.4 ha seed production of six species of perennial shrubs.

(<http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf>)

ii. Outputs related to Livestock productivity cluster activity

The cluster of activity on livestock productivity was initiated with a planning meeting in Dushanbe, held from 19-20 May 2014, to establish core partnerships and to agree on criteria for selecting field sites within the large action sites and on major intervention areas ([“Planning Workshop on Livestock Productivity - a component of the Dryland Systems CRP in Dushanbe, Tajikistan, 19-20 May 2014”](#)). To build on ICARDA’s expertise from a number of past R4D projects, and to ensure impact through livestock related interventions, it was agreed to focus on small ruminants in agro-pastoral livelihood systems, and to identify field sites - within Sogd Province in the Fergana Valley action site, and Karalpakstan within the Aral Sea action site. A number of or areas for best-bet interventions were identified in the workshop, based on results from earlier projects and expert knowledge, which would be verified and complemented by the outcomes from a rapid small ruminant (SR) meat value chain assessment (VCA) at the field sites.

ICARDA’s national staff was trained in Ethiopia. A subsequent toolkit for SR VCA, developed by CRP L&F, was adjusted to Tajik and Uzbek conditions and translated to Russian ([“Toolkit for rapid assessment of small ruminant value chains in Central Asia”](#)). This was followed by an intensive on-the-job training of NARS researchers for implementation in Sogd Province.

In Sogd Province it was agreed to continue working with target farmers and communities of an earlier IFAD Grant Project that was aligned with the CRP DS and had been completed in September 2013 ([IFAD Project](#)). An important challenge for securing future livelihoods of Angora goat keepers, and consequently for women Mohair processors, was increasing the fiber quality so that it reached international quality standards in fiber and fiber products. As a result, researchers continued with the initiative’s Artificial Insemination program in two Tajik Angora elite herds, using frozen semen from kemp-free Texas Angora goats ([Blog story on Artificial Insemination](#)). Another important challenge was to guarantee continued access to the productive rangelands of larger Angora goat breeders, sustaining the supply of quality breeding animals and pastoral communities with smaller herds, given the dynamics created by the new rangeland law. Thus, research plans are being developed to analyze and document the changes in rangeland access, complemented by analyzing utilization patterns and related rangeland and livestock productivity. The development of joint toolkits for rangeland monitoring are being discussed with ICARDA’s Geo-Informatics Unit to link remote sensing techniques with on the ground biomass estimation methods. Equipment for mobility studies is also being acquired.

A number of explorative missions were undertaken to Karakalpakstan to visit potential target districts, where intensive discussions were held with district administrators and livestock farmers. Nine villages in Karauzyak district were selected; and target plots for feed production and rangeland rehabilitation are currently being identified. The Forest department will provide seeds from potential forages for field testing in early spring ([“Selection process for identifying field sites for the Livestock Productivity activity cluster in the Aral Sea basin and the Fergana Valley action sites”](#)).

iii. Outputs related to Marginal lands management

1. In the Shurkul Lake’s area, Kushkupir (Khorezm, Uzbekistan) females are mainly responsible for fodder supply (36 %) and energy resources supply (15%), while the rest of the duties are assigned to

the male. Moreover, females have a tendency to be a housekeeper, and males tend to work more in farms, MTP, and WUAs.

2. Report on a qualitative survey analysis from Koshkupir settlements on what make profitable saline lands and lakes (socioeconomic, gender, youth, capacity building, extension for 70 householders incomes) was documented. (<http://www.cac-program.org/files/38a09fd8f6dc17cc12403d62cc0c903d.pdf>).

3. Reports on field baseline data collection on soil and water chemistry, utilization of halophytes with marginal water in Koshkupur district (<http://www.cac-program.org/files/bc4914f16cf75c45b166e153a5df1cce.pdf>)

4. Report on degraded land assessment and socio-economic survey in Khorezm, <http://www.cac-program.org/files/583d70f344f11e03725f6f54ade4a642.pdf>

iv. Outputs related to capacity development:

Training on seed production and seed quality of sorghum, pearl millet and fodder perennial shrubs and of organized at Azamat farm, Khegeli (Karakalpakstan) and in Bukhara

(<http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf>).

Training on salinity and frost-tolerant winter wheat production experiments in the Khorezm province, held on May 28th 2014. Forty farmers participated at the training and the field day, conducted by senior researchers from ICARDA CAC and KRASS (<http://krass.uz/ICARDA/CB/>).

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

Summarise major successes in the progress towards research outcomes and IDOs. Refer to relevant indicators from Table 1, where relevant and to the indicators of progress towards the CRP's IDOs .

On-farm adaptive trial outcomes (ID01, ID02, ID03)

- Thirty two improved winter wheat genotypes tolerant to salinity and frost were identified in Aral Sea Region in Uzbekistan (<http://www.cac-program.org/files/410cb8d14a063597dceb5ee5c0835444.pdf>).
- Five frost-tolerant, high yielding winter wheat varieties were identified in Sugd province, Tajikistan (<http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf>).
- Farmers in the Fergana Valley Action Site, Uzbekistan, selected four yellow rust resistant winter wheat varieties (<http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf>).
- Two salinity tolerant, high productive potato clones were identified in Karakalpakstan, within the Aral Sea Action Site (<http://www.cac-program.org/files/20a056406a8ab59b66fd079791d4d8b3.pdf>).
- Two heat-tolerant, high-productive potato clones were identified in the Fergana Valley Action Sites, Uzbekistan (<http://www.cac-program.org/files/c8313339a8a6c9c9e68a579c64115d32.pdf>).

- Two heat-tolerant chickpea varieties were identified in Khorezm Province, Uzbekistan, within the Aral Sea Action site (<http://www.cac-program.org/files/86fd7b57c6012791276c0be8c7b24330.pdf>).
- Three improved mungbean varieties were identified for winter wheat-mungbean crop rotation in Fergana Province, Fergana Valley Action site (<http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>).

These high yielding varieties of different crops are expected to increase the productivity of related crops, and improve farm income and food and nutritional security upon their adoption by farmers. Using mungbean in rotation with wheat will help earn additional income. Mungbean varieties offer excellent options as a summer crop where fields are left fallow by most farmers.

Cultivation of salinity and frost-tolerant new winter wheat varieties could greatly improve food security in otherwise vulnerable ecosystems. The cultivation of yellow rust-resistant wheat varieties will save farmers the cost of applying fungicide, and help protect nature.

The price of seed at harvest time could be around 50-100% higher, depending on the quality grade of seed and the grain price in the CRP-DS action sites in Central Asia. Hence, the involvement of small farmers in seed production could result in substantial additional income for farmers.

Outcomes towards quality seed production (ID01, ID02, ID03)

- 451 tons of quality wheat seed (eight varieties) produced (<http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>)
 - 404 tons in two action sites in Uzbekistan
 - 47 tons in one action site in Tajikistan
- 86 tons of mungbean seed produced
 - 5 tons in one action site in Uzbekistan (<http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>)
 - 81 tons in one action site in Tajikistan (<http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>)
- 3 tons of mini tubers (14 potato clones) produced (<http://www.cac-program.org/files/a8ebfbe751580dd589cf2d7025fb96ee.pdf>)
- 17 tons of seed of sorghum, pearl millet, alfalfa and perennial shrubs produced (<http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf>)
 - 11.5 ton of four sorghum varieties
 - 0.04 tons of one pearl millet variety
 - 0.5 tons of one alfalfa variety
 - 4.5 tons of six species of perennial shrubs.

Agricultural Innovation Systems (ID06, ID04)

- An 'Innovation Platform' (IP) workshop was held in Bishkek, Kyrgyzstan, within the Fergana Valley action site, targeting the capacity strengthening of IP stakeholders and the creation of a common understanding of Agricultural Innovation Systems and Innovation Platforms. Entry points for action were discussed: strategies to establish 'innovation platforms' in CA countries, and the opportunities and constraints controlling agricultural innovations and development <http://www.cac-program.org/files/51a5cf08f644039b7541dd0ce77b4e01.pdf>.
- A common approach to the planning of joint activities aimed at the development of **Rural Advisory services (RAS)** was achieved, a key success given current and emerging challenges

caused by the impact of climate change on agro-ecosystems. The establishment and improvement of institutional mechanisms for the exchange of experience and knowledge was also taken forward with the development of a set of recommendations to enhance extension systems and link science with male and female farmers, following a regional RAS conference, held in Bishkek on 17-21 November, 2014

<http://www.egfar.org/news/collaboration-innovation-rural-advisory-services-central-asia-and-southern-caucasus>. The CRP DS 'Innovation Platform' approach in Central Asia was considered a key innovative model for Strengthening RAS systems in Central Asia and the Caucasus region (web-post is pending approval as the report is being edited; the weblink to be provided soon).

- To improve the capability of CAC organizations, to enable them to be more pro-active in setting the research and innovation agenda for food, agriculture and rural development, and positioning research and innovation in the broader context of development, CACAARI, in cooperation with CRP DS in Central Asia, is taking the lead in the region in establishing a **Foresight platform** as a systematic, participatory and multi-disciplinary approach to explore mid- to long-term futures and drivers of change. In this regard, a Workshop on developing forward thinking capacities in Central Asia and the Caucasus region was held on 19 November, 2014 in Bishkek, Kyrgyzstan, with the purpose to advocate and raise awareness of different stakeholders of Agricultural Innovation System (AIS), who were capable of engaging in foresight/forward thinking in the CAC region on the future of food, agriculture and rural development, thus forming a critical mass with which CACAARI could work to promote and implement the concept of the foresight academy. As a result of the foresight Workshop, participants acknowledged the value of engaging in foresight/forward thinking in the CAC region, and urged CACAARI to promote foresight academy, a forward thinking platform in CAC region. CRP DS activity leaders in CA assured CACAARI they would continue joint actions towards establishing and operationalizing a Foresight Platform, and stipulate this activity in the Plan of Work of CRP DS in CA for 2015.
<https://drdosov.wordpress.com/2015/01/23/foresight-and-prioritization-of-demand-driven-innovations/>
- A **Baseline survey** was conducted in Kyrgyzstan, Fergana Valley, covering 120 Households. Baseline data was collected on the following issues: Demographic characteristics of households; Financial, physical, natural and social capital; Agricultural production; Access, quality, quantity, and management of water resources; Livestock production and management; Agricultural policy; Food security and nutrition; Borrowing and access to credit; System vulnerability and local coping mechanisms used by households. http://cac-program.org/crpd/survey/baseline_data.

