



RESEARCH  
PROGRAM ON  
Dryland Systems

Submitted: 30 January 2015

# CGIAR Research Program on Dryland Systems PLAN OF WORK AND BUDGET 2015

Food security and better livelihoods  
for rural dryland communities

## Annual Plan of Work and Budget (POWB) for Dryland Systems 2015

### Introduction

The POWB2015 was designed against a moving background of financial constraints that have seen the intended W1+2 budget fall from \$17.0 million as envisioned at the start to 2014 to \$10.3 million as determined by the Fund Council in November 2014. In addition the extension proposal submitted in April 2014 was rejected with commentaries from the ISPC and instructions from the Fund Council and Consortium Board to 1), implement major changes in the governance and management of the CRP and 2), establish an Independent Task Force whose main objective is to help improve the performance of the program during the extension and help develop a proposal for the 2<sup>nd</sup> call.

### Science and Implementation meeting June 30-July 4, 2014

Partly in response to the comments received from the ISPC and in parallel with the intervention from the FC and CB indicated above, the CRP's Independent Scientific Advisory Committee called for a meeting to 1), critically review progress to date against the objectives embedded in the Theory of Change and Intermediary Development Outcomes (IDO's) 2), identify impediments to more rapid progress towards CRP objectives and propose solutions towards greater impact to be included in a 2<sup>nd</sup> phase and 3), Develop an action plan for presentation to the Steering Committee and to inform the incoming CRP Director on the priority actions required for the next three years.

The recommendations of the Science and Implementation meeting with considerations of CO and ISPC comments on the extension proposal were:

- An integrated systems approach is taken at all sites that uses innovative science and interdisciplinary teams.
- Shift from descriptive to systems experimentation, analysis & modeling.
- Increasing inclusiveness in partnerships including more than 1 CGIAR center and the development of innovation platforms.
- Clear linkages of research hypotheses to outputs, outcomes and IDO's.
- Plausible outcomes identified including the identification of the barriers to outscaling of research outputs.
- Explicit linkages to other CRP's and especially those that link germplasm development to NRM within a production systems context.
- Value chain focus complements on-farm focus.
- Increasing recognition of need for enabling institutions & governance greater social equity and gender considerations.
- Contested paradigms hard vs soft sciences; researcher vs farmer knowledge. Primary focus on agricultural livelihood system (pastoral, agro-pastoral, irrigated crop, intensive rain-fed and tree-based).

- Options x context approach in research sites, research at scale of impact.
- More emphasis on SRT 1 & 4 (better functioning innovation systems, measuring impacts and cross-regional synthesis)
- Capacity development needs to be built in emphasizing fit for purpose participatory approaches and made explicit with perhaps as much as 10-15% of the budget for identified capacity development needs.

#### Administrative/reporting guidelines

- Identify the W3/Bilateral results that are mapped to each activity cluster and ensure a clear reporting structure for bilateral projects exists.
- Consider that at least 10% of the budget should be allocated to Gender (Integration) with as much as 10% for capacity development and communications.
- Consider that at least 1% should be used for M&E activities with a further 1% for risk management.
- Include in each activity a budget allocation for collecting data and data sharing via CGIAR Open Access system.
- Organize a priority list for the activity and phase out those that are unlikely to adopt the system approach (i.e. they work independently). The integrated approach via interdisciplinary research teams should be clearly stated in each activity.

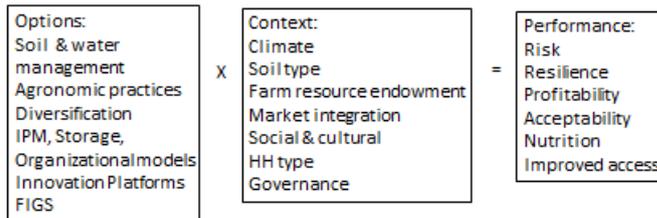
These recommendations were used as background to develop the POWB2015.

Details of this key meeting can be found [CRP-DS website](#).

The key change taken to design the POWB2015/16 has been the adoption of the options x context approach that is more consistent with a systems approach. This is represented below in comparison with the traditional approach to a CGIAR commodity program research.

Classical approach:  $G \times E = \text{Production}$

Systems approach:  $\text{Options} \times \text{Context} = \text{Performance}$



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FIGS = Focused Identification of Germplasm Strategy

By examining a range of contexts for a particular intervention of option (e.g., technological, institutional, social or policy) the program aims to extract principles for achieving impact at scale.

### CRP Management

After the reorganization of the [Program Management Unit](#) in the second half of 2014 and the complete staffing of the office with a Gender Coordinator, System Expert and new Director, the program has a structure consistent with the recommendations of the CRP external audit that was completed in 2014. In addition the program will rely on a newly developed online [Monitoring, Evaluation and Learning platform](#) that was presented to the December RMC and SC. In addition to the M&E the program has defined a 6 months review for its results and a risk management plan that will be updated twice a year. Thanks to the efforts of all partners CRP-DS is the first Program to have drafted specific guidelines to map bilateral projects. This document will be updated along the year in order to harmonize this process. The bilateral projects will benefit from the online platform that will reduce transaction costs associated with reporting and knowledge sharing.

In addition to the important processes established for 2015 the Program has presented to its SC the first draft of a Capacity Development Strategy fully aligned with the CGIAR guidelines. This represents one of the first such documents for a CRP. The strategy has been prepared with in-depth consultation with strategic partners such as GFAR. The program will implement the strategy during 2015, mainstreaming its main objectives into all systems studied.

The SC of the CRP-DS has approved the Youth Strategy in Dec 2014, again the first for a CRP, and it will start engaging strategic partners at flagship level in 2015 to initiate collaboration and leverage funding in order to compensate for budget reductions.

The program will operate under the current PIA until the end of 2015 and then present a revised approach for the implementation of the 2016 plan of work and budget that will extend its operation until the 2 CRP cycle phase.

### **Organization of the POWB2015**

The planning process for 2015/16 retained the original [5 Flagship Programs](#) that were organized on a regional basis, namely:

- [West Africa Sahel and Dry Savannas](#)
- [North Africa and West Asia](#)
- [East and Southern Africa](#)
- [Central Asia](#)
- [South Asia](#)

The 2014 extension proposal suggested a re-organization of the flagships around a matrix of regions x the major agro-ecosystems and more specifically around 5 major agricultural livelihood systems (ALS):

- Pastoral systems
- Agro-pastoral systems
- Intensive rain-fed systems
- Tree-based systems
- Irrigated crop systems

However with the rejection of the 2014 extension proposal and the re-organization of the Program Management Unit, the CRP has reviewed its organizational structure and at its RMC meeting Dec 9-10<sup>th</sup>, 2014 suggested to arrange activities around major challenges of drylands resulting in a region x thematic matrix with the following themes:

- Improving and stabilizing system productivity through diversification and intensification
- Optimizing economic, social and environmental co-benefits and trade offs
- Improving water management and allocation
- Achieving land degradation neutrality

These four themes will be underpinned by cross cutting activities that focus on gender and youth, knowledge synthesis and communications, capacity development and institutions and governance. In addition there is an overarching flagship that collates and synthesizes program level information on geoinformatics, metadata, systems analyses and modeling. It is envisioned that these changes would be gradually introduced during 2015/16 but are subject to change depending on the outcomes of the Independent Task Force

Given these substantial changes in the organization of the CRP that will come into effect in 2015 and 2016 we emphasize that the CRP is undergoing a transitional phase that will require iterations and possible further modifications during the reporting period 2015 and 2016. We also emphasize that the W1/2 funds were cut by 50% and has required a reduction in the number of action sites from 23 to 13 in the five original regions and 43% reduction in the number of ALS studied across all 5 regions. West Asia sites and one site in Central Asia have been suspended and Interdisciplinary Research Teams consolidated sites in West African and Dry Savannas and East/Southern Africa.

In this report we use the 2014 IDO's as submitted in the extension proposal:

- IDO 1. More resilient livelihoods for vulnerable households in marginal areas.
- IDO 2. More stable and higher per capita income for intensifiable households.
- IDO3. Year-round access to greater quantity and diversity of food.
- IDO 4. More sustainable and equitable management of natural resources.
- IDO 5. Women and youth have better access to and control over productive assets.
- IDO 6. Increased capacity of rural communities to innovate.

**The Plans of Work are presented in this document on the basis of each of the 5 Flagship Regions as the n-1 level and as the major agricultural livelihood systems identified and worked on in each region at the n-2 level.**

We expect to modify these during 2015 as the new CGIAR Strategic Research Framework is finalized. At this stage we do not foresee any difficulties in such a transition.

### **Expected outputs and outcomes**

At the program or n-level we expect to achieve the following in 2015:

At least 20 innovation platforms involving multi-stakeholder partnerships and learning alliances engaging women and men established for different IDO's.

Quantification of land use, land cover dynamics and land degradation for at least 2 target regions with assessment of yield gaps and decadal dynamics of the productivity of croplands and rangelands.

At least 10% of engaged NARS and partners outscale gender equitable development interventions and adopt guidelines for empowering rural women.

Systems approaches refined, including on social, economic and cultural aspects also pertaining to gender, and established with a CRP-wide community of practice in collaboration with the two other system CRPs.

Toolkit for tools on gender mainstreaming, gender analysis and gendered systems approach established, the last being tested in 2 systems researches on gender dynamics in diversity management on smallholder farms and on improved livelihoods for women in crop livestock systems.

More than 10 technical packages for improved agronomic management of production systems (e.g., irrigated systems, cattle feed guidelines, crop variety and soil fertility recommendations) used by several hundred households.

5 surveys and studies on ways to improve the gender-responsiveness of agricultural extension services and to address the gender wage gap, enhance working conditions, and increase control over income by female agricultural workers coordinated and carried out across five flagships.

More than 10 reviews, peer referred publications, manuals and guidelines for use by different clients.

At least 5 media stories on successes distributed.



## Budget Summary

Level	Component		Budget (USD)			
			W1&2	W3	Bilateral	Total
<b>A</b>	<b>Director's Office</b>		<b>974,336</b>	-	-	<b>974,336</b>
<b>0</b>	<b>Overarching Program</b>		<b>2,150,530</b>	-	-	<b>2,150,530</b>
0.1		<i>Gender and Youth</i>	550,000	-	-	550,000
0.2		<i>Geoinformatics</i>	550,000	-	-	550,000
0.3		<i>Institutions and Governance</i>	-	-	-	-
0.4		<i>Communication and Knowledge Sharing</i>	641,826	-	-	641,826
0.5		<i>Capacity Development</i>	175,000	-	-	175,000
0.6		<i>Integrated System Analysis and Modelling</i>	233,704	-	-	233,704
<b>B</b>	<b>Evaluation and Task Force</b>		<b>1,200,000</b>	-	-	<b>1,200,000</b>
<b>C</b>	<b>Coordination</b>		<b>1,740,000</b>	-	-	<b>1,740,000</b>
C.1		<i>Flagship Coordination</i>	1,500,000	-	-	1,500,000
C.2		<i>Center Coordination</i>	240,000	-	-	240,000
	<b>Flagship Projects</b>					
<b>1</b>	<b>West Africa and Dry Savannas</b>		<b>1,027,427</b>	<b>4,902,741</b>	<b>3,030,847</b>	<b>8,961,015</b>
1.1	Agro-pastoral system interventions	<b>Location:</b> Kano-Katsina-Maradi Transect (Nigeria and Niger)	513,617	2,892,922	1,602,842	5,009,380
1.2	Intensive Rainfed System interventions	<b>Location:</b> Wa-Bobo-Sikasso Transect (Ghana, Burkina Faso, and Mali)	513,810	2,009,819	1,428,005	3,951,635
<b>2</b>	<b>North Africa and West Asia</b>		<b>759,000</b>	<b>4,494,499</b>	<b>575,862</b>	<b>5,829,361</b>
2.1	Agro-pastoral system interventions	<b>Location:</b> Béni Khedache-Sidi Bouzid (Tunisia) Countries: Tunisia, Algeria, Iran	253,000	2,042,954	401,764	2,697,718
2.2	Intensive Rainfed System interventions	<b>Location:</b> Saiss (Morocco)	253,000	408,591	40,176	701,767
2.3	Irrigated-crop system interventions	<b>Location:</b> Nile Delta (Egypt)	253,000	2,042,954	133,921	2,429,875
<b>3</b>	<b>East and Souther Africa</b>		<b>997,707</b>	<b>2,323,955</b>	<b>4,314,198</b>	<b>7,635,860</b>
3.1	Intensive Rainfed Systems interventions	<b>Location:</b> Chinyanja Triangle (Changara-Ntcheu/Dedza) Transect Countries: Malawi, Tanzania, Mozambique	367,600		195,632	563,232
3.2	Pastoral Systems interventions	<b>Location:</b> Marsabit-Yabello-East Shewa Transect Countries: Ethiopia, Kenya, Zimbabwe, Zambia	630,107	2,323,955	4,118,566	7,072,628
<b>4</b>	<b>Central Asia</b>		<b>760,000</b>	<b>1,925,158</b>	<b>455,577</b>	<b>3,140,735</b>
4.1	Intensive Rainfed Systems interventions	<b>Location:</b> Aral Sea Region (Turkmenistan, Uzbekistan and Kazakhstan)	300,000	792,712	104,559	1,197,271
4.2	Irrigated Crop Systems interventions	<b>Location:</b> Fergana Valley (Kyrgyzstan, Tajikistan and Uzbekistan)	460,000	1,132,446	351,018	1,943,464
<b>5</b>	<b>South Asia</b>		<b>764,000</b>	<b>781,758</b>	<b>2,095,536</b>	<b>3,641,294</b>
5.1	Agro-Pastoral Systems interventions	<b>Location:</b> Chakwal (Pakistan)	263,200		2,095,536	2,358,736
5.2	Irrigated Crop Systems interventions	<b>Location:</b> Jodhpur, Barmer and Jaisalmer districts, Rajasthan (India)	215,000	279,200		494,200
5.3	Irrigated Crop Systems interventions	<b>Location:</b> Anantapur and Kurnool districts, Andhra Pradesh (India)	162,000	192,338		354,338
5.4	Irrigated Crop Systems interventions	<b>Location:</b> Bijapur district, Karnataka (India)	123,800	310,221		434,021
	<b>Grand Total</b>		<b>10,373,000</b>	<b>14,428,111</b>	<b>10,472,020</b>	<b>35,273,131</b>



**Table1. Flagship Projects**

level of Organization within the CRP	Description of planned key activities at each level of internal organization	Expected results of planned key activities	Planned Budget (\$ 000s)
Level n-1: Flagship Project	Provide a list of all the Flagship Projects (level n-1) which constitute the full CRP (level n). Indicate, where relevant, the geographical areas where the Flagship is implemented. Number Flagships from 1 to x	Expected progress toward the CRP IDOs, and indicators of this progress	Budget per Flagship Project
0. Overarching Program	Gender and Youth, Geo-informatics, Institutions and Governance, Communications, Capacity Development, Integrated System Analysis and Modelling	<p><b>Progress towards CRP IDOs and indicators of progress</b></p> <p><b>IDO1:</b> Quantification of the land use, land cover dynamics, land degradation pattern and hotspots, and productivity of the croplands and grasslands in 5 flagships/regions to support international donors, NARS, NGOs prioritize resources for development actions reversing land degradation, improving and stabilizing livelihoods (2016)</p> <p><b>IDO3:</b> Assessment of the yield gaps and decadal dynamics of the productivity of the croplands and grasslands. (2015)</p> <p><b>IDO5:</b> At least 10% of the NARS and Partners out-scale gender equitable development interventions. (2015) At least 10% of the NARS and Partners adopt guidelines for empowering rural women and increased gender equity. (2015) At least 25% of the NARS and Partners out-scale gender equitable development interventions. (2016) At least 25% of the NARS and Partners adopt guidelines for empowering rural women and increased gender equity. (2016) Provision of information resources through CRP-DS web-based geo-to youths and women.</p>	2,150.53



<p>1. <a href="#">West Africa Sahel and Dry Savannas</a></p>	<p><b>Burkina Faso, Ghana, Mali, Niger and Nigeria</b></p> <p><a href="#">Kano-Katsina-Maradi Transect (Nigeria and Niger)</a> <a href="#">Wa-Bobo-Sikasso Transect (Ghana, Burkina Faso, and Mali)</a></p> <p>Collaboration with other CRPs:</p> <p><b>CCAFS</b> (policy linkages/climate smart technologies) <b>DC</b> (dual-purpose cereals) <b>RTB</b> (market diversification) <b>WLE</b> (integrated watershed management/ecosystem services/biomass production)</p>	<p><b>Progress towards CRP IDOs and indicators of progress</b></p> <p><b>IDO1:</b> Tree density reduction rates decreased by 20% in participating farms at field sites; no significant increase in the % of food-insecure households (in a context of fast population growth). (2017)</p> <p><b>IDO2:</b> 20% of women acquired knowledge through participatory evaluation of dual purpose crops. (2017) 50% increase in income of women through adoption of least cost feed rations for sheep fattening. (2017) 5% of households (low income HH: 10%) increased their income at field sites. (2017)</p> <p><b>IDO3:</b> At least one women association trained in tree propagation techniques and post-harvest handling of indigenous fruit trees. (2016) 10% of households improved their dietary scores at field sites. (2017)</p> <p><b>IDO4:</b> Skill of at least 20% of farmers at the action site is increased in innovative agro-forestry techniques. (2017) 50% increase in household income through adoption of optimal combination of improved crop variety and integrated soil fertility management. (2017) 10% increase in water productivity of crops and livestock at participating farms in field sites; 10% increase in agricultural biodiversity maintained by participating farms at field sites; 10% increase in livestock performance at participating farms in field sites. (2017)</p> <p><b>IDO5:</b> 10% improvement in the sex ratio and age ratio of farmers adopting approaches promoted. (2017)</p> <p><b>IDO6:</b> 120 progressive farmers and stakeholders trained on systems innovation and community based seed production for improved seed delivery. (2016) At least 2 CBOs or boundary partners have adopted innovative organization approaches at</p>	<p><b>8,961.015</b></p>
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		each field site. (2017)	
<p><b>2. North Africa and West Asia</b></p>	<p><i>Morocco, Algeria, Tunisia, Libya, Egypt, Mauritania, Syria, Palestine, Jordan, Iraq, Saudi Arabia, Iran, Yemen, Oman, Turkey, and Afghanistan</i></p> <p><a href="#">Béni Khedache-Sidi Bouzid (Tunisia)</a> <a href="#">Saiss (Morocco)</a> <a href="#">Nile Delta (Egypt)</a></p> <p>and Bilateral Activities in: Tunisia, Algeria, Iran</p> <p>Collaboration with other CRPs:</p> <p><b>WHEAT, DC, GL</b> (crop rotation) <b>WLE</b> (water management)</p>	<p><b>Progress towards CRP IDOs and indicators of progress</b></p> <p><b>IDO1:</b> Grazing lands productivity is improved by 20 % in communal rangelands under rest and managed by communities. (2017) 5 % of HHs will have more secured food access. (2017) Integrated crop-livestock: 10% of farmer communities in old land of Nile Delta adopted new feeding strategies. (2017) Improved crop yield: 25% increase in wheat and fababean yields at farm level will lead to increase food security at national level by 10%. (2017) Climate change adaptation strategies: 2 climate change adaptation scenarios adopted by water planners. (2017)</p> <p><b>IDO2:</b> Increased Income: 10% of low income households in farmer communities increased their income by at least 20% after adoption of technologies introduced through the CRP-DS activities in 2015-2017.</p> <p><b>IDO3:</b> 5 % of households improved their food access. (2017) Women and children dietary improvement: 10 % of households improved their dietary scores at farm level due to dissemination and adoption of new technology packages including high yielding varieties and better farm management (soil, water and crop). (2017)</p> <p><b>IDO4:</b> 20 % increase in crops performance at participating farms in field sites. (2017). Reduce land degradation by 30% due to the adoption of decision makers of well-understanding and better knowledge on salt dynamics, salt balance, possible build-up in the soil and water required for leaching; 10% of farmers adopted the best interventions identified by CRP-DS in salt-affected soils of the Nile Delta. (2017)</p>	<p><b>5,829.361</b></p>



		<p>Improved water productivity of crops, trees and livestock: 25% increase in water productivity due to improved packages introduced and widely adopted by farmers. (2017)</p> <p>Agricultural biodiversity: 10% change in levels of agricultural biodiversity maintained by households and uses derived from it due to intensification and diversification agro practices and anticipation of growing new crops (varieties). (2017)</p> <p>Enhanced soil fertility: 15% increment in soil fertility due to diversification agro practices including cereal-legume crop rotation which improves the organic matter content that improves soil nutrient and water dynamics, soil structure and productivity subsequently reduce fertilizers application/cost and improve the farm revenue. (2017)</p> <p>Best Management Practices adopted: 5% of farmers adopted cereal-legume crop rotation which improves soil nutrient status and productivity through use of fertilizer and nutrient best management practices (BMP). (2017)</p> <p>Use or adoption of sustainable agro-ecosystem management: 25% irrigation water saving due to high adoption of sustainable agro-ecosystem management. (2017)</p> <p><b>IDO5:</b></p> <p>Number of scientists, NGOs, development agencies, and policy makers whose awareness has been raised with regards to 1-gender wage gaps in paid agricultural labor and 2- gender differentiated impacts of technologies. (2017)</p> <p>Involvement of women and youth in the decision process improved through the creation of at least 3 women/youth associations in the field sites. (2017)</p> <p>Out-scaling gender equitable development interventions by NARS and partners: 20% improvement in the women-men ratio at farm level in adopting the introduced package to improve agricultural production system; 5% improvement on women access to technical support to their identified needs. (2017)</p> <p>NARS and development partners adoption of guidelines for empowering rural women and increased gender equity: 10% improvement in institutionalizing of gender-equitable development interventions by involvement of women and youth in the decision making process. (2017)</p> <p><b>IDO6:</b></p> <p>At least 1 CBOs or boundary partners have adopted innovative organization approaches at</p>	
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		<p>each field site. (2017)</p> <p>2 innovation platforms established and operational and at least two communities' participatory development plans developed with all stakeholders. (2017)</p> <p>Water and land policies analyzed and documented; value-chains for sheep, olive, figs and cactus developed with the participation of all actors and stakeholders. (2017)</p>	
<p><b>3. East and Southern Africa</b></p>	<p><i>Sudan, South Sudan, Ethiopia, Eritrea, Kenya, Somalia, Tanzania, Zambia, Malawi, Mozambique, Zimbabwe</i></p> <p><a href="#">Chinyanja Triangle (Changara-Ntcheu/Dedza) Transect</a> <a href="#">Marsabit-Yabello-East Shewa Transect</a></p> <p>and Bilateral Activities in: Ethiopia, Kenya, Zimbabwe, Zambia, Malawi, Tanzania, Mozambique.</p> <p>Collaboration with other CRPs:</p> <p><b>CCAFS</b> (NRM and governance)</p>	<p><b>Progress towards CRP IDOs and indicators of progress</b></p> <p><b>IDO2:</b></p> <p>The major opportunities for and constraints to technology adoption and land use choice decision by small holder farmers (both men and women) understood for out-scaling. (2015)</p> <p>50% of the intensifiable men and women have adopted appropriate soil, water and crop management technologies. (2017)</p> <p>20% of intensifiable households have improved livelihoods due to improved yield and diversified income. (2017)</p> <p>50% of the intensifiable men and women have improved per capita income due to adoption of appropriate soil, water and crop management technologies (2017)</p> <p><b>IDO3:</b></p> <p>20% the young and women have access to good quality and nutritious food as a result of improved pre- and post-harvest processing. (2017)</p> <p><b>IDO4:</b></p> <p>Hotspot areas of land degradation identified and participatory and ex-ante analysis of best practices conducted. (2016)</p> <p>Sustainable and climate-smart land and water management options introduced on 15% of the action site. (2017)</p> <p><b>IDO6:</b></p> <p>200 model farmers and 50 stakeholders trained on sustainable land management, systems innovation and participatory plot-farm-landscape management options and acquired the capacity to train others. (2016)</p>	<p><b>7,635.86</b></p>