Sustainable Land Management (SLM) technologies (ID04)

- The synthesis, collection, and documentation of 57 SLM options were completed by mobilizing national partners in all five Central Asian countries. The description and packaging of collected information is done in a concise and easy to comprehend format, using the template adapted from WOCAT (form available online). A compilation document is available online (<http://www.cacilm.org/node/214>) to ensure easy access and facilitate use and uptake by various stakeholders. It is planned to be worked into brochure (book form) in early 2015. This outcome contributes towards IDO 4.
- Sustainable land management (SLM) knowledge sharing web-platform "Knowledge 4 Sustainable Land Management" was launched at www.cacilm.org. The Knowledge sharing hub presents practical technologies, practices, and approaches that Central Asian countries can implement for sustainable land management, validated by researchers from partner countries alongside colleagues from international research. This outcome contributes towards IDO 4.

Outcomes related to Marginal lands (ID01; ID03; ID04)

A number of explorative field missions were undertaken in Karakalpakstan to collect baseline data for potential target districts (reports are under preparation). Intensive discussions were held with district administrators and livestock farmers, women leaders, household members, and other stakeholders. Nine villages in Karauzyak district were selected, and target plots for feed production and rangeland rehabilitation are currently being identified.

v. Outcomes related to quality seed production:

- 17 tons of seed of sorghum, pearl millet, alfalfa and perennial shrubs produced (<http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf>);
 - 11.5 tons of four sorghum varieties;
 - 0.04 tons of one pearl millet variety;
 - 0.5 tons of one alfalfa variety;
 - 4.5 tons of six species of perennial shrubs.

vi. Capacity strengthening:

Three farmers/community-based seed multiplication units on salt tolerant cereals, legumes and forage perennial plants were identified.

vii. Outcomes towards quality capacity development:

Seed multiplication trials of sorghum (4 local varieties), Hashaki1, a new pearl millet variety, was released, and fodder beet (2 varieties), legumes (mung bean and caw pea improved lines), quinoa, and sesame varieties were established on three specialized farms in Khegeli, and Karabuga farms in Karakalpakstan. (<http://www.cac-program.org/files/97cad2721f4745d063db64cb45da1c1f.pdf>). Super-elite (certified seeds) and first reproduction seeds of sorghum, pearl millet, and perennial fodder shrubs (*Kochia prostrata*, *A. undulata*, *Ceratoides ewersmanniana*, *Haloxylon aphyllum*) were collected and documented. Seed growers (12, including four women) were trained in post-harvest practices, seed storage procedures, and seed quality control. Seed production systems and the multiplication of improved crop varieties and arid fodder species will be addressed by establishing farmer/community-based seed multiplication units in local villages, and by promoting farmer to farmer and farmer to pastoralist exchange and extension services.

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

The wheat farmers in the Aral Sea Region and Sugd, Tajikistan, have been frequently harvesting crops with lower productivity or losing entire crops in some years because of cultivation of frost-susceptible varieties. Cultivation of frost-tolerant varieties such as commercially released 'Yaksart' and other pipeline varieties (<http://www.cac-program.org/files/410cb8d14a063597dceb5ee5c0835444.pdf>, <http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf>) could help resource poor farmers living in vulnerable ecosystem, and will ensure successful wheat harvests in normal, as well as frost-occurring years.

The cultivation of heat tolerant (<http://www.cac-program.org/files/c8313339a8a6c9c9e68a579c64115d32.pdf>) and saline-tolerant (<http://www.cac-program.org/files/20a056406a8ab59b66fd079791d4d8b3.pdf>) potato clones and heat-tolerant chickpea (<http://www.cac-program.org/files/86fd7b57c6012791276c0be8c7b24330.pdf>) will diversify cropping systems and cope with the effect of climatic extremes prevalent in vulnerable systems.

The cultivation of heat tolerant mungbean in winter wheat-mungbean rotations will double the cropping intensity, improve family nutrition as a source of protein, and increase farm income (<http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>).

The availability of several stress-tolerant varieties of wheat, chickpea, mungbean, and potato, as described above, provides diverse options for crops and cropping systems to farmers in both vulnerable areas, as well as in sustainable intensive agro-ecosystems.

Adoption and seed production of new varieties of diverse crops boost farm income and diversify farming systems in Uzbekistan and Tajikistan

The unavailability of quality seed of wheat, the major staple in Central Asia, results in lower productivity and negatively impacts food security. A lack of crop diversification limits continuous food supply to smallholder families, restricts cash flow, and forces youth to migrate to distant cities and abroad. Therefore, the priorities of the CRP-DS activity on 'Seed Systems' in 2014 include:

- (i) Quality seed production of improved varieties of crops to boost income in 2014 – Farmers can sell seed at 25 to 100% higher price compared to grain,
- (ii) Improving productivity of crops in 2015 by planting quality seed produced in 2014
- (iii) Diversifying farming systems in 2015 by growing multiple crops and using crop bi-products for animal feed
- (iv) Improving food security, nutrition, and the income of men and women smallholders through harvesting and the sale of multiple crops in a year, and
- (v) Reducing vulnerability that might occur due to the failure or low productivity of one crop in the rotation because of adverse climate.

In 2014, 562 tons of seed of different crops were produced, which is expected to expand cultivation in 2015, specifically:

- (i) 461 tons of wheat seed occupying some 2300 ha (<http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>),
- (ii) 86 tons mungbean seed on 4300 ha (<http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>; <http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf>)
- (iii) other crops (potato, barley, chickpea, sorghum, pearl millet, etc) (<http://www.cac-program.org/files/a8ebf751580dd589cf2d7025fb96ee.pdf>; <http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf>; <http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf>).

In order to take advantage of the profitability of seed production, over 200 farmers were trained in quality seed production. Most of the farmers who attended the training were, or will be involved, in the seed production of multiple crops. This will further improve farm income.

The cultivation of mungbean during summer months (when fields are vacant after wheat harvest in June) will result in multiple advantages, such as:

- (i) Additional income from a second crop
- (ii) Improved family nutrition through the consumption of protein rich mungbean
- (iii) Less expenses on consumption of mungbean can substitute for dietary protein requirements, to an extent
- (iv) Bi-products of mungbean are utilized as nutritious feed for animals, and
- (v) Improvements in soil health, to sustain productivity.

D. GENDER RESEARCH ACHIEVEMENTS (1 page)

CRP CA flagship's gender activities for 2014 year included mainly targeted filling the gap in practice and knowledge regarding gender issues. The Interdisciplinary Research Team (IRT) discussed and agreed on means to align their objectives and outcomes following the CRP DS Gender Strategy, and to incorporate gender ex-ante in research activities, including tools and

methods, and on catalyzing change agents to bring about more gender-equitable attitudes and behaviors among all the stakeholders. IRTs, following the identified actions site for 2014, have conducted gender activities mainly in the Aral Sea with a target of: Reducing gender disparities in critical vulnerabilities to more resilient dry land agro-ecosystems management, improving access to agricultural and domestic technologies in the Aral Sea region. In the and Ferghana Valley the focus was on integrating gender differences and equity goals into the development and testing of technologies for intensified production, increased income, and improved well-being.

The main achievements of the CA region regarding gender activities included: over 30 regional and local workshops which targeted both male and female (around 25%) participants. Gender related issues were discussed and integrated into the cost-benefit analysis template (<http://www.cacilm.org/comp3table-assessment-net-change-selected-slm-technology>). One research report on the “Feminization of agriculture” was produced to contribute to gender equity in access to agricultural labor. Another, more technical report addressed differences in water using practices and understanding of water use efficiency within households looking at gender equity in access to technologies and appropriate delivery systems. Increased involvement, of not only men and women, but especially youth into program activities is growing as a part of the Program’s capacity building processes. As such, the involvement of local bachelor, master students, and interns has helped to conduct more inclusive knowledge dissemination and awareness raising about the gender goals of the CRP DS.

The main CA activities contributing to four CRP research development outcomes were:

- **More rapid adoption of technologies with additional benefits for women by incorporating their preferences** through: 1) mainstreaming gender issues in diagnostic tools and methods in salinity management (CA 4.1); 2) national partners initiating knowledge transfer events for improving men’s and women’s access to good practices in water use efficiency (CA 4.2); 3) increased awareness for national partners of gender roles when promoting farmer to-farmer seed exchange; and 4) increased awareness within seed systems institutions on the role of gender in seed systems (CA 4.5).
- **Men and women increase yields/outputs/Income from DS crops and livestock through the use of technology and management innovations:** 1) enhanced capacity of male and female stakeholders, and especially youth, working as researchers, extension agents, service providers, and lead farmers to plan, implement, monitor and evaluate research and extension services, as well as to apply Geographic Information Systems and Remote Sensing (GIS/RS) for the sustainable management of soil, water, and agro-biodiversity resources (CA 4.6; 4.8).
- **Policy reforms improved gender equity in access to agricultural technologies, assets, services and markets** through: 1) Increased engagement of national partners in dialogue on gender gaps in access to information; 2) improved cultivation of crop varieties that bring more food to households and higher farm income to both female and male farmers (CA 4.4).
- **Women empowered within HHs and communities** through 1) increased capacities in farming technologies and extension services, and enhancing the capacities of women researchers and rural women living in rural marginal lands and communities to apply intensified irrigation.

The main challenge for integrating gender studies has been a lack of land ownership, and as a result, very low numbers of women farmers. At the same time these challenges have been addressed through women who have access to the use of land and water resources, including female farmer’s workers, household members and women researchers. Assessed by gender performance indicators, sex-disaggregated social data was collected and used to diagnose important gender-related constraints in water use efficiency (CA 4.3.) and needs assessments in marginal lands (CA 4.1) in the two CA action sites (Primarily IDO 1 and 4).

The institutional architecture of integration of gender is in its early development stage where a network of specific CRP scientists and managers responsible for gender outputs is in the process of

being established. Currently, there are two Centers which are coordinating integrative gender activities.

Procedures in terms of gathering baseline knowledge on gender and assessments of gender equality implications has started and is reflected in the outputs and indicators tracking women's participation in trainings, workshops, farmer days, and any knowledge and capacity-building activities.

Gender empowerment through improved capacity

A workshop held in Bishek, Kyrgyzstan, on December 8, 2014, - "Gender mainstreaming to higher and sustainable income and well-being in Fergana valley through CRP DS approaches" – helped to deepen and integrate understanding of gender, specifically how to use gender as a tool for improving the well-being, and increasing the income, of rural families in the Fergana Valley. Training was conducted within the Innovation Platform component of CRP DS in Central Asia. All training participants were from Kyrgyzstan. There were 17 training participants, nine of them women. All participants had high or technical education background, and all of them were involved in agriculture, since they work as consultants, or in farmer organizations. For 98% of training participants this training was their first experience of gender education.

With an eye on long-term sustainability, the majority of participants will be invited to conduct research. The task given to trainers was therefore to help participants distinguish gender in daily life and to recognize gender in daily relations. At the training, participants were taught the following: basic gender concepts, an understanding of the relationship between gender and food security, gender and agriculture, and gender and well-being. While the first part of the workshop was theoretical, the second part was practical: participants received detailed information about the Innovation Platform and Gender Strategy, identified the main gender gaps in agriculture, and developed further gender-mainstreamed steps and activities for research program realization in their communities. <http://www.cac-program.org/files/9697de1b54e13c7846d169afecef2056.pdf>.

1. Internships: Four female scientists held internships on salinity assessment and baseline data collection for different marginal land categories in the Aral Sea Basin. Evaluations included:

- Dr. Elena Shuyskaya (04.09-10 November 2014) on "Salt tolerance strategies of halophytes and its use in phytoremediation of marginal saline lands in Uzbekistan"; <http://www.cac-program.org/files/8dab9a358d7d6d6e8937e178430f3adb.pdf>
- Dr. Marina Lebedeva on "Studies of chemical, mineralogical, and micromorphological properties of natural and anthropogenic soils to determine the status of marginal salt-affected lands"; <http://www.cac-program.org/files/8dab9a358d7d6d6e8937e178430f3adb.pdf>
- Aysulu Safarova, Moscow State University (10.09-20.09.14), undertook a field survey on cover vegetation on marginal lands in Karakalpakstan
- Dilyafuz Arifkhanova (06.03-30.05.2014) – studied chemistry of soils and aboveground biomass, collected along a salinity gradient in Karauzyak district.

3 KRASS (NGO in Aral Sea action site) specialists (senior researchers) were also trained at ICARDA, including Dr. Yulduz Djumaniyazova and Shirin Babadjanova on "Scientific management of field experiments" during 3-6th of September 2014, (<http://krass.uz/ICARDA/CB/>;) and on "Statistical Design and Data analysis of field experiments" during 1-12th of December 2014 (<http://krass.uz/ICARDA/CB/>).

4. Trainings: five percent of female farmers involved in Self-Help Group (SHG) activities on cultivation of dual-purpose crops and halophytes in Karabuga farm; at least 15 farmers trained in seed quality legumes and cereals (sorghum and pearl millet) production.

ICARDA and KRASS organized a field day on 28 May 2014, focused on salinity- and frost-tolerant winter wheat production experiments in Khorezm. Five percent of participating farmers were female,

5. A Master's thesis of Tanna DeRuyter was supported, in collaboration with the University of Nevada. The thesis was entitled: "Modeling Halophytic Plants to Improve Agricultural Production and Water Quality in Arid and Semi-Arid Regions." (<http://www.cac-program.org/files/e14f88f0371d8d15cac01ed478afd7a6.pdf>)

E. PARTNERSHIPS BUILDING ACHIEVEMENTS

Within the context of the **Knowledge and technology dissemination strategy**, apart from strategic partnership with Central Asian country organizations (<http://cac-program.org/projects/cacilm>), the CACILM team is looking at ways to make accumulated knowledge more available and accessible. For this purpose, the KM-CACILM II project has engaged in another initiative – the KLINK knowledge hub initiated by the GIZ regional program in Central Asia and a private IT company (SIRIS Academic, www.sirisacademic.com). A representative of GIZ was invited to brief the project about KLINK during the February 2014 workshop in Almaty on SLM prioritization. The project member participated in a presentation event of the new system in Bishkek in March 2014. KLINK is implemented by GIZ and works with IT company SIRIS Academic. The focus is on managing knowledge on NRM in Central Asia. The concept is 'knowledge management system (hub), which is similar to a customized search-engine tool that can be integrated into websites and offer local search (within the website) and global search options (within a network of websites that run the tool). This tool allows users to upload any type of document onto their own website and identify who can access it. Any document can be private, restricted, constrained, or public. Users can specify stakeholders that they do not want to share a particular document with. Private documents will not show up in global search results and can only be accessed by authorized users. The project is interested in becoming a partner in the network to make knowledge generated available and accessible within project activities. The advantage of KLINK is that it can link existing and new websites in a seamless way. An MoU between parties has been agreed and is currently being submitted for signatures.

Partnership in the Aral Sea Action site have been established with NGO KRASS, local authorities and Farmer Councils. Support letters have been received for successful implementation of activities (<http://krass.uz/project.html>.)

Partnership with international centers

The cluster activity on **On-farm adaptive trials** brought three CG Centers (ICARDA, CIP and Bioversity International) together to work in close partnership with two non-CG Centers (AVRDC and ICBA). ICARDA and CIMMYT worked together in providing improved germplasm to wheat growers in the Action Site. This activity utilized improved germplasm developed by CRP WHEAT, CRP 3.5 (Dryland Cereals) and CRP 3.6 (Legumes). A number of national research institutions, private farmers, and governmental organizations worked closely to successfully implement the activities.

An activity on **Seed systems** brought three CG Centers (ICARDA, CIP and Bioversity International) and two non-CG Centers (AVRDC and ICBA) together to work in strong partnership within a CRP-DS Action Site in Central Asia. This activity utilizes outputs (improved varieties) of CRP WHEAT, CRP 3.5 (Dryland Cereals) and CRP 3.6 (Legumes). A number of national research institutions, private farmers, and government organizations work closely to successfully implement the activities.

Within livestock activities, partnerships with core national research partners in Tajikistan and Uzbekistan were established through a multi-stakeholder planning meeting in May 2015 (see above). The meeting also discussed linkages with other clusters of activities at the action sites.

A long-standing partnership between ICARDA and the Tajik Livestock Research Institute (TLRI) has been developed since 2007; the Director of the Sogd Branch of TLRI in Khujand has started to implement the project activities at the target field sites, such as rapid SR VCA, the continuation of the Angora goat genetic improvement program , the analysis of Tajik rangeland law, and active

lobbying of local governments to provide continued access for goat keepers and pastoral communities. A first work plan and budget was agreed and implemented in the last quarter of 2014; the workplan and budget for 2015 is under preparation. TLRI and ACTED are discussing the potential role of NGOs in community organization and interaction with local governments.

A joint mission to Karakalpakstan for field site selection was undertaken with a representative of the Uzbek Research Institute of Karakul Sheep Breeding and Desert Ecology; the institute is a key partner for small ruminant herd management and halophyte testing in Uzbekistan, and will provide technical backstopping for rangeland monitoring at both sites. Local partners in Karyuzak district are being identified for day to day project implementation.

It has been agreed with ICBA to be responsible for testing options for winter feed production on marginal/saline land and rangeland rehabilitation in Karakalpakstan; a detailed workplan and budget is under preparation as a basis for an MoU for 2015 between ICARDA and ICBA.

The Uzbek Veterinary Research Institute in Samarkand participated in a planning workshop as a partner for implementing animal health related interventions once they have been defined through the rapid VCA.

Within the **Water Use Efficiency** activity, a formal partnership was established with Urgench State University, which can use CRP research activities to help engage faculty and students in research, dissemination, and modifying syllabus. Informal partnerships have been established with local water user associations, assisting them to improve agricultural water management, consulting them in the development of methodologies, and making them aware of the instrumentation and data collection protocols of our research, and its purpose.

Under the CRP 1.1. program Water Use Efficiency activity, IWMI has been able to establish partnerships with different institutions.

- a) Specifically, a partnership with the International Potato Center (CIP) to improve potato varieties and water management technologies to enhance water use efficiency, resilience, cost-effectiveness, and the productivity of smallholder farms in stress-prone Central Asian environments. Demonstration sites organized in Ferghana and Andijan Provinces of Uzbekistan have been used to compare current farmer irrigation practices with other advanced irrigation methods, such as partial root drying, drip irrigation, high frequency irrigation, improved irrigation scheduling, and other forms of deficit irrigation where water was only applied to potatoes during the tuber initiation stage.
- b) A partnership has been established with Sughd Basin Water Management Organization, as well as its branches in B. Ghafurov and J. Rasulov Districts. A partnership with Water User Associations (WUAs) along the Khojabakirgan Main Canal has helped identify the institutional aspects/governance of water management. Two WUAs have agreed to be partners in a study of the institutional aspects of water management: one WUA is Obi Ravoni Ovchi Qalacha, and the second WUA is X. Olimov. Surveys were conducted in these two WUAs among three types of water users: individual, state, and kitchen-garden land owners/households.
- c) Partnerships have also been established with three WUAs in Ferghana Valley, part of Uzbekistan. One WUA is Tomchi-Kuli, Markhamat District, Andijan Province, the second WUA is Kodirjon A'zamjon in Kuva District, Ferghana Province, and the third is WUA K. Umarov in Tashlak District, Ferghana Province of Uzbekistan. Partnerships have been established with WUAs to study technical, as well as institutional, aspects of water management. Specifically, research has studied water-energy efficiency, and surveys have been conducted on institutional/governance aspects among individual farmers and kitchen-plot owners.
- d) Partnerships have also been established with individual consultants on how to carry out surveys: qualitative as well as quantitative data collection.
- e) IWMI, in collaboration with AVRDC, the Land Use Institute and Horticulture Institute, both in Tajikistan, have been able to set up demonstration sites in Soghd Province to cultivate mung bean.