<p>4. <u>Central Asia</u></p>	<p><i>Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan</i></p> <p><a href="#">Aral Sea Region (Turkmenistan, Uzbekistan and Kazakhstan)</a> <a href="#">Fergana Valley (Kyrgyzstan, Tajikistan and Uzbekistan)</a></p> <p>Collaboration with other CRPs:</p> <p><b>WLE</b> (water management)</p>	<p><b>Progress towards CRP IDOs and indicators of progress</b></p> <p><b>IDO1:</b> 10% increase in productivity of winter wheat, potato, mung bean, chickpea, forages maintained by establishing a functional seed system platform and access to quality planting material of varieties in the field sites. (2015) 10% Increase in livestock production performance achieved through participatory planning of interventions to increase feed production and value chain analysis in the field sites. (2015)</p> <p><b>IDO2:</b> 300 households increase their incomes through adoption of innovative technologies by farmers heading those households in the field site. (2015)</p> <p><b>IDO3:</b> 170 households improve their dietary scores in the field sites through better access and availability of quality wheat, mung bean, chickpea, potato and other crops. (2015)</p> <p><b>IDO4:</b> 10% increase in water use efficiency of crops through innovative technologies in irrigation and farming practices in the field site. (2015)</p> <p><b>IDO5:</b> 220 households improve their vital activity through enhancing their leadership skills in participatory planning and decision making within their community-based interventions. (2015)</p> <p><b>IDO6:</b> At least three innovation platforms established within the action Sites for multi-stakeholder dialogue to address socio-economic, cultural, management and policy issues at farm/community level and congruent decision and participatory planning of interventions for development. (2015) 10% of farmers, rural advisory services agents, agronomists, and representatives of local agricultural education and research institutions improve their understanding of Sustainable Land Management (SLM) practices through continued facilitation of dissemination (demo-sites) of SLM technologies and approaches. (2015)</p>	
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<p><b>5. South Asia</b></p>	<p><b>India, Pakistan</b></p> <p><a href="#">Chakwal (Pakistan)</a> <a href="#">Jodhpur, Barmer and Jaisalmer districts, Rajasthan (India)</a> <a href="#">Anantapur and Kurnool districts, Andhra Pradesh (India)</a> <a href="#">Bijapur district, Karnataka (India)</a></p> <p>Collaboration with other CRPs:</p> <p><b>DC, GL</b> (Management blue and green water, diversification &amp; intensification and dual purpose crops/hybrids)</p>	<p><b>Progress towards CRP IDOs and indicators of progress</b></p> <p><b>IDO1:</b> Improved fodder varieties increased 5 % in milk production of large ruminants Improved 30% wheat production Enhanced crop yields by &gt;20% in participating farmers' fields</p> <p><b>IDO2:</b> Labor saving by 30-40% in different water saving techniques Reduced 50 % land preparation cost Resource saving (Fertilizer and seed) saving by 40%</p> <p><b>IDO3:</b> Enhanced incomes (~double) from diversified areas and family nutrition through consumption of diversified food</p> <p><b>IDO4:</b> 20 % Increased awareness of sustainable management of rangeland resources for end users Water saving increased by 70% in drip irrigation system and 30% in Bed-furrow planting Reduced 15% soil erosion</p> <p><b>IDO5:</b> 10 % increase in production will help women in improving food security at household level 40 % Improved supply of fodder and feed for women involved in livestock farming 10% increase in milk and meat production will help women in improving food security at household level</p> <p><b>IDO6:</b> Enhanced awareness and skills of farmers and stakeholders More number of farmers convinced and motivated to adopt improved management Enhanced synergy through collective action by partners</p>	<p><b>3,140.735</b></p>
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**Table 1a Cluster of activities**

Level	level of Organization within the CRP	Description of planned key activities at each level of internal organization	Expected results of planned key activities	Planned Budget (\$ 000s)
0.1	Gender and Youth	<p><b>Location:</b> Global (across the 5 Flagship regions of CRP-DS)</p> <p><b>Objectives:</b>            (1) To gender-mainstream new research of CRP DS through a gendered systems approach by researchers of CRP DS;            (2) To identify entry points for making agricultural extension services more gender-responsive and thus more effective, efficient, and flexible to changes in the biophysical and socio-economic environment ;            (3) To develop means to address the gender wage gap, enhance working conditions, and increase control over income of female agricultural laborers</p> <p><b>Methods:</b>            (1) Statistical exploratory</p>	<p><b>Outputs:</b>            (1) Tested systems research approach regarding gender-specific research questions and regarding mainstreaming gender into CRP DS research (outputs: 2 studies on improved livelihoods for women in crop livestock systems, and on the system regarding agricultural biodiversity management by households; Gender Working Group jointly developed a system’s approach to gender-mainstreaming in CRP DS research, and disseminated it through guidelines and in 2 CRP DS workshops for researchers on systems; 8 Gender integration seminars for scientists in each Partner Centre (learning, integrating, disseminating); Production of a ‘Case for mainstreaming gender into CRP DS related research’); Gender Report compiled pointing out systemic change achieved;            (2) Options identified for gender-responsive extension services (outputs: 2 studies on extension service systems and intervention options to create equity for women and men in access and benefit); (3) Impacts of increased rural labor opportunities for women in the context of a rise in labor migration by men and means to address the gender wage gap, enhance working conditions, and increase control over income (outputs: 3 studies on change of system’s and its impact on women’s paid work);</p> <p><b>Outcomes:</b>            At least 10% of the NARS and Partners out-scale gender equitable development interventions.            At least 10% of the NARS and Partners adopt guidelines for empowering rural women and increased gender equity.</p>	450



		<p>methodologies, (2) (household) surveys (one using mAgri™ agent network) combined with qualitative data collection (mostly through focus groups, also key informant interviews), (3) Series of case studies and ethnographic research to design a survey questionnaires and deepen quantitative analysis, (4) Framing analysis in GAAP, WEIA gender frameworks re development outcomes, (5) Analysing decision making and transaction trajectories embedded in socio-economic, cultural systems analysis</p>		
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0.2	Geo-informatics	<p><b>Location:</b> Global (across the 5 Flagship regions of CRP-DS)</p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>(1) Geoinformatics Data Portal and Tools</li> <li>(2) Mapping CRP DS Activities and Web-based Visualization Tools</li> <li>(3) ICARDA Climate Stations and Climate Data Processing and Implementation of CRP DS DM and OA</li> <li>(4) Data and Visualization Inputs for CRP DS website</li> <li>(5) Development and Maintenance of CRPDS M&amp;E Tools</li> <li>(6) RS and GIS Software and Packages</li> <li>(7) Spatial Data Web-hosting and Cloud Systems (UK)</li> <li>(8) Drought mapping and Monitoring Tools</li> <li>(9) Geoinformatics Support, Technical Backstopping and Other Minor Services</li> <li>(10) Development and Implementation of the</li> </ul>	<p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>(1) Geospatial Science, Technology and Application (GeSTA) for CRP DS. Activities include the spatial data management, streamlining of the archived data, processing, development of new tools, etc.</li> <li>(2) Mapping CRP DS Activities on the ground, site areas, and related data streamlining, online visualization, map servers, coordination activities with CO's CRP mapping tools</li> <li>(3) Maintenance of climate stations, daily data collection and reporting, web-tools for Open Access; Data Storage and Archiving Systems; Geoinformatics Capacity and Support; Strategic Guidelines and Protocols for the Spatial data Management</li> <li>(4) Identify the suitable features of analysis, identify and collect the expressions of the statistics, programs development for computations on the web, web implementations, summary of hits</li> <li>(5) In-house development of the M&amp;E tool and web portal for CRP DS, infrastructure</li> <li>(6) ENVI and IDL Package, ESRI ARCGIS Suite of Package, RS/GIS Modules, Graphics, Coding, etc.</li> <li>(7) Maintenance of the UK Servers and Data Portals, we have annual renewal contract CITRIX Systems UK</li> <li>(8) Development of satellite based improved algorithms, methods, datasets for near-real-time mapping, monitoring and assessment of droughts and drought impacts on the Agro-Ecosystems</li> <li>(9) Minor support, provide quick maps, data, provide day to day technical support, services, printing maps and posters, etc.</li> <li>(10) Development, customization, implementation and online visualization tools for the eFieldData, its database management, tech support</li> <li>(11) Collection of the time-series remote sensing data for generation of various vegetation indices such as NDVI, EVI, LSWI, NSDI etc. across the Drylands system flagship and target areas</li> <li>(12) Annual maintenance, replacement, upgrading, networking, backup and other related services in-order the keep system working steadily on 14/7/365</li> </ul> <p><b>Outcomes:</b></p> <p>Quantification of the land use, land cover dynamics, land degradation pattern and hotspots, and productivity of the croplands and grasslands in 2 flagship regions</p>	550
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		<p>electronic data collection (11) RS, GIS and Climate Data Analysis at regional scales (12) Maintenance and Management of Geo-cyberinfrastructure, High-end Processing, Storage and Archiving system for CRP DS (13) Hi-tech RS Systems (Hyperspectral, Infrared, UAV, for CRP DS)</p> <p><b>Methods: see above</b></p>		
0.3	Institutions and Governance	<p><b>Location:</b> Global (across the 5 Flagship regions of CRP-DS)</p> <p><b>Objectives: tbd in 2015 via a Working Group</b></p> <p><b>Methods: tbd in 2015</b></p>	<p><b>Outputs:</b> (1) Annual Report (2) M&amp;E Platform (3) Scoping Studies (4) Background institutional and governance performance for 2nd Call</p> <p><b>Outcomes:</b> At least 20 IP's operating in flagship regions</p>	Not yet assigned
0.4	Communication and Knowledge Sharing	<p><b>Location:</b> Global (across the 5 Flagship regions of CRP-DS)</p> <p><b>Objectives:</b> (1) To provide a credible and authoritative platform for</p>	<p><b>Outputs:</b> (1) Established Network of Communication Focal Points with ToRs and rotating leadership, with representation from each center and links to gender focal points and data manager focal points and other CRPs (2) Develop Communications and Knowledge Management Strategy with wide participation from all centers; (3) Create synergies with other CRPs; Dryland Systems is an active participant and contributor in</p>	641.826