F. CAPACITY BUILDING (1/2 page)

On Adaptive Varietal Trials:

- Training for young researchers: 22 young researchers (16 men and six women) trained in scientific management of field experiments (<http://www.cac-program.org/files/dff0a7e10cb22f475b9e1922b0c0d2b4.pdf>); 13 young researchers (nine men and four women) trained in statistical design and data analysis (<http://www.cac-program.org/files/8a0bfa4993fa24573384b713f647f2f6.pdf>).
- Training for women - 126 farmers, doctors and students (16 men and 110 women) were provided with information on healthy diets (<http://www.cac-program.org/files/f0e7646233646d539a4020cca87c9637.pdf>), and role of crop diversification in food diversification for sound health.
- Farmers' training – 134 wheat farmers (125 men and nine women) taught effective selection techniques of improved varieties through farmer field days (<http://www.cac-program.org/files/fda65f1f7054bc4ffd694273e16cf19b.pdf>; <http://www.cac-program.org/files/58b6e509705aa5bd690d7893e1efffb0.pdf>) 130 farmers (12 men and 118 women) received information and learned about growing mungbean (<http://www.cac-program.org/files/58b6e509705aa5bd690d7893e1efffb0.pdf>).

Capacity development of young researchers, farmers, and women:

- 285 farmers and researchers (166 men and 119 women) received training on on-farm adaptive varietal trials. Capacity development of the men and women farmers and young researchers, specifically training related to technology (variety and crop rotations) generation, testing, and adoption, was considered crucial for them to adequately benefit from CRP-DS initiatives. The rural farmers in the action sites are poorly informed about the options of stress tolerant varieties of crops for their farming systems. Therefore, CRP-DS activity on “On-farm Adaptive Trials” organized four farmers’ field days (<http://www.cac-program.org/files/fda65f1f7054bc4ffd694273e16cf19b.pdf>; <http://www.cac-program.org/files/58b6e509705aa5bd690d7893e1efffb0.pdf>) to demonstrate the performance and evaluation of new varieties of wheat. A total of 134 (125 men and nine women) farmers benefitted from these events. Thirty five young researchers (25 men and nine women) were trained in the scientific management of field experiments and experimental design and data analysis through two specialized training courses (<http://www.cac-program.org/files/dff0a7e10cb22f475b9e1922b0c0d2b4.pdf>; <http://www.cac-program.org/files/8a0bfa4993fa24573384b713f647f2f6.pdf>). Through a workshop, 126 farmers, doctors and students (16 men and 110 women) received information on healthy diets (<http://www.cac-program.org/files/f0e7646233646d539a4020cca87c9637.pdf>), and the role of crop diversification in food diversification for sound health.
- Farmers training – 208 farmers (194 men and 14 women) trained in quality wheat seed production (<http://www.cac-program.org/files/ae9243f9d73935afd1208f410848b2f9.pdf>; <http://www.cac-program.org/files/28bb4dc8f66b474a70f95dc8a533f635.pdf>), and 12 farmers (eight men and four women) trained in postharvest practices of seed quality and storage (<http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf>). The unavailability of quality wheat seed to rural wheat farmers negatively impact productivity and food security. There are limited numbers of rural farmers in Action Sites involved in seed production of high-yielding wheat varieties. Wheat seed is produced by farmers outside the Action Sites, which has two disadvantages, (i) not enough control over seed quality, and (ii) farmers in the Action Site are devoid of the higher price received from seed production compared to grain production. At present, farmers, small farmers in particular, in the Action Sites lack proper knowledge on the production of quality seed. As a result, training programs for quality wheat seed production was organized in four provinces (3 in Uzbekistan and 1 in Tajikistan) to provide relevant information to farmers in order to strengthen their capacity in quality wheat seed production (<http://www.cac-program.org/files/ae9243f9d73935afd1208f410848b2f9.pdf>; <http://www.cac-program.org/files/28bb4dc8f66b474a70f95dc8a533f635.pdf>).

12 farmers (eight men and four women) were also trained in post-harvest practices to maintain seed quality and storage of sorghum and pearl millet varieties, alfalfa, and fodder perennial shrubs (<http://www.cac-program.org/files/Oda05a7095c153af6afabd6b1e893d45.pdf>).

3 KRASS senior researchers were trained by ICARDA CAC in Tashkent in 2014 on “Scientific management of field experiments,” held from 3-6 September (KRASS.uz/ICARDA/CB) and on “Statistical Design and Data analysis of field experiments,” held from 1-12 December (KRASS.uz/ICARDA/CB).

Within the **Knowledge Management** activity in CACILM-II a total of 24 events (trainings, workshops, round-tables, field-days) were held in 2014, involving the participation of 621 men and 225 women. Please see Annex 3 for detailed information.

Within Water Use Efficiency activity, jointly with CIP, IWMI has organized capacity building initiatives: trainings for farmers who cultivate potato in Fergana Valley; and two trainings and farmer field days organized to demonstrate water saving technologies and different varieties of potato crop in the field. More than 100 farmers participated in the training from Fergana and Andijan provinces, and 25% of the farmers were female farmers.

Within a study of water governance at WUA level, IWMI has been able to build the capacities of five WUAs, as well as five individual consultants on how to assess WUA governance, and how to organize surveys and gather the opinions of water users. As a result, individual consultants working alongside five WUA administrations have been able to conduct surveys among 180 water users from Tajikistan and Uzbekistan.

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

- One of the major risks in forming the multidisciplinary partnerships is the narrow or conservative understanding of knowledge management or research, in general, which is mainly due to a lack of exposure of one discipline to another. Therefore, continuous capacity building and awareness raising is crucial to ensure that knowledge management or research consists of other avenues, for example not only the generation and capturing of knowledge in reports or scientific papers, but also translating them into easy to comprehend material and promoting these materials in a variety of forms.
- A big challenge in the transition economies of Central Asia is the sometimes high staff change rates or designation of new heads of organizations, which creates additional need for rapport building. This may cause delays in planned activities.
- Climate-related risk like extremely dry years or harsh winters heavily affect the profitability of rangelands improvement; severe soil salinity nearby Karabuga village may negatively reflect on farmers/agro-pastoralist incomes.

Three major risks exist that cannot be mitigated but can impede outcomes and impacts of the **livestock component**, are: 1) continuity of funding from CRP DS and Russian funds in 2016 as livestock and rangeland related interventions need continuity to achieve impact and sustainable change; 2) climate related risk like extremely dry years or harsh winters, and 3) livestock epidemics which will heavily affect the profitability of rearing livestock and easily offsetting positive income effects achieved by the tested interventions.

Three other major risks that can adversely affect project implementation, delivery of results and outcomes include:

1. National scientists from partner centers do not fully engage in the implementation of project activities
2. smallholder producers are not willing/interested or do not have the potential (skills, resources) to test or adopt improved management practices
3. Rangeland regulations/laws are not applied in a transparent way (e.g. site-specific distortion of regulations impede valid conclusions).

The proposed mitigation actions for these risks are:

1. To encourage the full engagement of partners, and detailed joint work and budget planning and full transparency in project implementation are being practiced and a full national staff position ensures continuous communication between international and national scientists in the local language;
2. Technologies and interventions are being selected based on previous experience and solid knowledge of local conditions; participatory approaches will be used to field-test interventions through efforts to create awareness and provide required knowledge and skills through formal or on-the-job training of livestock keepers, depending on the nature of the intervention
3. Local key resource persons will be closely involved in analyzing rangeland policies, and the way they are being implemented to be able to fully understand the way they are being scaled out in practice.

Risks related to Water Use Efficiency

- 1) Water is free in Uzbekistan, farmers pay low fees for services of WUAs. These may be a limiting factor to convince farmers and WUAs to increase WUE
- 2) There is a high correlation between yields of winter wheat and nitrogen. Therefore, studies are needed to increase Nitrogen-use efficiency, along with WUE
- 3) There are sometimes limited, good quality planting materials available for farmers. Therefore, good quality planting material should be provided, even for control treatments.

H. LESSONS LEARNED

1. **Complexity of system research:** System research is complex in nature, hence bringing system level changes is a daunting task. External factors such as inputs, market, and policy have often been outside the control of researchers, making the 'impact pathway' difficult to achieve
2. **Mind-set lacking:** There has been a lack of mind set on system research at research and policy levels. Hence, hypothesis testing has been a real challenge.
3. **Inadequate capacity:** A lack of proper understanding of systems research by researchers and the unavailability of manpower has proved to be a bottleneck in achieving an expected level of impact.
4. The indicators provided in this report bear a high level of confidence, and there are excellent opportunities for making further progress in the Central Asia Flagship. A lot remains to be done through CRP-DS in bringing improvement in "System approach" research, through partnerships with both public and private sectors, and with development agencies to make investments in Dryland System interventions.
5. Strengthening multi-crop/forage seed multiplication systems, increased yields from cold, drought and heat tolerant and synergetic rotation in wheat and rice production system significantly help smallholders to improve and stabilize incomes and adapt to climate change in Aral Sea Basin environments.