		<p>scientific information, knowledge and tools on drylands agriculture;          (2) To actively reach out to and mobilize staff, partners and beneficiaries at all levels;          (3) To facilitate user-driven research, science-based dialogue, knowledge sharing, and evidence-based policy, among key partners;</p> <p><b>Methods:</b>          9-step Process of Communications Planning linking Research to Development Outcomes</p>	<p>the KM4CRPs initiative;          (4) Finalize and Implement Program Branding Guidelines; Dryland System brand is widely recognized and globally positioned;          (5) Identified new and/ or re-vamp existing tools for external and internal communication (i.e. website, shared collaboration spaces, social media, etc); Program website, knowledge repository, Office 365 collaboration platform, and social media tools widely used and updated by partner centers and other actors collaborating with the program;          (6) Developed and disseminated program-wide guidelines and templates for capturing information on research outputs and stories of impact; Annual calendar of external strategic side-events and program activities created and used widely throughout the program; E-Monthly Update and Blog established to disseminate program news and drive critical debate on select policy issues; Partner centers submit program research outputs and impact stories through a variety of mediums (publications, photos, written articles, etc) on a regular basis as per annual plan of communication activities defined in collaboration with Program Communications; Various Branding, Communication and Reporting templates are created, disseminated and utilized successfully by all partner centers          (7) Identified and utilize target knowledge multipliers to help disseminate research results and best practices more widely and connect to a wider multi-disciplinary audience          (8) Created and disseminate standard package of program promotional materials;          (9) Built internal capacities to successfully fully engage in and deliver communications activities through communications workshop trainings on subjects such as: participatory communications planning, social media, process documentation, video &amp; still photography, advocacy, comms. writing, use and application of ICTs, M&amp;E and knowledge management, etc.          (10) Provided support and guidance to partner centers in developing appropriate activities and products to communicate the brand and impact of program to internal and external audiences          (11) Identified list of salient policy issues and strategic side-events for strategic engagement of the program at global level;          (12) Define relevant targets and monitor and evaluate results for each stated indicator above.</p> <p><b>Outcomes:</b></p>	
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			<p>(1) Dryland Systems becomes increasingly viewed as the leading source and disseminator of science-based knowledge and information on dryland agriculture development to benefit both the poor and the environment of target dryland systems through the use of innovative, relevant and appropriate communication tools and processes.</p> <p>(2) Dryland Systems creates, fosters and sustains an organizational culture of knowledge sharing and learning that engages all staff and partners in the process of gathering, developing and deploying intellectual/research capital to facilitate realization of overall programmatic goals, at all levels.</p> <p>(3) Dryland Systems activities and research results are effectively communicated in ways that will engage, influence and positively affect the behavior of target local, regional and global audiences to undertake policy actions and/or social mobilization on salient policy issues affecting the lives of people and communities in the dryland areas.</p>	
0.5	Capacity Development	<p><b>Location:</b> Global (across the 5 Flagship regions of CRP-DS)</p> <p><b>Objectives:</b></p> <p>(1) To develop the capacities of core individuals, organizations and systems through the dissemination and exchange of relevant quality knowledge and skills following systematic needs assessment;</p> <p>(2) To maximize the potential impact of CD interventions by reaching out to stakeholders and meeting their needs through</p>	<p><b>Outputs:</b></p> <p>(1) Needs assessment surveys from each site; Responses analyzed, synthesized to reflect the CD needs to achieve objective 1; Descriptions developed for all CD initiatives including goals and expected outcomes; ICT used in CD to respond to needs of remote stakeholders. At least one course of MOOCs on a theme identified in the needs assessment is piloted using internet and satellite broadcasting; Priority given to those who can transfer the knowledge and skills they acquire to further populations “train the trainer”; CD interventions developed, delivered to farmer communities (themes: Sustainable intensification and agro-biodiversity, nutrition &amp; health, sustainable natural resources management, communication and negotiation skills, foresight studies, innovation platforms formation); Selected stakeholders participate in CD intervention allowing them to access and share available agricultural knowledge; Core CRP-DS scientists, center representatives and site coordinators participate in a minimum of three central-level interventions a year on the outlined subjects. Learning, documenting learning and sharing learning across teams is an integral part of the project cycle; QA and M&amp;E Systems developed, piloted and approved for full application by the end of 2015; Common data base of beneficiaries developed and used for M&amp;E follow ups and update on new initiatives using web-marking.</p>	175



	<p>pertinent partnerships with international, regional, sub-regional and local organizations including public, private and non-governmental organizations and farmers and women associations in addition to alumni and beneficiaries of previous CD activities;</p> <p>(3) To ensure sustainability of CD efforts through improved focus on resource mobilization at the international, regional and local levels, diversifying and funding modalities, and improving donor relations</p> <p><b>Methods:</b></p> <p>(1) Training needs assessment</p> <p>(2) Internal and external expertise and diversified tailored CD modalities and delivery mechanisms while applying quality assurance and monitoring and evaluation throughout the process</p>	<p>(2) Core local researchers, women and youth identified and join CD intervention on engendering research and communications; Core research and innovation coordinators identified and join CD intervention on ARI4D platforms formation; Core stakeholders identified to participate in the GCARD3 dialogue process and provide them with the necessary knowledge and skills preparation to effectively contribute to the process; Impacts' M&amp;E mechanism developed at the CRP-DS central level to apply to system-level CD interventions; At least one course on a theme of shared importance; At least one example of collaboration with a university or informal learning center at local level; Existing private sector engagement analyzed and fruitful ones strengthened; Collaborate with GFAR Facility on CD in countries that are targeted by CRP-DS;</p> <p>(3) At least one pilot intervention per site; Resource mobilization as relevant is included in the performance appraisal of CRP-DS staff members</p> <p><b>Outcomes:</b></p> <p>(1) Local stakeholders in each site including small-holder men and women farmers possess the needed knowledge, skills and attitudes that enable them to better discuss and decide their own agricultural futures with their research and policy making counterparts and shape CRP-DS pathways to achieve impact on the ground</p> <p>(2) Institutional policies at the local/national level have changed to further target the poor through policies such as including agricultural research and innovation as a priority in rural development agendas, improved land allocation and improved market systems.</p> <p>(3) Accountability and impact in national research and innovation systems increased through development towards more strategic coherence &amp; transparent stakeholder involvement.</p> <p>(4) Mechanism for developing, maintaining and strengthening partnerships in CD is developed and applied.</p> <p>(5) Collaborative initiatives strengthened to realize stronger capacities of local agricultural innovation systems empowering them to achieve impacts at scale</p> <p>Investments in CD increased to better meet the needs of the local stakeholders.</p>	
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		(3) Participatory partnerships development analysis		
0.6	Integrated System Analysis and Modelling	<p><b>Location:</b> Global (across the 5 Flagship regions of CRP-DS)</p> <p><b>Objectives:</b>            (1) To develop an up-to-day scientific, analysis-strong, yet gendered and handful framework for researching transitions of agricultural livelihood systems (ALS) in coping with the social-ecological complexity context and other grand challenges in dryland development. This serves as basis for framing research processes/activities targeting the later objectives.            (2) To formulate an global network, across flagship regions and across partner centers, for drylands' integrated systems research being accountable,</p>	<p><b>Outputs:</b>            (1) Generic integrated systems framework for researching ALS transitions proposed, its robustness assessed through peer reviews (by involved scientists in CRP and outside of CRP). The generic framework meets the following standards to cope with the complexity context: (i) scientifically up-to-day, (ii) principles-based (i.e. minimal specification for overcoming contextual diversity), (iii) sufficient system boundary setting support assess multi-dimensional ALS performance, (iv) focus on human actors' roles, behavior and generative relationships (inter-actions) (i.e. to be relevant to social transitions of ALS), (v) focus on attractors of, and variation for positive changes (rather battling resistance), (vi) handful for guiding system analysis and modeling (e.g. protocols of system narrative analysis and system representation, generic criteria and indicator (C&amp;I) of system performance assessment), and some others.            (2) Theme-specific integrated systems frameworks (of 4 themes identified) elaborated, based on the generic framework identified in (1) and contributions of thematic scientists across Flagships.            (3) CRP-DS's Integrated System Network/Cluster identified and functions, where relevant individuals representing partner centers, NARS and their roles are identified; protocol, schedule of collaborative activities identified.            (4) One key case study site in each Flagship identified for focal integrated system research. Narrative-based system analyses, and context-option matrices implemented in all Flagships. At least two Flagships applied quantitative integrated system modelling and provide results.            (5) Two CRP-level integrated systems research workshop organized and the results documented for support further research activities            (6) List of individuals, groups in NARS identified for enhancing their systems research capacities.            (7) One CRP-level training of trainer (ToT) organized for relevant junior scientists, preferable gender-balanced in NARS and Centers.</p>	233.704



		<p>functioning towards CRP-DS's IDOs and SLO.          (3) To improve systemic understandings and identify systemic intervention strategies to obtain the four CRP-DS's thematic targets through a spectrum of demonstrative case studies on integrated systems analysis and modelling across CRP-DS's Flagships.          (4) To provide frameworks, meta-data and guides for Flagships' development of (i) context-SLM option and (ii) context-system tool option matrices          (5) To build research and educational capacities on integrated system research in CRP-DS's partners (CGIAR centers, NARS, national university) and improve their integration into other related international research communities.</p> <p><b>Methods:</b>          (1) Complex adaptive</p>	<p><b>Outcomes:</b>          (1) Up-to-day scientific, analysis-strong, yet gendered and handful framework for researching transitions of agricultural livelihood systems (ALS) in coping with the social-ecological complexity context and other grand challenges in dryland development implemented by CRP's partners for enhancing systemic impacts of research.          (2) A global network, across flagship regions and across partner centers, for drylands' integrated systems research is operating towards obtaining CRP-DS's IDOs and SLO.          (3) Systemic understandings and identify systemic intervention strategies obtained across CRP-DS's Flagships and CRP's 4 core research themes.          (3) Databases context-SLM option and (ii) context-system tool option matrices updated and be accessible.          (5) Research and educational capacities of relevant, junior scientists in NARS, Centers and their connection to related international communities improved.</p>	
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		<p>human-environmental system approach.</p> <p>(2) Tool box approach that identifies, verifies relevant methods of systems analysis/modelling (ranging from narrative-based systems analyses to quantitative integrated systems modelling) and provides guidance of context-relevant, complementary uses.</p> <p>(3) Context- SLM option matrix approach as a system method</p> <p>(4) Context - modelling tool matrix as a system method</p> <p>(5) System-structured narrative synthesis framework for integrating impacts, lessons learned across CRP-DS Flagships.</p>		
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Level	level of Organization within the CRP	Description of planned key activities at each level of internal organization	Expected results of planned key activities	Planned Budget (\$ 000s)
1.1	Agro-pastoral system interventions	<p><b>Location:</b> <a href="#">Kano-Katsina-Maradi Transect (Nigeria and Niger)</a></p> <p><b>General objective:</b> To improve the multi-product productivity, stability and gender equity of agro-pastoral systems in West African Sahel by enhancing subsidiary linkages between annual crops, trees and livestock as well as promoting the use of indigenous knowledge and resources.</p> <p><b>Specific objectives:</b>            (1) To characterize and understand roles of local knowledge and female and male farmers' practice about integration of tree on farms and landscapes in contributing to semi-arid agricultural systems' productivity and stability            (2) To assess factors influencing</p>	<p><b>Outputs in 6 months:</b>            (1) PRA conducted at the action sites in KKM by month 6/Surveys on 400 farms conducted at the action sites in KKM by month 6/A progress report on crowd sourcing local knowledge about tree integration at field, farm and landscape scales;            (2) Report on gender preference on local dual purpose crops and progress on of field trials;            (3) Practical guidelines on least cost feed rations for cattle/sheep fattening/Progress report on on-farm farmers' managed fattening experiments;            (4) The participatory domestication research and development activities conducted/Priority indigenous fruits species and training provided on propagation techniques;            (5) Survey report on local management of tree, crop and animal breeds;            (6) Survey report on locally produced nutritious foods and imported foods;            (7) Tree crop management demonstration protocols developed and installation achieved; Report on demonstration installation produced;            (8) Innovative platform model for promotion of improved and integrated technology transfer, seed delivery and stakeholders linkage along the value chain involving 540 female and male farmers and actors established and operationalized in 3 IP sites (Kadawa, Alkamawa, Bagwai) of Kano/Three functional community based seed multiplication scheme established, each involving 50-60 trained female and male farmers for supply of high quality wheat seed across the 3 IP sites;            9. Report on status and threats to local agro-biodiversity at three districts of Kano (Kadawa, Alkamawa, and Bagwai) agro-biodiversity farming system surveys.</p> <p><b>Outputs in 12 months:</b>            (1) Feedback workshops in all sites where PRA were organized by month 12/A full report on factors influencing female and male farmers' decisions to grow MPTs and practice FMNR</p>	5,009.38