6. **Building an integrated crop and tree diversification and crop-livestock feeding systems combined with added value for resilience and increased income leads to sustainable food security in marginal environments.**
7. **Mung bean used for double cropping is a high value cash crop, which achieves high prices at local markets. Therefore, double cropping is the most effective way to achieve impact. Irrigation scheduling using SMS technologies/weather stations is another method. It requires cooperation between farmers/WUAs/and District and Canal water administrations. Each of them has to have incentives and knowledge to improve WUE. Therefore, it requires close cooperation between WUE activity and Innovation Platforms.**

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	In Central Asia: Stress (salinity, frost, heat, disease) tolerant winter wheat, chickpea, mungbean and potato varieties: <ul style="list-style-type: none">32 winter wheat genotypes tolerant to salinity and frost in Aral Sea Region in Uzbekistan (http://www.cac-program.org/files/410cb8d14a063597dceb5ee5c0835444.pdf).5 frost tolerant, high yielding winter wheat varieties in Sugd province, Tajikistan, Fergana Valley Action site (http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf).4 yellow rust resistant winter wheat varieties in Fergana province, Uzbekistan, Fergana Valley Action site (http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf).2 heat tolerant chickpea varieties in Khorezm Province, Uzbekistan, Aral Sea Action Sites (http://www.cac-program.org/files/86fd7b57c6012791276c0be8c7b24330.pdf).2 salinity tolerant, high productive potato clones in Karakalpakstan, Aral Sea Action Sites (http://www.cac-program.org/files/20a056406a8ab59b66fd079791d4d8b3.pdf).2 heat tolerant, high productive potato clones in Fergana province, Fergana Valley Action sites (http://www.cac-program.org/files/c8313339a8a6c9c9e68a579c64115d32.pdf).3 improved mungbean varieties in Fergana province, Fergana Valley Action site (http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf).				30	50	
		Seed production (562 ton) of improved varieties wheat, barley, chickpea, , mungbean, potato, sorghum, pearl millet, alfalfa and perennial shrubs on 175 ha <ul style="list-style-type: none">451 ton seed of 8 winter wheat varieties produced (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf)4 ton seed of 1 barley variety produced (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf)				60 ha area planting	175 ha planted	
						200 ton seed production	562 ton seed produced	

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
		program.org/files/766c1b22d448edc58cac508418562a47.pdf <ul style="list-style-type: none"> 1.7 ton seed of chickpea produced (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf) 86 ton seed pf mungbean produced (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf) 3 ton mini tuber of potato produced (http://www.cac-program.org/files/a8ebf751580dd589cf2d7025fb96ee.pdf) 11.5 ton seed of sorghum produced (http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf) 0.5 ton seed of alfalfa produced (http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf) 4.5 ton seed of perennial shrubs produced(http://www.cac-program.org/files/e18e031a4bec451f5b7ed660e6374d27.pdf) 						
		Sustainable land management (SLM) knowledge sharing web-platform "Knowledge 4 Sustainable Land Management" launched at www.cacilm.org . The Knowledge sharing hub presents practical technologies, practices, and approaches that Central Asian countries could implement for sustainable land management, validated by researchers from partner countries alongside colleagues from international research.				1	1	
		One salt –drought tolerant and early maturing pearl millet variety One booklet with 8 stories on crops diversification on marginal lands Including technologies packages of crops cultivation produced 2 improved mungbean varieties in Karabuga farm (in collabpration with AVRDC) – (report is pending approval for posting, weblink to be provided) 2 improved topinambur varieties on marginal lands for improving forage and tuber production (http://www.cac-program.org/files/97cad2721f4745d063db64cb45da1c1f.pdf)				4	4	4
		On water use Efficiency 1. IWMI Research Report 157 - "Land Reforms and Feminization of Agricultural Labor in Sughd Province, Tajikistan". http://www.iwmi.cgiar.org/publications/iwmi-research-reports/iwmi-research-report-157/ . 80% contribution to this report was based on CRP DS funding and 20% on CRP WLE. 2. Peer-reviewed journal paper: Muhtarov, F., Fox, S., Mukhamedova N, Wegerich K. Interactive institutional design and contextual relevance: water user groups in Turkey, Azerbaijan and Uzbekistan. Environmental Science and Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.10.006				1-Research Report 2. Technical Reports	8	

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
		<p>3. Report on qualitative survey analysis from Komiljon Umarov WUA "WHAT BUILDS INTO the WATER USE EFFICIENCY at the household level- Baseline analysis". -Based on the gender responsive objectives of the Gender strategy of the CRP Drylands systems program http://www.cac-program.org/files/b1f5bc5b1cb97658b8ee54908113136d.pdf</p> <p>4. Blog stories and on-line discussions within Multi Use water services MUS e-conference in regards to sharing experience on multiple uses of water and gender issues based on the flagship activities in the Central Asian region (28 Apr-24 May, 2014) http://www.rural-water-supply.net/en/resources/details/575</p> <p>5. News-release: "Are more women farmers a good thing in Tajikistan?" http://www.iwmi.cgiar.org/2014/07/are-more-women-farmers-a-good-thing-in-tajikistan/</p> <p>6. News-release: 'Changing face of agriculture in northern Tajikistan'. http://cac-program.org/news/detail/412</p> <p>7. FIELD REPORT NARES and Extension staff incorporate good governance practices for improved land and water management (short version of draft report). http://www.cac-program.org/files/015da160d981515ae3ae8b7e0cea4f7c.pdf</p> <p>8. Mochalova, E. [NARS]; Anarbekov, Oytur [IWMI]; Kahhorov, U. [NARS]; 2014. Institutions as key drivers of collective action in WUAs [Water User Associations] of Uzbekistan. [Abstract]. In International Commission on Irrigation and Drainage (ICID). 22nd International Congress on Irrigation and Drainage: securing water for food and rural community under climate change, Gwangju, Korea, 14-20 September 2014. http://cac-program.org/files/9cb119a2382c3d446cc1e81eedf957c7.pdf</p>						
		<p>In Geoinformatics</p> <p>1) Global Map with all flagships and actions sites http://geoagro.icarda.org/en/default/visualization/crp/image/crpds_all_flags_hips.JPG</p> <p>2) Flagship map http://geoagro.icarda.org/en/default/visualization/crp/image/crpds_flagship_ca.JPG</p> <p>3) CA Action Sites http://geoagro.icarda.org/en/default/visualization/crp/image/crpds_ca_action_site_aralsea.JPG; http://geoagro.icarda.org/en/default/visualization/crp/image/crpds_ca_action_site_fergana.JPG</p> <p>4) Overall Map for Central Asia: http://www.cac-program.org/files/09367c98fe13a92e9409bbc5688b2218.pdf</p>						
All	2. Number (from 1) of flagship products	<p>On Water Use Efficiency</p> <p>1. Blog stories and on-line discussions within Multi Use water services MUS e-</p>					3	

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
	produced that have explicit target of women farmers/NRM managers	conference in regards to sharing experience on multiple uses of water and gender issues based on the flagship activities in the Central Asian region (28 Apr-24 May, 2014). http://www.rural-water-supply.net/en/resources/details/575 2. News-release: "Are more women farmers a good thing in Tajikistan?" http://www.iwmi.cgiar.org/2014/07/are-more-women-farmers-a-good-thing-in-tajikistan/ 3. News-release: "Changing face of agriculture in northern Tajikistan". http://cac-program.org/news/detail/412						
All	3. Number (from 1) of flagship products produced that have been assessed for likely gender-disaggregated impact	On water Use efficiency 1. IWMI Research Report 157 - "Land Reforms and Feminization of Agricultural Labor in Sughd Province, Tajikistan". http://www.iwmi.cgiar.org/publications/iwmi-research-reports/iwmi-research-report-157/ 2. Report on qualitative survey analysis from Komiljon Umarov WUA "WHAT BUILDS INTO the WATER USE EFFICIENCY at the household level- Baseline analysis". -Based on the gender responsive objectives of the Gender strategy of the CRP Drylands systems program. http://www.cac-program.org/files/b1f5bc5b1cb97658b8ee54908113136d.pdf 3. FIELD REPORT NARES and Extension staff incorporate good governance practices for improved land and water management (short version of draft report). http://www.cac-program.org/files/015da160d981515ae3ae8b7e0cea4f7c.pdf				2	3	
All	4. Number of "tools" produced by CRP	Experimental design and data analysis using Genstat training manual translated in Russian could be valuable for researchers, and teachers in Central Asia and the Caucasus (http://www.cac-program.org/files/e64e435753a8bc5861b209489ac14c31.pdf).				1	1	
		<ul style="list-style-type: none"> Synthesis and collection of over 50 SLM that are applicable in Central Asia (http://www.cacilm.org/node/214). Prioritization of 4-to-8 SLM for demonstration and promotion (http://cac-program.org/files/cacilm/cacilm_rw_minutes_en.pdf). Training manual for similarity mapping analysis for dissemination of selected SLM in Central Asia in 4 target agro-ecosystems (http://www.cacilm.org/system/files/CA%20Similarity%20report_eng.pdf). This document includes 5 country maps showing similar areas where selected SLM can be applied. Guidelines and script for downloading and bias correction of downscaled climate change models (http://www.cacilm.org/manual-cc-bias-correction) 				3	3	
		<ul style="list-style-type: none"> Within Marginal Activity one book on utilization of Kochia prostrata – 				1	1	

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
		perennial fodder shrub for rangelands improvement and livestock feeding – (in editing. weblink to be provided)						
		<ul style="list-style-type: none"> In livestock Productivity Rapid SR VCA tools developed in Ethiopia and Pakistan were adjusted to Central Asian conditions and translated in Russian 				1	1	2: a. Toolkit for rangeland monitoring adapted for Tajikistan b. Handbook on forage potential and nutritional characteristics of non-conventional forage crops prepared ;
		<p>On Water Use Efficiency 5 DSSAT models were successfully calibrated for 5 cultivars of winter wheat using past datasets. Data still under development</p> <p>12 Guidelines have been produced and disseminated for farmers on cultivation and irrigation of potato in Central Asia region. Two training and farmer fields days organized to demonstrate water saving technologies and different varieties of potato crop in the field. More than 80 farmers participated in the training from Ferghana and Andijan provinces and 25% of farmers were female farmers in</p>				12 guidelines and 2 trainings for farmers on cultivation and irrigation of potato	17	

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
		Andijan. http://www.cac-program.org/files/7e250744ee231b26c8bcc9b8c309036a.pdf						
All	5. Number (from 4) of tools that have an explicit target of women farmers	Glossary: The web pages, blog stories, press releases and policy briefs supporting indicator #4 must have an explicit focus on women farmers/NRM managers to be counted						1 (GIS based data on rangeland utilization and status)
All	6. Number (from 4) of tools assessed for likely gender-disaggregated impact	Gender disaggregated Baseline data collected from Batken province, Fergana Valley Action Site on: Demographic characteristics of the household; Financial, physical, natural and social capital; Agricultural production; Access, quality, quantity, and management of water resources; Livestock production and management; Agricultural policy; Food security and nutrition; Borrowing and access to credit; System vulnerability and local coping mechanisms used by households. http://cac-program.org/crps/survey/baseline_data				0	1	
All	7. Number of open access databases maintained by CRP	On-farm Adaptive Varietal Trials Field experiments (http://www.cac-program.org/files/410cb8d14a063597dceb5ee5c0835444.pdf)				5	5	
		Data base on soil and water chemistry, utilization of halophytes with marginal water in Koshkpur district, Aral Sea Action Site (http://www.cac-program.org/files/bc4914f16cf75c45b166e153a5df1cce.pdf)				1	1	
		Standardized format description of 57 sustainable land management technologies and approaches applicable in Central Asian countries synthesized and collected from NARS and world databases (http://www.cacilm.org/node/214)					1	
		On water Use Efficiency: 1. Socio-economic semi-structured survey database: from Komiljon Umarov WUA, Toshloq district, Fergana province, Uzbekistan. Topic: "What builds into the water use efficiency at the household level- Baseline analysis." http://cac-program.org/news/detail/412 . 2. Data base containing on Fergana and Andijan demonstration field (Irrigation, Mechanical work, Labour. Using Chemical Protection, Fertilizer Use, Yield, Soil moisture, Phenology and Meteo). In progress and continued in 2015. 3. Survey has been conducted among 194 water users on improvement institutional conditions of WUAs in Tajik and Uzbek part of FV: 2 WUAs in Tajikistan						

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
		and 3 WUAs in Uzbekistan http://www.cac-program.org/files/015da160d981515ae3ae8b7e0cea4f7c.pdf Analysis continued 4. Database includes regional map, Soil map and Ground water level map of WUA K.Umarov in Fergana valley. More over the database contains details from demonstration fields of Fergana (i.e.: Irrigation, Mechanical work, Labour, Using Chemical Protection, Fertilizer Use, Yield, Soil moisture, Phenology and Meteo) In progress and continued in 2015.						
		Data base on research site in Batken province, Fergana Valley Action Site on: Demographic characteristics of the household; Financial, physical, natural and social capital; Agricultural production; Access, quality, quantity, and management of water resources; Livestock production and management; Agricultural policy; Food security and nutrition; Borrowing and access to credit; System vulnerability and local coping mechanisms used by households. http://cac-program.org/crpds/survey/baseline_data				1	1	
All	8. Total number of users of these open access databases							
All	9. Number of publications in ISI journals produced by CRP	3 journal articles on utilization of marginal resources and ecosystem function. Pdf D1.4 Article 1: Halophyte Biomass. A Promising Source of Renewable Energy (http://www.cac-program.org/files/9e982d43c872ddfc3324716910fafa25.pdf) Article 2: (http://www.cac-program.org/files/4bf7dba8eeec8f320e7f9115cd1599eb.pdf) Article 3: (http://www.cac-program.org/files/6123dd5f3937f91d4565fd98b9c391ef.pdf) 5 Abstracts at ICAL2 in Samarkand related to Aral Sea Action Site Brief Report (http://www.cac-program.org/files/ee1bb76a5a7e81a06b3b2b2a83d17d09.pdf) Abstract Book (http://www.cac-program.org/files/c65314b149c356370d3b4beb83be929a.pdf) Handbook on nutritional Value of halophytes and livestock feeding (in editing, weblink to be provided)				4	3	1
		In Water Use Efficiency: 1. Peer-reviewed journal paper: Muhtarov, F., Fox, S., Mukhamedova N, Wegerich K. Interactive institutional design and contextual relevance: water user groups in Turkey, Azerbaijan and Uzbekistan. Environmental Science and Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.10.006				1	2	2

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
		2. Mochalova, E. [NARS]; Anarbekov, Oytur [IWMI]; Kahhorov, U. [NARS]; 2014. Institutions as key drivers of collective action in WUAs [Water User Associations] of Uzbekistan. [Abstract]. In International Commission on Irrigation and Drainage (ICID). 22nd International Congress on Irrigation and Drainage: securing water for food and rural community under climate change, Gwangju, Korea, 14-20September 2014. http://cac-program.org/files/9cb119a2382c3d446cc1e81eedf957c7.pdf Transactions. Volume 1. Question 58 and 59. New Delhi, India:International Commission on Irrigation and Drainage (ICID). pp.228-229. (ICID Transaction 31(A)).						
1,2,3, 4, 6	10. Number of strategic value chains analyzed by CRP	Clearly indicate the type of value chains you are reporting on in the next columns	Field site selection was delayed so VCA could not be started as planned			2	0 (1 VCA initiated for goat produce in Sogd province)	2 (goat meat VC in Tajikistan and SR meat VC in Uzbek) Tajikistan;
1,5,6,7	11. Number of targeted agro-ecosystems analysed / characterised by CRP	(i) irrigated agriculture agro-ecosystem in Central Asia, covering a relatively small area of about eight million hectares, but at the same time providing the lion's share of the agricultural products in the region; (ii) mountain agro-ecosystem in Central Asia, constituting over 90% of the area of Kyrgyzstan and Tajikistan; (iii) rangelands agro-ecosystem in Central Asia, constituting the largest portion of land resources in Kazakhstan, Turkmenistan, and Uzbekistan; (iv) rainfed agro-ecosystem in Central Asia, considered separately to emphasize crop production system outside of irrigated areas. Spatial data sources and criteria to identify these agro-ecosystems and areas where SLM can be outscaled are provided in training manual for similarity mapping analysis for dissemination of selected SLM in Central Asia in 4 target agro-ecosystems http://www.cacilm.org/system/files/CA%20Similarity%20report_eng.pdf .				4	4	
		Marginal lands: Draft of technology packages on mixed crop, livestock feeding system; agroforestry with cereals and legumes etc.. on marginal lands at Karabuga farm, Aral Sea Action Site (Estimated population - 1500-2800)						
1,5,6,7	12. Estimated	Central Asia: 65.7 million						

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
	population of above-mentioned agro-ecosystems							
CAPACITY ENHANCEMENT AND INNOVATION PLATFORMS								
All	13. Number of trainees in short-term programs facilitated by CRP (male)	On-farm Adaptive Varietal 166 http://www.cac-program.org/files/f0e7646233646d539a4020cca87c9637.pdf ; http://www.cac-program.org/files/dff0a7e10cb22f475b9e1922b0c0d2b4.pdf ; http://www.cac-program.org/files/8a0bfa4993fa24573384b713f647f2f6.pdf)				100	166	
		On-farm Seed systems 195 (http://www.cac-program.org/files/28bb4dc8f66b474a70f95dc8a533f635.pdf ; http://www.cac-program.org/files/ae9243f9d73935afd1208f410848b2f9.pdf)				135	195	
		On Knowledge Management: Total of 24 events (trainings, workshops, round-tables, field-days) were held in 2014. Please see Annex 3 for detailed information.				200	621	
		Training – workshop on “Gender mainstreaming to higher and sustainable income and well-being in Fergana valley through CRP DS approaches” in Bishkek, Kyrgyzstan on 8th December, 2014. activities for research program realization in their communities. http://www.cac-program.org/files/9697de1b54e13c7846d169afecef2056.pdf .				8	9	24
						not defined	Intensive 3 day on the job training of Tajik NARS researcher for rapid VCA (1 male)	Two trainings on utilization and adoption of biosaline forage production from saline environments (about 25 male farmers)

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
		<p>In Water Use Efficiency:</p> <ol style="list-style-type: none"> 1. Two-week training on crop modeling (DSSAT and AquaCrop modeling) (10 trainees; 6 male) 2. "Role and Tasks of WUA" presented at CRP 1.1. Meeting in Khujand for over 100 farmers, Tajikistan on October 16, 2014. (100 male farmers). 3. "Improving potato irrigation and cultivation in the field" IWMI-CA and CIP staff organized, 35 male farmers participated, Andijan on June 13, 2014. "Improving potato irrigation and cultivation in the field" IWMI-CA and CIP staff organized, 28 farmers participated in Andijan and 23 farmers participated in Fergana, 8 September Andijan and 9 September Fergana, 2014. (35 male farmers). 4. "Efficient water use at the level of WUA" seminars in the context of CRP1.1 where organized first in June 16 then in August 18 with participation of 60 farmers in total (In WUA K.Umarov, Fergana valley). 16th Meeting of Steering Committee with the participation of local authorities (regional water management department, 3 heads of WUAs and representatives of Mahalla committees) and 20 farmers (55 participants excluding farmers). <p>Two consultants in Tajikistan as well as three consultants in Uzbekistan have passed training on conducting survey/interview with water users and WUA administration on institutional aspects of water management. Plan has been accomplished, 5 local consultants' skills are enhanced and survey has been conducted.</p> <p>1 two-week training on crop modeling (DSSAT and AquaCrop modeling) 1 two-week training on crop modeling (DSSAT and AquaCrop modeling) (10 trainees; 4 females)</p>						
All	14. Number of trainees in short-term programs facilitated by CRP (Female)	On-farm Adaptive Varietal 119 http://www.cac-program.org/files/f0e7646233646d539a4020cca87c9637.pdf ; http://www.cac-program.org/files/dff0a7e10cb22f475b9e1922b0c0d2b4.pdf ; http://www.cac-program.org/files/8a0bfa4993fa24573384b713f647f2f6.pdf)				72	119	
		On-farm Seed systems 14 (http://www.cac-program.org/files/28bb4dc8f66b474a70f95dc8a533f635.pdf ; http://www.cac-program.org/files/ae9243f9d73935afd1208f410848b2f9.pdf)				15	14	
		On Knowledge Management: Total of 24 events (trainings, workshops, round-tables, field-days) were held in 2014. Please see Annex 3 for detailed information.				100	225	
		Training – workshop on "Gender mainstreaming to higher and sustainable income and well-being in Fergana valley through CRP DS approaches" in Bishkek, Kyrgyzstan on 8th December, 2014. activities for research program realization in				8	8	24