farmers' decisions to grow multi-purpose trees (MPTs) and extent to which MPTs provide the functions and characteristics desired by farmers (gender differentiated);  
(3) To test and evaluate least cost feed rations based on locally available feed resources for improved livestock productivity (sheep fattening) and efficient livestock-mediated nutrient transfer;  
(4) To improve integrated domestication and commercialization of indigenous fruit and nut tree crops (IFTs) for food security and income generation at the action site and beyond involving female and male stakeholders;  
(5) To identify and promote nutrition rich local foods;  
(6) To identify optimal combinations of crop-tree-livestock management options, yet and feasibly and relevantly, resulting in improved multi-product productivity of agro-pastoral systems;  
(7) Assess the effects of

produced;  
(2) Complete report on gender preference on crops along with evidence from laboratories for food-fodder trait analysis;  
(3) Full report on on-farm fattening experiments;  
(4) A full report on domesticating and commercializing indigenous fruit and nut tree crops for food security and income generation at the KKM site;  
(5) Report on options for improved management of tree, crop and animal breeds;  
(6) Report on recommended nutritious foods that are locally available to improve diets;  
(7) Optimal combination of crop variety and options of soil fertility management for optimal yield and efficient water use in parklands system identified in participatory trials with female and male farmers/Tree/shrub-crop interactions evaluated on-farm and the role of trees on soil water and nutrient balance in mixed tree/shrub-crop systems at farm scale documented;  
(8) 120 progressive female and male farmers and stakeholders trained on system innovations and community based seed production for improved seed delivery and technology transfer to local circumstances;  
(9) Capacity and awareness on agro-biodiversity conservation enhanced through training of 50 female and male stakeholders representatives and through training of 3 trainers on in-situ conservation.

**Outputs/Outcomes:**

(1) Annual report, peer reviewed publications & data collected archived & publically available;  
(2) Publication on Gender preferred local dual purpose crops;  
(3) Increased manure collected for crop production/Increased household income through sheep fattening;  
(4) Reduce household vulnerability risk through better use of the agro biodiversity provided by the tree-crop system; 5. Ten households applied better tree, crop and animal breeds management practices;  
(6) Twenty households use improved combinations of locally available foods;  
(7) Crop and tree products increased;  
(8) Innovative partnership models for improved seed delivery, technology transfer and market linkage fully adopted by farmers and all stakeholders within the three IP sites;



	<p>intensification on local agro-biodiversity in areas with intensification potentials and the roles of different stakeholders bringing about this effect;</p> <p>(8) To strengthen female and male farmers' capacity in integrated management of tree (e.g. farmer-managed natural generation (FMNR) and MPTs), crop and livestock components in agro-pastoral system;</p> <p>(9) To establish innovative platforms in a multi-stakeholders setting for promoting the out-and up-scaling of locally succeeded diversification/intensification options;</p> <p><b>Methods:</b></p> <p>(1) Narrative-based system analysis of agricultural livelihood systems (including social-cultural (gender and youth) dimensions)</p> <p>(2) Participatory Rural Appraisals (PRA) for domestication and commercialization analyses</p>	<p>(9) Contribution to sustainable management of dryland agro-biodiversity.</p> <p><b>CD Results:</b></p> <p>(1) Popular newspaper, policy briefs and video on FMNR and MPTs; At least 20% of the farmers at the action site master the innovative agroforestry techniques;</p> <p>(2) Knowledge on gender preferred local dual purpose crops for further food-fodder trait analysis;</p> <p>(3) Practical guidelines for livestock extension workers on least cost ration for sheep fattening (extension workers sensitized to distribute those equally to men, women, youth);</p> <p>(4) Popular gender-sensitive newspaper, policy briefs and video on the use of agro biodiversity for risk reduction/At least one women association trained in tree propagation techniques and post-harvest handling of IFTs;</p> <p>(5) Technical Advisory Notes on better tree, crop and animal breeds management practices, for extension workers and farmers;</p> <p>(6) Factsheets on nutritious local foods and their utilization (dissemination to both genders and youth);</p> <p>(7) Video on precision agriculture developed (when showing action, involving men and women (also in nontraditional roles);</p> <p>(8) Communities and policy makers actively mobilized and taking actions in promoting in-situ conservation of threatened agro-biodiversity in selected areas across the 3 districts.</p> <p><b>Gender Results:</b></p> <p>(1) Capacity of male and female farmers, including poor rural communities' organizations is strengthened through collective actions, practical farmer to farmer training and learning processes on MPTs and FMNR;</p> <p>(2) Gender preferred local dual purpose crops seeds for gene bank;</p> <p>(3) Increased income for women through sheep fattening;</p> <p>(4) Male and female farmer, including poor rural communities organizations capacity is strengthened in tree domestication and propagation techniques;</p> <p>(5) Increased income from local crops (millet, tiger nut, leafy vegetables, etc.) and small ruminants for marginal groups (women, elderly people);</p>	
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		<p>(3) Household-farm surveys (gender and age disaggregated)  (4) Gender analysis of systems targeted by research in 2015 (focus on transaction analysis)  (5) Participatory development of partnership models for technological transfers  (4) Operational system modeling (TBD)</p> <p><b>Gender dimension:</b>  (2) Understand gender preferred local dual purpose crops in mixed farming systems using field trials;</p>	<p>(6) Improved nutritional state of mothers and children/Increased income for women from diversified local foods;  (7) Household income increased through farm product sale, equity and equality in decisions on use of household income enhanced on household level;  (8) Engaging in participatory and inclusive capacity building of women and female and male youth;  (9) Assessing the gender role in conserving agro-biodiversity</p>	
1.2	Intensive Rainfed System interventions	<p><b>Location:</b> <a href="#">Wa-Bobo-Sikasso Transect (Ghana, Burkina Faso, and Mali)</a></p> <p><b>Overall objective:</b> To improve food productivity, benefit sharing equity (including gender and youth aspect) of WASDS intensive rain-fed systems whilst minimize agriculture-induced land degradation and climate-driven vulnerability</p> <p><b>Specific objectives:</b></p>	<p><b>Outputs in 6 months:</b>  (1) Establishment of one biophysical monitoring network across CRB-equipped/control field pairs sampling 3 catena positions, 3 household types and 4 crop types (Kani site)/Initial crop model parameterization for local agronomic practices, germplasm and CRB effect on soil water dynamics/Initial TOA-MD model parameterization based on DS-CRP HH survey data, and ex-ante simulation of CRB adoption/Initial report on perceived bottlenecks to CRB adoption (biophysical, economic, customary, gender roles (decision making), information gaps of main actors, etc.);  (2) Multi-purpose tree diversity and distribution assessment report;  (3) Progress report and field visits to identify participating female and male farmers/2 composting training videos screening events and demos organized at Yagtuuri (Ghana) and Mahon (Burkina Faso) field sites, directly reaching at least 200 female and male farmers. Feedback collected from female and male farmers;  (4) Parcel databases produced from VHR imagery and validated by communities for 3 communes/Mobile platform customized for local conditions and connected to mobile</p>	<b>3,951.635</b>



(1) To identify household-preferred, gender-relevant multi-purpose trees (MPTs) (multi-purposes: improved nutrition, livestock feed, minimized or reversed land degradation);  
(2) To assess in a gender-sensitive manner factors influencing farmers' decisions () to grow MPTs and extent to which MPTs provide the functions and characteristics desired by farmers (also gender-sensitive);  
(3) Explore the use of dual-purpose crops and post harvest mechanization for intensified stover and crop residue production;  
(4) To map land holdings with clarified holders (gender-disaggregated) over diverse agricultural landscape mosaics smallholders;  
(5) Analyze and document existing local, gender-relevant conventions governing NR management in mixed crop-livestock systems and identify interventions to strengthen

operator/Beneficiaries and their assets registered in the platform for 3 communes in a gender-sensitive manner/Online M&E interface operational to monitor platform operations;  
(5) PRA conducted at WBS Yagtuuri field site/Survey administered on 200 farms across the WBS transect/Progress report on local knowledge about tree integration at field, farm and landscape scales;  
(6) First yield results from dual-purpose crops trials in 2014 (report)/Set up of 2015 feeding trials (with stover harvested from farmers in 2014)/Demonstrations of fodder chopper at Yagtuuri site;  
(7) Report on analysis of existing local conventions governing natural resource management;  
(8) Report on activities undertaken at community level, including assessment of value chain and utilization training;  
(9) Technologies and practices promoted by DSCR are ranked by smallholder community representatives (men and women) involved in 2 district-level Transformative Scenario Planning (TSP) processes initiated at Lawra and Koutiala/Other preferred technologies and practices relevant to DSCR are identified by TSP stakeholders and shared with the DSCR WAS&DS team for WBS;  
(10) Updated WAS&DS report on analysis of HH survey highlighting the characteristics of the agricultural systems including Burkina Faso sites.