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
		their communities. http://www.cac-program.org/files/9697de1b54e13c7846d169afecef2056.pdf .						
								3: two trainings on utilization and adoption of biosaline forage production (Karakalpak); 1 training on goat herd management (Sogd Province)
		In Water Use Efficiency: 1 female graduated from Master's program passed "Gender training for conducting surveys and getting familiar with methods and tools for gender analysis in research"						
All	15. Number of trainees in long-term programs facilitated by CRP (male)	In Water Use Efficiency: 1 male bachelor student "Gender training for conducting surveys and getting familiar with methods and tools for gender analysis in research"						
All	16. Number of trainees in long-term programs facilitated by CRP (female)	In Central within Marginal Land Activity				20	38	
		In Water Use Efficiency: 1 female graduated from Master's program passed "Gender training for conducting surveys and getting familiar with methods and tools for gender analysis in research"						

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
1,5,6,7	17. Number of multi-stakeholder R4D innovation platforms established for the targeted agro-ecosystems by the CRPs	SLM knowledge sharing web-platform "Knowledge 4 Sustainable Land Management" www.cacilm.org . This platform focuses on sustainable land management by promoting 4 selected technologies/innovations, that are mature for outscaling, to target 4 distinct agro-ecosystems (irrigated, mountain, rainfed, rangelands) in Central Asia.				1	1	
		1. National level IP: In Tajikistan to promote sustainable and efficient water and land management 2. National level IP: in Kyrgyzstan to improve land (soil) productivity 3. National level IP: in Uzbekistan to promote sustainable land and water management http://www.cac-program.org/files/51a5cf08f644039b7541dd0ce77b4e01.pdf				1	3	
		In water Use efficiency: 1) Two farms were selected for improved potato irrigation studies in the Fergana Valley, Sobitjon Obot, Fergana (N=40°18'39.79", E=71°50'55.88"). Baht Taronasi, Andijan (N=40°30'43.41", E=72°17'18.62"). 1) Normal Furrow Irrigation by Farmer 2) Normal Furrow Irrigation with Irrigation Scheduling 3) High Frequency Furrow Irrigation 4) Partial Root-zone Drying (PRD) 5) Drip Irrigation (Dri) 2) With the purpose of water and energy use efficiency analyses wheat plots in 4 different soil conditions across 4 farms were monitored and in "Odiljon Farruhbek Saxovati" (N=40°31'59.9", E=71°47'4.1") new varieties of mung bean after winter wheat was planted with employment of two alternative irrigations methods: 1) Furrow irrigation 2) Alternate furrow irrigation 3) Presentation "Concept of Asset Management for Sustainable development of WUAs" has been done in Central Asian sub-regional preparatory Conference for the 7th World Water Forum 8-9 July 2014, Dushanbe, Tajikistan.						
TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT								
All	18. Number of technologies/NRM practices under research in the CRP (Phase I)	Within Marginal Lands activity 50 improved genotypes of different crops (sorghum, pearl millet; topinambur, forage legumes; fodder crops)				30	50	
		In Central Asia: On-farm Adaptive Varietal Trials 50 improved genotypes of different crops				30	50	

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
		(http://www.cac-program.org/files/410cb8d14a063597dceb5ee5c0835444.pdf ; http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf ; http://www.cac-program.org/files/86fd7b57c6012791276c0be8c7b24330.pdf ; http://www.cac-program.org/files/20a056406a8ab59b66fd079791d4d8b3.pdf ; http://www.cac-program.org/files/c8313339a8a6c9c9e68a579c64115d32.pdf ; http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf						
		Livestock Productivity				1	1 (Semen of Texas Angora goat breed was applied)	1 (halophyt esfodder)
All	19. Number (from 18) of technologies under research that have an explicit target of women farmers	Within Marginal Lands activity: Field experiments and yields data				5	8	
All	20. Number (from 18) of technologies under research that have been assessed for likely gender- disaggregated impact							
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	Within Marginal Lands activity in Karabuga community, Karauzyak district Agroforestry (4) ; Rangelands improvement (3) ; Halophytes arid fodder production (1) and Crops Diversification (1) 22. Number of people who will potentially benefit from plans, once finalised, for the scaling up of strategies – 7000.						
		In Central Asia: 1. Vulnerable Areas (Aral Sea Region / Action Site) http://www.cac-				3	3	

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
		program.org/crpds/sections/crpds_aral 2. Intensive Agro-ecosystem (Fergana Valley, Action site) http://www.cac-program.org/crpds/sections/crpds_fergana 3. Mountains Dryland (Rasht Valley) http://www.cac-program.org/crpds/sections/crpds_rasht						
		Feasible approaches and SLM packages were identified for 4 agro-ecosystems (1 SLM for each agro-ecosystem) in Central Asia. Identification of feasible approaches were done in multiple stages, for more information please see http://cac-program.org/files/cacilm/cacilm_rw_minutes_en.pdf				4	4	
1,5,6,7	22. Number of people who will potentially benefit from plans, once finalised, for the scaling up of strategies	2000 farmers and their families, about 12000						
		In Central Asia: Two 1. Vulnerable Areas (Aral Sea Region / Action Site) - 5.7 million http://www.cac-program.org/crpds/sections/crpds_aral 2. Intensive Agro-ecosystem (Fergana Valley, Action site) - 13 million http://www.cac-program.org/crpds/sections/crpds_fergana 3. Vulnerable Areas (Aral Sea Region / Action Site) - 5.7 million						
All, except 2	23. Number of technologies /NRM practices field tested (phase II)	i. Raised bed planting for irrigated agro-ecosystem; ii. Agroforestry for mountain agro-ecosystem; iii. Pasture improvement for rangelands agro-ecosystem; iv. Conservation agriculture for rainfed agro-ecosystem. Identification of feasible approaches were done in multiple stages, for more information please see http://cac-program.org/files/cacilm/cacilm_rw_minutes_en.pdf Please see Annex 4 Excel table with demo-sites coordinates and areas.				4	4	4
		Crop varieties and crop rotation: 1. Newly released and pre-released varieties of crops (http://www.cac-program.org/files/d81128688a7308385df5a615fe8e9604.pdf) 2. Wheat-Mungbean and wheat-potato rotation (http://www.cac-program.org/files/1d8d449c23e1672f3210ac190c3d31df.pdf)				1	2	
		In Marginal Land activity				9	9	
		Within Livestock Productivity activity				2	1 (Artificial)	3 (a. salt tolerant)

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
							insemination (AI) campaign for improved productivity of Angora goats)	forage production; b. feeding strategy incl. halophytes; c. improved herd management;
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)	Seed production of improved varieties of wheat, barley, chickpea, mungbean, sorghum, pearl millet, alfalfa and perennial grasses in: <ul style="list-style-type: none"> Intensive agro-ecosystem of Fergana Valley (Fergana in Uzbekistan and Sugd in Tajikistan), and Agro-pastoral system in Aral Sea region (Karakalpakstan and Khorezm provinces of Uzbekistan) http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf				2	2	
		In Central Asia: Four agro-ecosystems for which SLM were being tested are located in demonstration sites in Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan under (i) raised bed technology; (ii) conservation agriculture; (iii) pasture rotation and improvement; and (iv) agroforestry (please see Annex 4 Excel table with demo-sites coordinates and areas) www.cacilm.org .				4	4	
		In water use efficiency: New approach to Water use efficiency in the household level. http://www.cac-program.org/files/b1f5bc5b1cb97658b8ee54908113136d.pdf						
1,5,6,7	25. Number (from 24) of above innovations/approaches/options that are targeted at inequality between men and women	Within Livestock Productivity activity				Not defined	Agopastoral (Sogd) ecosystem was selected	Agropastoral (a&b Karyuzak ; c. Sogd)

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
	decreasing							
1,5,6,7	26. Number of published research outputs from CRP utilised in targeted agro- ecosystems	In Central Asia On SLM: List of produced dissemination materials including promo-video about conservation agriculture, booklets, recommendations, pocket calendars, posters is provided in Annex 5.				10	15	10
		In Central Asia: Scientific poster: Sharma, R.C., A. Amanov, Z. Ziyaev, E. Sadykov, J. Turok, A. Morgounov, M. Keser, F. Ozdemir, and M. Baum. 2014. Frost tolerance in winter wheat genotypes evaluated in Aral Sea cold zone in Central Asia. Poster presented at the Annual Meetings of the Crop Science Society of America, 2-5 November 2014, long Beach, USA. https://scisoc.confex.com/scisoc/2014am/webprogram/Paper89212.html (http://www.cac-program.org/files/60888c82b78db38600f76dcf6948bf49.pdf)						
All, except 2	27. Number of technologies/NRM practices released by public and private sector partners globally (phase III)	Glossary: In the case of crop research that developed a new variety, e.g., the variety must have passed through any required approval process, and seed of the new variety should be available for multiplication. The technology should have proven benefits and be as ready for use as it can be as it emerges from the research and testing process. Technologies made available for transfer should be only those made available in the current reporting year. Any technology made available in a previous year should not be included. Clearly identify in this cell the technologies/practices thus released (scale up phase), the geographical areas concerned						
POLICIES IN VARIOUS STAGES OF DEVELOPMENT								
All	28. Numbers of Policies/ Regulations/ Administrative Procedures Analyzed (Stage 1)	Survey of rural advisory service providers is completed in Kazakhstan, Kyrgyzstan, and Tajikistan and being conducted in Uzbekistan (questionnaire available at http://www.cacilm.org/system/files/Template_farm_%20advisory_%20services_eng.pdf). For 2015 planned recommendations on the best channel for outscaling of the SLM technology packages to establish an enabling environment for their adoption by farmers.				1	1	1
		Policy dialogue and multi-stakeholders consultation on marginal resources use initiated (two seminars 30 Jan., 2014 Urgench, Khoresm region) and 5-6 February, 2014 at Samarqand State University, 2014.				1	1	1
		Within Livestock Productivity activity				0	0	2: (Rangela