**Outputs in 12 months:**

(1) Community-level stock-taking activity on outputs from in-vivo and computerized simulation CRB experiments (including FOs, NGOs, local private sector)/Final crop model outputs highlighting performance of CRB (sole, bundled with other practice) across space, time and HH endowments/Final tradeoff analysis results showing socially differentiated opportunity costs for CRB (sole, bundled) adoption/CRB (sole, bundled) business model development workshop organized for NGOs, local private sector;  
(2) Compendium of locally recommended multi-purpose trees species for food, feed and medicine;  
(3) Yearly report providing all data related to soil physic-chemical properties, water dynamics, farmers compost quantities and quality and crop performance/Composting training videos customized to fit local preferences / conditions at two field sites;  
(4) One mAgri™ agent network is operational in the 3 target communes/One mLocGov™ agent network is operational in the 3 target communes/5,000 households are registered in the



	<p>them;</p> <p>(6) Jump-start orange-fleshed sweet potato in West Africa through diversified markets to improve nutritional status;</p> <p>(7) To assess ecological (soil/water conservation) and gender-relevant socio-economical (income and food security) tradeoffs and synergies driven by different technological options (among intensification and diversification options (CRB and other soil, crop, tree management practices), governance and market alternatives with respect to farm productivity, profitability, natural resources and social equity (including gender and youth aspects)</p> <p>(8) To promote the dissemination of least-regret local and exogenous land restoration (e.g. most suitable Farmer Managed Natural Restoration (FMNR) techniques and processes from hotspots of practice to new, degraded frontier areas) through</p>	<p>platforms;</p> <p>(5).Feed-back workshops in all sites where PRA was organized/A full report on factors influencing farmers' decisions to practice FMNRT/FMNRT introduced in 2 communities (Yagturi and Zinkaa) with PRA and community workshops on FMNRT and needs assessment/Learning visit organized for 20 community members to Kanpour in Lawra district, and 6 members to Talensi-Nabdam in UER on FMNRT by World Vision;</p> <p>(6) First results from the 2015 feeding trial (report)/2015 mother-baby trials on improved dual-purpose crops (peanut, sorghum, sweet potato) conducted by female and male farmers;</p> <p>(7) Draft manuscript on participation in decentralized management of natural resources;</p> <p>(8) Report of extension activities and materials produced (including video or other communication tool on utilization);</p> <p>(9) Preliminary results and learning's from the TSP process are published in a joint CCAFS-DS working paper to guide future WBS transect developments, scale up (tune down) of higher (lower) priority activities at the community level/At least one training event is organized for DSCR field site stakeholders by the district-level platform to learn about the content of one national agricultural policy instrument/Full analytical report completed and aggregated for the 5 WAS&amp;DS countries.</p> <p><b>Outcomes:</b></p> <p>(1) At least 36 farming households provide active guidance in the performance evaluation of CRB (sole or bundled) and for addressing bottlenecks towards CRB (sole or bundled) adoption and dissemination/Evidence from simulated and real-world CRB experiments is disseminated to national stakeholders by at least (2) District-level platforms and 1 parliamentary event/At least 1 private sector partner, NGO or CSO engages farmers to commit resources towards 2016 CRB setup;</p> <p>(3) Hundred households in project site maintain and use recommended multi-purpose trees to improve nutritional quality of food and feed;</p> <p>(4) At least 20 female and male farmers implementing the technology at each DSCR field site of WBS, with 20% yield increase/Communities are aware of benefits of composting and have provided guidance on how to deploy technology on a larger scale;</p> <p>(5) Local communities and individual female and male farmers work with local private sector to update land tenure information service;</p>	
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	<p>providing appropriate training on land restoration techniques and management involving both genders and youth; (9) To promote the current regional science-policy platforms to catalyze systems change towards sustainable intensification and reduced vulnerability;</p> <p><b>Methods:</b> (1) Participatory Appraisal Research (PAR) method: Participatory development of expected future-actions matrixes for different purposes (2) High-resolution remote sensing and GIS analysis for accurate land tenure mapping (3) Participatory Rural Appraisals (PRA) for domestication and commercialization analyses (4) Household-farm surveys (gender and age disaggregated) (5) Gender analysis of systems targeted by research in 2015 (focus on transaction analysis) (6) Empirical (ex-post) statistical</p>	<p>(6) Annual report, peer reviewed publications &amp; data collected archived &amp; publicly available; (7) Local communities and individual female and male farmers work with improved crop for dual purpose (peanut, sorghum, sweet potato) and intend to use the stover for their livestock; (8) Oral local conventions in one community formalized and validated in a gender-sensitive manner open to changes in the existing conventions; (9) Evaluation of community acceptance and assessment of perspective of OFSP within farming and livelihood systems; (10) District-level science-policy platforms initially focused on climate change adaptation now start influencing national policy design in the larger context of agricultural intensification and vulnerability reduction/DS field site stakeholders and WBS-scale actors collaborate to visualize coordinated pathways for agricultural intensification across the entire transect (e.g. new urban market opportunities, ...); (11) Benchmarks for potential (ex ante) and actual (ex post) impact of the different technologies tested at household level.</p> <p><b>CD Results:</b> (1) At least 36 farming households are directly involved in CRB-related experimentation and associated participatory action research/At least 5,000 female and male farmers are exposed to, and learn from the results of the simulated and real-world experiments through their respective FOs/At least 10 private sector actors, NGOs and CSOs develop skills related to CRB business models; (2) Technical advisory notes on better management practices of multipurpose trees are dissemination to extension workers and farmers; (3) Dissemination of technical sheet in best soil conservation technology at each site; Capacity development stakeholders (female and male ) involved in production of training videos have integrated learning and products in their video portfolio, for further dissemination; (4) One local mAgri™ agent network has been capacitated to assist female and male smallholders with agricultural information/One local mLocGov™ agent network has been capacitated to provide land tenure information services to farmers and local communities; (5) Popular gender-sensitive newspaper, policy briefs and video on FMNRT/At least 20% of the farmers at the action site are trained on FMNRT; (6) Trainings on crop-livestock integration and crop residues management;</p>	
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	<p>analysis, including social, cultural, economic factors (6) Whole farm bio-economic modeling and landscape-level multi-agent system modeling (TBD) (7) Participatory development of partnership models for technological transfers (8) Gendered baseline and impact studies</p> <p><b>Gender dimension:</b> Gender is mainstreamed in the above research ensuring the equitable participation of women, youth and disadvantaged groups additionally to men in research, technology and evaluation, and knowledge creation; aiming at economic empowerment.</p>	<p>(7) Training on conflict management over natural resource use; (8) DSCR field site stakeholders' understanding of national agricultural policy instruments (and their strengths and weaknesses) has improved/DSCR field site stakeholders (both genders) are engaging the district-level science-policy platforms to advocate for policy instruments that favor their priorities and interests; (9) At least 250 farmers and their households participate in the HH survey and inform on relevant constraints and opportunities on resource endowment, land productivity, HH income, vulnerability and coping strategies.</p> <p><b>Gender Results:</b> (1) 4 different farm types are explicitly involved in simulated and real-world experiments, based on HH typologies derived from earlier DS-CRP work/Peanut, as a women's crop, is involved in the set of 4 crops investigated for response to CRB and bundled practices; (2) Marginalized smallholder farmers have access to additional sources of nutritious food and feed for better livelihood; (3) 10-20% of youth and women are trained on soil restoration techniques/Women and young farmers are involved in composting activities and provide new insights on the production process, and use (particularly for high-value, garden cropping); (4) Socially differentiated customer categories are identified and members pay different fees to enroll in the land tenure information service/Land managed by women farmers (e.g. home gardens etc.) is explicitly registered in the service; (5) Capacity of male and female farmer, including poor rural communities organizations is strengthened through collective actions, practical farmer to farmer training and learning processes on FMNR; (6) Women's role in elaboration and implementation processes of local conventions documented; 8. Reports with gender- disaggregated results; (7) DS field sites women and youth groups are communicating their priorities to policy makers via their involvement with the district-level platforms; (8) Indicators for ex ante and ex post impact desegregated by gender and the contribution of the different technologies quantified by different household member categories.</p>	
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Level	level of Organization within the CRP	Description of planned key activities at each level of internal organization	Expected results of planned key activities	Planned Budget (\$ 000s)
2.1	Agro-pastoral system interventions	<p><b>Locations:</b> <a href="#">Béni Khedache-Sidi Bouzid (Tunisia)</a></p> <p><b>Objectives:</b></p> <p><b>Overall objective:</b> To improve agricultural livelihood assets and resilience in marginal drylands</p> <p><b>Specific objectives:</b></p> <p>(1) To raise the awareness of major program's stakeholders (including policy decision-makers and development organizations) on importance of conserving agro-biodiversity, gender and youth equities and chances of out-scaling innovations;</p> <p>(2) To identify potential options of technological (e.g. post-harvesting), economic (input/output markets' links)</p>	<p><b>Outputs in 6 months:</b></p> <p>(1) 3 CBOs, 4 NGOs, 4 administrations, 4 NARS (IRA, INRAT, INRGREF, OI), 1 CG Center (ICARDA), 5 actors from private sector enter public-private-civil society (R4D) partnerships to work together in order to promote multi-stakeholder processes that result in the achievement of tangible development outcomes/2 Innovation Platforms and 2 learning alliances established/2 media campaign organized/Olive oil label submitted to the labeling office for approval/50 farming households involved in the production and commercialization process identified/5 (GDA, SMSA) contracts signed/Technical package for supplemental irrigation developed in collaboration with Olive Institute;</p> <p>(2) Pilot versions of the Bio-economic and or multi-agent system models developed and discussed with female and male stakeholders;</p> <p>(3) Verified methodology to review and assess the impact of “PRODESUD 1” experience and national program on soil and water conservation produced and discussed with stakeholders (including IFAD, DG ACTA and Ministry of Agriculture);</p> <p>(4) One review of current common rangeland use practices and policies and discussion with policy makers initiated around the development of a pastoral code for communal rangelands in Tunisia;</p> <p>(5) 3 CBOs of women and youth and smallholder farmers established and legally formalized in Zoghmar and Beni Khédache/</p> <p>(6) Inventory/review of the already undertaken research works and studies related to impacts of soil and water conservation techniques finalized/6 female and male staff trained on the use of the questionnaire and 2 pilot watersheds selected for field monitoring of water balance parameters;</p> <p>(7) Verified methodology to assess the impact of “PRODESUD 1” project experience on communal</p>	2,697.718

and institutional (community-based organizations) interventions to enhance impact ;  
 (3) To assess possible effects climate change on household welfare and natural dryland resources (soil, water and biodiversity);  
 (4) To assess likely impacts of the policy, institutional and technological interventions on agricultural productivity, household welfare, gender and youth equity and livelihood system resilience in the face of unexpected climate and other global change  
 (5) To identify optimal, relevant policy interventions regarding improving marginal dryland's livelihood assets, impact and resilience.

**Methods:**

(1) Social-ecological context similarity analysis and mapping to guide data sampling/collection and scaling-out;  
 (2) Farm-household surveys for

and private rangeland management developed and validated by stakeholders  
 (8) Conservational cropping practiced on 60 ha of farm in Zoghmar/potentials of drought tolerant forage legume evaluated/3 forage legume germplasm multiplied and be available for on farm rehabilitation/nutritive value and biomass production of 3 barley varieties quantified/2 local plants collected and their Anthelmintic in vitro activity tested/nutrient deficiencies of used animal feed resources identified/small ruminant flock management practices fine-tuned and documented/on transect AnGR (animal genetic resources) under prevailing production systems characterized and mapped/breeding practices mapped and feeding systems using GIS technologies characterized/Improved rams in 30 farmers' small flock introduced and 750 offspring genetically managed.

**Outputs in 12 months:**

(1) Report on the process of innovation platform and its effectiveness drafted/Reports on 3 multi-stakeholders workshops and meeting produced/5 media activities (TV, Radio, Facebook) documented;  
 (2) Data on olive sector and sheep production collected posted and shared on the open database/2 scientific papers on sheep and olive value chains submitted for publication;  
 (3) One bio-economic and/or multi-agent model calibrated/scenarios simulated, identified and comparatively analyzed/One scientific paper submitted to relevant journal;  
 (4) Assessment report on soil and water conservation practices and natural resources management implemented by DG ACTA and PRODESUD 1 drafted and validated by stakeholders;  
 (5) Draft Pastoral code developed and discussed with stakeholders and decision makers;  
 (6) Gender-sensitive diagnostics of livelihood systems published/Gender-sensitive diagnostic analysis of cactus value chain completed;  
 (7) Report on "Integrated impacts of soil and water conservation techniques" produced;  
 (8) In partnership with OEP, 200 ha of private rangelands in Zoghmar improved by planting Opuntia ficus indica; In partnership with OEP, the management plan of 1000 ha of private rangeland in Beni Khédache achieved  
 (9) 2 factsheets on key rangeland species developed/1 Policy brief on communal rangeland management developed/1 vulnerability map of Stipa tenecissima ecosystem to climate change developed/Productivity of landscape depressions enhanced by 30% as compare to baseline



building integrated, spatially explicit database for system analysis and modeling  
(3) Multivariate statistics analysis for identifying typology of smallholder agricultural livelihood systems (incl. socio-cultural system elements)  
(4) Narrative-based human-environment system (HES) analysis of agricultural livelihood system dynamics (at two interlinked scales: farm and landscape) using both collected database and transaction analysis of female and male stakeholders'  
(5) Bio-economic modeling  
(6) Multi-agent system modeling  
(7) Complementary use of bio-economic and multi-agent system models to generate future scenarios of land uses, livelihood outcomes in response to different policy, institutional and technological options/interventions; Comparative analysis of these generated scenarios for assessment trade-offs,

data/Status and trends of agro-biodiversity and its threats assessed, monitored and reported/3 scientific papers published/Drought monitoring database as part of a global network initiated;  
(19) 60 ha under zero tillage system combined or not with alley cropping monitored and evaluated/Crop yield and WUE (water use efficiency) improved by 10%, soil fertility restoration increased by 0,2% yearly), fuel consumption decreased by 20%/Current feeding calendar and gaps for nutrient deficiency analyzed and major nutrient deficiencies identified/Small ruminant Water footprint assessed in Zoghmar/Animal genetic resources across the site mapped and a report published/Fattening practices monitored, evaluated and a report published/Ethno practices of the natural vegetation resources on health status assessed/In vitro anthelmintic potential of some herbal medicines studied, documented and promoted/Improved rams and Artificial Insemination (AI) for genetic improvement performed on 2000 sheep/Small ruminant flock management package fine-tuned and documented and published in a booklet/Livestock management guidelines under low input production systems developed.

**Outcomes:**

(1) Two innovation platforms established and operational and at least two communities' participatory development plans developed with all stakeholders which will enhance funding opportunities in the site;  
(2) Label of two products (olive oil variety Zarrazy and Barbabrine breed sheep) are proposed to the administration which will open favorable market and consequently increase farmers income;  
(3) Modeling work results used by decision makers to tackle the issue of trade-offs and to build appropriate strategies for sustainable development of dry areas and adaptation strategies to shocks (e.g. climate change, market fluctuation);  
(4) Using the outputs of the assessment studies of natural resources management, the National development agencies as DG ACTA and CRDAs adapt their strategies for an enhanced efficiency to control natural resources degradation/Methodology to review and assess the impact of PRODESUD 1 (Project de development agropastoral du sud est) experience and national program on soil and water adopted by stakeholders including IFAD, DG ACTA and MoA;  
(5) Rangeland degradation awareness increased thanks to the pastoral code for direct and indirect beneficiaries. Increased perception on the need to adhere to a general policy on the efficacy of community-based rangeland management;



synergies  
(8) Multi-stakeholder workshops for participatory appraisals of problems and risks, identification of scenarios and trade-offs, and options for coping with trade-offs.

**Gender dimension:**

- (1) To understand how vulnerabilities are different between men and women farmers (gender-explicit vulnerability)
- (2) To assist rural women and men in developing and acting on their own livelihood improvement options through collective action, based on improved understanding of roles of women and men in conserving agrobiodiversity.
- (3) To support the elaboration of policies to offer opportunities to women and youth to participate in a self-determined manner in sustainable agricultural production conserving agro-diversity and in the post-harvest value chain

(6) Women and youth empowered (also in non-traditional roles) and their access to resources improved, and consequently their dietary scores at field sites enhanced;  
(7) Water productivity improved up to 15 %, awareness on the risks of climate change raised, and land degradation and drought effects better mitigated; 8. Recommendations on sustainable rangeland resources with emphasis on lowlands endorsed by policy makers; Degradation of 1000 ha of private and community managed land, water, rangelands, and biodiversity decreased in the site; 9. Land degradation and energy saving decreased up to 10 % through the use of no-till practices and shrub/cactus planting/Feed and food availability in the site is sustainably increased up to 10 % by planting shrub/cactus.

**CD Results:**

- (1) 3 Multi-stakeholders and Policy maker workshops on IP implementation and policies held/1 MSc degree on Monitoring and evaluation of IP implementation approach and process initiated/1 training course on IP design and implementation for the benefit of 20 stakeholders held/Report on training sessions on different field activities depending on the season (soil preparation, harvesting, packaging etc.);
- (2) 3 Multi-stakeholders and policy makers workshops held/2 MSc degrees on policies of natural resources initiated;
- (3) One workshop held to sharing the results of the literature review report on soil and water conservation impact assessment with key persons in development agencies and other partners ( 3 from central directorates, 6 from regional services, 5 NGOs); 1 training course on SWC impact assessment for 20 participants from NARS and development agencies held/1 MSc thesis on SWC impact assessment completed/10 researchers trained on hydrological modeling and climate change assessment;
- (4) 2 MSc degrees on the management of agro-pastoral rangelands and biodiversity conservation initiated/10 participants trained on rangeland monitoring;
- (9) 3 PhD and 2 master students enrolled in livestock activities/2 field days organized for 50 farmers (50 % women)/1 farmer travelling workshop in connection with CANA-CLCA, held/20 farmers and extension agents attended one training course on CA.

**Gender Results:**

- (1) 100 Women and 100 youth fully involved in the IP implementation process and their



			<p>involvement reinforced through newly created Women NGOs;</p> <p>(2) 20 women farmers trained to participate in different agriculture related value chains to their benefit /1 Women NGOs involved in value chain building;</p> <p>(3) Bio economic/ multi-agent modeling involves all stakeholders including women and youth;</p> <p>(4) Role of women and youth in degradation and conservation of natural resources analyzed, reported and used in the planning process;</p> <p>(5) Report on understanding of how the use of common rangelands affects men and women differently; 6. Engendered curriculum for capacity building for legally establishing small holder associations promoted;</p> <p>(7) Relations between soil and water conservation (SWC) programs and impacts on gender related issues (% investments, working days, household income, etc.) highlighted and awareness risen among stakeholders;</p> <p>(8) Role of women and youth in rangeland management and biodiversity conservation assessed and awareness risen among concerned stakeholders;</p> <p>(9) The role of women and youth in livestock activities assessed and awareness rose on the need for better equity in sharing responsibilities and benefits.</p>	
2.2	Intensive rain-fed system interventions	<p><b>Locations:</b> <a href="#">Saiss (Morocco)</a> (Algeria), <a href="#">Nile Delta (Egypt)</a></p> <p><b>Objectives:</b></p> <p><b>General objective:</b> To improve the productivity, economic-ecological efficiency and stability of the intensive rain-fed farming systems in North Africa by intensification and diversification options</p> <p><b>Specific objectives:</b></p>	<p><b>Outputs in 6 months:</b></p> <p>(1) 3 on-farm demonstrations established on 6 ha/2 on-farm best-bet packages of crop management installed and managed/2 field visits held for 40-60 farming households /2 on-farm trials with the introduction of food legume crops and phosphorus fertilizer management plants installed and managed/2 field visits held for 30-40 farming households /3 Trials on IPM options established and data collected on disease, insects, weeds and effectiveness of the interventions;</p> <p>(2) 12 trials established and data collected on plant, soil, water and climate parameters;</p> <p>(3) 1 comprehensive analysis of production systems, livelihood opportunities and constraints conducted, choices of different actors of farm households, and elements of socio-cultural system influencing choices identified; Participatory facilitation training provided to all national focal points within the site/One innovation platform established/Specific needs for technology, best practice, social or institutional intervention clearly identified by members of the innovation system, within the agricultural innovation platform;</p> <p>(4) One report prepared on the differentiated impacts of labor opportunities on gender in the</p>	701.767