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
								nd access /rangeland tenure in 2 countries)
All	29. Number of policies / regulations / administrative procedures drafted and presented for public/stakeholder consultation (Stage 2)that 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. 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/decreed 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/decreed) 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	In Central Asia: Demonstration sites in Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan under (i) raised bed technology; (ii) conservation agriculture; (iii) pasture rotation and improvement; and (iv) agroforestry (please see Annex 4 Excel table with demo-sites coordinates and areas)				20	100	100

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
	a result of CRP research							
		In Central Asia: On-farm Adaptive Varietal Trials around 100 ha (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf)					100 ha	
		On seed system activities >200 ha in Aral Sea region of Uzbekistan and Fergana Valley of Uzbekistan and Tajikistan (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf)					200 ha	
		On Marginal Land activity >100 ha in Aral Sea region of Uzbekistan				35	35	50
All	34. Number of farmers and others who have applied new technologies or management practices as a result of CRP research	In Central Asia: On-farm Adaptive Varietal Trials: 34 (a) number of women farmers concerned 5 34(b) number of male farmers concerned (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf)					5 (W) 40 (M)	
		In Central Asia: Crop seed producers of Aral Sea region of Uzbekistan and Fergana Valley of Uzbekistan and Tajikistan () 34 (a) number of women farmers concerned 34(b) number of male farmers concerned (http://www.cac-program.org/files/766c1b22d448edc58cac508418562a47.pdf)					4 79	
		In Central Asia within CACAII-II: Demonstration sites are established and regular field-days are being conducted. Number of male/female who applied new technologies will be estimated from focus group discussions in 2015, questionnaire is prepared and available at http://www.cacilm.org/comp3focus-group-questions .						14
		On Marginal Land activity						
		Karauzyak district (Uzbekistan) and Kazalinsk (Kazakhstan) in Aral Sea region of Uzbekistan (a) number of women farmers concerned (b) number of male farmers concerned					48 56	

Annex 2: Performance indicators for gender mainstreaming with targets defined

Performance Indicator	CRP performance approaches	CRP performance meets requirements	CRP performance exceeds requirements
1. Gender inequality targets defined	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	Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations And	Sex-disaggregated social data collected and used to diagnose important gender-related constraints in at least one of the CRP's main target populations And The CRP has defined and collected baseline data on the
2. Institutional architecture for integration of gender is in place	<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 	<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 	<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

Annex 3: Activities conducted in 2014 within Knowledge Management in CACILM II

#	Title	Date	Number of participants (male/female)
1	Regional Workshop on SLM prioritization	25-27 February 2014 (Almaty, Kazakhstan) http://cac-program.org/projects/cacilm	28 (22/6)
2	Annual Planning Workshop	28-30 April 2014 (Tashkent, Uzbekistan) http://cac-program.org/projects/cacilm	62 (50/12)
3	Methodological Workshop of Component 3 (KM in CACILM phase II)	10-11 June 2014 (Dushanbe, Tajikistan)	12 (10/2)
4	Consultation workshop on downscaling Climate Change Models and SWAT	16-20 June 2014 (Tashkent, Uzbekistan) http://www.cacilm.org/node/91	22 (14/8)
5	On-the-job training workshop “Development of similarity maps to promote selected SLM packages in Central Asia”	16-18 September 2014 (Bishkek, Kyrgyzstan)	16 (11/5)
6	Regional Project Meeting	17 November 2014	17 (12/5)
7	Field Days	Kazakhstan (20 June 2014) http://www.cacilm.org/node/159 Kazakhstan (5 Sept. 2014) http://www.cacilm.org/node/122 Kyrgyzstan (6 May 2014) http://www.cacilm.org/node/96 Kyrgyzstan (18 June 2014) http://www.cacilm.org/node/120 Kyrgyzstan (4 Sept. 2014) http://www.cacilm.org/node/121 Kyrgyzstan (26 October 2014) http://www.cacilm.org/node/186 Tajikistan (2 August 2014) http://www.cacilm.org/node/109 Tajikistan (11 November 2014) http://www.cacilm.org/node/202 Tajikistan (12 December 2014) Uzbekistan (9 July 2014) http://www.cacilm.org/node/98 Uzbekistan (30 July 2014)	80 (52/28) 160 (106/54) 20 (16/4) 18 (14/4) 23 (19/4) 20 (17/3) 30 (24/6) 30 (26/4) 26 (24/2) 50 (43/7) 35

		http://www.cacilm.org/node/108	(31/4)
		Uzbekistan (11 Sept. 2014)	25 (21/4)
		Uzbekistan (26 Dec. 2014)	25 (22/3)
8	Workshop	Kyrgyzstan (20 February 2014)	9 (8/1)
		Kazakhstan (18-19 June 2014)	20 (13/7)
9	Trainings	Kazakhstan (24-25 December 2014) http://www.cacilm.org/node/211	20 (8/12)
10	Round Tables	Kazakhstan (5 December 2014) http://www.cacilm.org/node/208	50 (30/20)
		Kazakhstan (8 December 2014) http://www.cacilm.org/node/210	48 (28/20)

Annex 5: List of dissemination materials prepared in different languages (Knowledge Management, CACILM-II, Central Asia)

- ❖ No-Till Farming Technology: Uzbekistan (in Uzbek) http://youtu.be/nazA4P6g_PI
- ❖ No-Till Farming Technology: Uzbekistan (in Russian) http://youtu.be/rpjTQ5j3i_k
- ❖ Direct Sowing: Kazakhstan (in Russian) <http://youtu.be/ahfZNkko0mo>
- ❖ Recommendation - The ridge-furrow cultivation technology of winter wheat under irrigated conditions of South of Kazakhstan http://www.cacilm.org/ru/system/files/The%20ridge-furrow%20cultivation%20technology%20of%20winter%20wheat_ru.pdf
- ❖ Recommendation - The cultivation of alfalfa by No-till technology in rainfed lands of South of Kazakhstan (in Russian) http://www.cacilm.org/ru/system/files/The%20cultivation%20of%20alfalfa_No-till%20technology_rainfed_ru.pdf
- ❖ Recommendation - Direct seeding of winter wheat in rainfed lands of South of Kazakhstan (in Russian) http://www.cacilm.org/ru/system/files/Direct%20seeding%20of%20winter%20wheat_rainfed_ru.pdf
- ❖ Recommendation - Cultivation of agricultural crops on ridges by combinations of machineries (Tajik partners, in Russian) <http://www.cacilm.org/ru/system/files/Cultivation%20of%20crops%20on%20ridges%20by%20combinations%20of%20machineries.pdf>
- ❖ Technologies and Approaches to the Sustainable Land Management in Central Asia – collection of available SLM technologies on soil fertility improvement, improving methods of sowing, agroforestry, cultivation of slopes, water demand management and improvement of rangelands, etc. (in Russian) http://www.cacilm.org/ru/system/files/SLM%20technologies%20and%20approaches%20in%20CA_ru.pdf
- ❖ Brochure – Project Information (in Russian) http://cacilm.org/ru/system/files/CACILM%20brochure_ru.pdf
- ❖ Poster - Direct Seeding of Lucerne at Rainfed and Irrigated Agricultures: Kazakhstan (in Russian) <http://www.cacilm.org/ru/system/files/Direct%20seeding%20of%20alfalfa%20under%20rainfed%20and%20irrigated%20agriculture.pdf>
- ❖ Poster - Resource-saving Technology of Cultivation of Winter Wheat at Irrigated Agriculture: Kazakhstan (in Russian) http://www.cacilm.org/ru/system/files/Resource-saving%20technology_cultivation%20of%20winter%20wheat_irrigation_ru.pdf
- ❖ Poster - Resource-Saving Technology of Cultivation of Cereal Crops in Rainfed Agriculture: Kazakhstan (in Russian) http://www.cacilm.org/ru/system/files/Resource-saving%20technology_cultivation%20of%20cereal%20crops_rainfed%20conditions_ru.pdf
- ❖ 2015 Table Calendar – Mountain Agro-ecosystem: Uzbekistan (in Russian) http://www.cacilm.org/ru/system/files/Calendar%202015_mountain%20agroecosystem_ru.pdf
- ❖ 2015 Pocket Calendar – Soil Conservation Technologies for Rainfed Ecosystem: Uzbekistan (in Russian) http://www.cacilm.org/ru/system/files/Calendar%202015_Soil%20conservation%20technologies_rainfed%20conditions_ru.pdf
- ❖ Recommendation - Technology of Growing Crops by Mulching Polyethylene Film (in Kyrgyz) http://www.cacilm.org/ru/system/files/The%20technology%20of%20growing%20crops_mulching_polyethylene%20film_kyr.pdf
- ❖ Recommendation - Role of Thermal Factor in Complex Soil Reclamation: Kyrgyzstan (in Russian) http://www.cacilm.org/ru/system/files/The%20role%20of%20thermal%20factor%20in%20the%20integrated%20soil%20melioration_ru.pdf
- ❖ Recommendation - Cultivation of Maize and Tomatoes under the Film: Kyrgyzstan (in Russian) http://www.cacilm.org/ru/system/files/Cultivation%20of%20maize%20and%20tomato%20under%20polyethylene%20film_ru.pdf
- ❖ Booklet - Use of Fertilizers in Agricultural Crops, Considering Soil Conditions (in Uzbek) http://www.cacilm.org/ru/system/files/The%20use%20of%20fertilizers%20in%20agricultural%20crops_soil%20conditions_uz.pdf

- ❖ Booklet - Agrotechnology to Improve Soil Fertility and Organic Matter Enrichment (in Uzbek)
http://www.cacilm.org/ru/system/files/Agrotechnology%20to%20improve%20soil%20fertility_uz.pdf



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.

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