	<p>(1) To assess the effects of different conservation agricultural technologies (ranging from zero/minimal tillage, soil/fertilizer nutrient management, water management to improved seeds and IPM) on crop productivity and resource use efficiency;</p> <p>(2) To establish baseline settings of the socio-economic and biophysical performance indicators for further integrated impact assessments of interventions inclusive of all stakeholders</p> <p>(3) To evaluate the effectiveness of social group-specific knowledge on the improvement of collective management of tree (olive) resources for enhance farm system's stability and viability in the face of water scarcity;</p> <p>(4) To determine the causes of system vulnerability and local coping mechanisms, and evaluate the feasibility of technologies, and monitor their adoption/Continue to monitor the development of the learning</p>	<p>action site;</p> <p>(6) 2 Trials on conventional and NT systems under cereals/food legumes rotation conducted. Soil and water properties and plant parameters monitored and reported;</p> <p>(7) 20 Observation nurseries and 20 yield trials of durum wheat and bread wheat planted and evaluated in three stations.</p> <p><b>Outputs in 12 months:</b></p> <p>(1) 3 on farm demonstrations established/Data on biomass, soil characteristics collected/60 farmers identified for out-scaling of CA practices under FAO-ICARDA collaboration project/1 Best bet package demonstrated to farmers and stakeholders/Knowledge and awareness of 40-50 concerned members of farming households, extension and stakeholders enhanced on the need to apply the package to bridge the yield and contribute to food security/1 best bet package of phosphorus management and improved varieties demonstrated to 30-40 farming households and technicians/5-6 promising lines with improved tolerance to dry conditions identified/At least 2 IPM options for wheat and faba bean be developed/About 20-30% yield increase due to applications of IPM options;</p> <p>2. 8 to 10 on-farm trials (1 ha each) implemented on the response of wheat to supplemental irrigation package (Meknes &amp; Tadla)/1 experiment on the combined effect of planting date, supplemental irrigation and on different varieties/lines of wheat in Tadla/3 trials implemented on Deficit SI of olive trees (1), potatoes (1) and onion (1) (0.25 ha each)/2 field days fort each site (50 female and male farmers)/The role of local knowledge on the management of trees evaluated and reported;</p> <p>3. Scoping study report prepared/At least 5 Partners identified to deliver the technology and resources committed/</p> <p>(2) Clear research plan documented by the interdisciplinary team of scientists from ICARDA, INRA and other national and international partners/Literature review completed and characterization report produced/Data and information gaps identified and primary and secondary data collected/Simulation models to fill the gap generated</p> <p>(3) Conceptual model built and shared with all stakeholders for comments/The awareness of 100 farming households will be enhanced on the importance of the use the improved packages of food legumes rehabilitation in the wheat based system through the India-Morocco Initiative;</p> <p>(4) One workshop held with the relevant development organizations and NGOs to relay findings</p>
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	<p>alliances initiated in all of the sites in 2013/14, which legitimated and defined the contextual entry point for an innovation platform to be initiated within each site.</p> <p>(5) To identify the most optimal technology options (of intensification and/or diversification strategy) by means of bio-economic modeling, and socially, economically feasible pathways of out- and up-scaling of the defined options;</p> <p>(6) To identify relevant human actors from the learning alliance for creating more gender-balanced working committees for facilitating the delivery of technological and institutional innovation</p> <p>(7) Establishment of working innovation platforms at sub-national level in five sites across the considered countries</p> <p><b>Methods:</b></p> <p>(1) Participatory process of development of innovation</p>	<p>and co-identify means to address gender wage gap in agriculture/One workshop held to disseminate findings to the policy makers;</p> <p>(5) 2 small scale seed enterprises engaged in production and marketing of 100 MT of quality seed each; 6. Best bet package of crop management under CA evaluated/Database on soil, crops under CA collected to develop suitability map for zero tillage;</p> <p>(7) 100 promising lines of bread wheat and durum wheat provided to NARS/Six advanced and four released varieties of durum wheat evaluated for water use efficiency.</p> <p><b>Outcomes:</b></p> <p>(1) A total of 60 farmers increase their awareness on diversification, crop rotation and conservation agriculture/More than 50 farmers apply IPM technology in the action site;</p> <p>(2) At least 80 farmers apply supplemental irrigation packages developed by the program;</p> <p>(3) National partners use the results of livelihood and production systems analysis in their formulation of options for addressing constraints/Stakeholders involved with the innovation platform have bought ownership into the process of joint learning, discovery and contextually relevant and effective contemporary avenues for dissemination, adaptation and broad uptake of best production practices and packages/At least 75% of the members of the innovation platform (farmers, government, industry representatives, market agents, civil society and relevant non-agricultural sectors) regularly attend scheduled meetings/Resources pledged by institutions, private companies, governments and individuals at the initiation of the innovation platform begin to flow at a rate that sustains the initial process of testing proof of concept in the effectiveness of multi-input packages (technical, social, economic, institutional policy) through dissemination for adoption, and where necessary, controlled trials/Improved or newly conceptualized models and approaches for social and economic organization are adopted by farming communities and facilitated by governmental agencies with a mandate for fostering the creation of agricultural cooperatives under the aegis of the Morocco Green Plan/Resources to implement the interventions identified by the innovation system committed and delivered by public, private and international organizations/Government pledges resources to support the innovation platform/Farmers trained (directly or through farmer-farmer) perceive benefits from the training in different (economic and non-economic) areas;</p> <p>(4) Awareness of relevant development agencies, NGOs and policy makers rose;</p>	
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	<p>platforms for promoting sustainable intensification and/or diversification</p> <p>(2) Landscape-level narrative-based system analysis of favorable farming systems</p> <p>(3) Social-economic, agronomic data collection</p> <p>(4) Multivariate statistical analysis for defining farm-household typology (incl. socio-cultural system elements/institutions)</p> <p>(5) Crop simulation modeling (select one among available model and calibrate it)</p> <p>(6) Bio-economic modeling that uses (4) and (5).</p> <p>(6) Model-based ex-ante assessments of intensification options (technical, policy and institutional aspects).</p> <p>(7) Multi-stakeholder participatory workshops</p> <p><b>Gender dimension:</b></p> <p>(1) To measure and understand underlying reasons regarding gender wage gaps in agricultural labor</p> <p>(2) To train women and men</p>	<p>(5) 10% average yield increase for 200 ha of farmers' fields covered with quality seed of preferred varieties.</p> <p><b>CD Results:</b></p> <p>(1) One week theoretical and practical course on conservation agriculture, no till machinery, cereal-legume rotations and implications of social roles offered to 8-12 extension workers and technicians/2 farmer field schools days organized/40-60 farmers trained on improved package through demonstration trials and field visits/At least 20-30 farmers trained on IPM through farmer field schools;</p> <p>(2) 80 female and male farmers and technicians trained on supplemental irrigation and crop management through farmer field schools/2 MSc students supervised on water management/25 extension staff, NARS technicians, NGOs, private trained by INDIA-Morocco on the developed packages and tools/200 farmers attended on-the job training with at least 25% of women/5 scientists and 5 students (MS, PhD) from INRA, IAV and ENA trained on system approach, modeling and management of Production systems through India-Morocco initiative;</p> <p>(3) 10 national focal points trained on facilitation for 'innovation platforms'/As part of the innovation platform initiative, 3 new forms of social and economic organization tested, in line with the Plan Maroc Vert, and aimed at engagement in the areas of (i) effective access to technical information and improved primary inputs, (ii) cooperative options for more profitable marketing, reduction in post-harvest loss and sustainable natural resource management;</p> <p>(4) Gender wage gap in agricultural labor analysed/ 3-5 development agencies and/or NGOs and 5 policy-makers sensitized on addressing the gender wage gap in agricultural labor of Morocco;</p> <p>(5) 20 (16 male and 4 female) technicians from NARS trained on quality seed production and seed business management;</p> <p>(6) 30-40 female and male farmers and technicians trained through 2 field days/1 PhD and 1 MSc students supervised;</p> <p>(7) 16 research assistants trained in use of Breeding Management Systems/ 40-50 female and male members of farms attended field days/4 PhD supervised.</p> <p><b>Gender Results:</b></p> <p>(1) Awareness among national development partners about the role of gender in conservation</p>	
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		farmers for (i) improving their understanding of wheat production issues outside of their direct contribution to the wheat production chain, (ii) allowing them to pass on the knowledge to other women such female farm workers, and (iii) fulfilling non-traditional roles in wheat production with improved techniques	<p>agriculture increased;</p> <p>(2) 2 national development partners initiated actions to address gender gaps in CA/Gender gaps in access to knowledge/information on best bet practices under CA analyzed;</p> <p>(3) Documentation of gender differentials in production systems, of trade-offs (economic, nutritional, household labor, tastes) in the choice of varieties of the two genders, of needs and demands of women and youth, of empowerment opportunities and constraints (e.g. empowerment trade-offs between household members) ; on the basis of this, facilitation of access to technologies and seeds by women and youth; empowerment of women through equal participation in innovation platform and household empowerment aiming at equality (equal rights) and equity of all household members; (5) Modernized seed production and post-harvest technologies release youth and female farmers from manual threshing, winnowing and store pest control providing more time for activities of their choice (modern income generation, education).</p>	
2.3	Irrigated-crop system interventions	<p><b>Location:</b> <a href="#">Nile Delta (Egypt)</a>, <a href="#">Saiss (Morocco)</a></p> <p><b>Objectives:</b></p> <p><b>Overall objective:</b> To improve household welfare, its stability and equity, and to protect soil-water resources from degradation in irrigated farming systems in North Africa dryland, and to provide science-based support to policy decision-making towards achieving this development goal.</p>	<p><b>Outputs in 6 months:</b></p> <p>(1) Monitoring process put in place/One survey on production systems developed with collection of 100 samples;</p> <p>(2) 4 raised-bed machines purchased and delivered/Implementation of 100 demonstration fields targeting a minimum of 300 farming households /Faba bean varieties with high yield and pest resistance identified (2-3 elite lines each of characteristics)/1 or 2 new pesticides for 1 or 2 IPM options and 2 or 3 elite lines each of wheat with high yield and pest resistance identified;</p> <p>(3) GIS analysis of well density in the project area (Preliminary report on the use of shallow ground water in the Nile Delta);</p> <p>4. One interim report produced on salt dynamics under contrasting irrigation and cultivation practices/One package of sustainable interventions to control soil degradation identified and field tested/One Workshop to present the first 6 months findings to the main stakeholders;</p> <p>5. One Innovation platform established with documentation of mutually agreed upon objectives by female and male stakeholders comprising the innovation system within the platform, an agreed upon research agenda, and pledges of (financial, human or in-kind) resources to sustain the platform;</p> <p>6. Comprehensive analysis of production systems, livelihood opportunities and constraints</p>	2,429.875

	<p><b>Specific objectives:</b></p> <p>(1) To assess livestock (esp. buffalos) production gaps (current productivity compared to potential) and opportunity for reducing the gaps;</p> <p>(2) To assess economic-ecological efficiency and productivity induced by different technological options (e.g. water-saving irrigation, groundwater water uses, new planting options, mechanized raised-bed planting, soil amendments for minimizing salinity);</p> <p>(3) To evaluate farms' adoption of these technological options and key social, cultural, human capacity, economic and policy/institutional drivers of adoption;</p> <p>(4) To establish baseline data on the socio-economic and biophysical indicators for further integrated impact assessments of policy-technological interventions as well as of climate change</p> <p>(5) To develop capacity of</p>	<p>produced/Relevant data collected;</p> <p>7. One workshop with policymakers and biophysical scientists on gender implications of water innovations (biophysical and social); One report and policy brief produced;</p> <p><b>Outputs in 12 months:</b></p> <p>(1) Data collected and 400 samples on production systems analyzed/The role of livestock in Nile delta farming systems identified;</p> <p>(2) One report on adoption of mechanized raised-bed technology includes yield and water consumption comparing to the traditional farmer practices drafted/2 brochures on mechanized raised-bed implementation in Nile Delta developed and distributed;</p> <p>(3) Final report on the use of shallow ground water in the Nile Delta (GIS analysis of well density in the project area);</p> <p>(4) One workshop held on salinity and water management for farmers and stakeholders/One workshop to present findings to national policy makers/One research report on salt dynamics will be produced;</p> <p>(5) Partners have been identified and roles defined in the implementation of activities to be jointly undertaken under the aegis of the innovation platform established, and resources are provided as pledged in order to undertake the actions (documentation);</p> <p>(6) The baseline survey report is prepared/One report on climate change historical impact on agriculture in the Nile delta produced/One report on climate change future impact on agriculture in the Nile delta produced/One workshop on perceptions and strategies to cope with climate change held with farmers and stakeholders/One workshop to present findings to the national policy makers;</p> <p>(7) 1 follow up seminars and 1 follow up workshop on gender empowerment through innovations in irrigated agriculture held with policy makers, NGOs, and development agencies along with media presence.</p> <p><b>Outcomes:</b></p> <p>(1) 50 Farming households involved in the project activities are aware of the production systems and related feeding gaps/25 farming households involved in the project adopt the recommendation on livestock role in the farming system and increase their profit up to 15% as</p>	
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	<p>farmers and extension services in efficient, flexible uses of improved technologies in adapting to climate change; (6) To establishment of innovation platforms at sub-national level for promoting the out-and up-scaling of innovations</p> <p><b>Methods:</b> (1) Participatory (multi-stakeholders) process of development of innovation platforms for promoting sustainable intensification (2) Landscape-level narrative-based system analysis of agricultural system analysis (incl. socio-cultural system elements) (3) Social-economic, agronomic data collection (4) GIS analysis of well density (5) Field-based soil degradation assessment (6) Hydrological analysis of shallow water dynamics. (7) Multi-stakeholder participatory workshops</p>	<p>compared to baseline data; (2) At least 1000 members of farming households in the Nile Delta have adopted the raised-bed technology/Crop yields of the farmers involved in the project are increased by 20% as compared to baseline data/Faba bean crop yields of the farms involved in the project are increased by 30% as compared to baseline data/Adoption of IPM in the same farms reduces pesticides costs up to 25%/Adoption of proposed technologies reduces the wheat yield gaps by 20%/Irrigation water saved by 20%; (3) National policy makers' workshop includes the ground water use in the policy brief and discussions; (4) Outputs and information generated on salt dynamics on maintaining the optimum depths of drains will be adopted by decision makers/50 farming households involved in field demonstration days, farmer-to-farmer visits and targeted trainings acquired knowledge on the new proposed technologies; (5) Stakeholders involved with the innovation platform have bought ownership into the process of joint learning, discovery and contextually relevant and effective contemporary avenues for dissemination, adaptation and broad uptake of best production practices and packages/At least 75% of the female and male members of the innovation platform (farmers, government, industry representatives, market agents, civil society and relevant non-agricultural sectors) regularly attend scheduled meetings/Resources pledged by institutions, private companies, governments and individuals at the initiation of the innovation platform begin to flow at a rate that sustains the initial process of testing proof of concept in the effectiveness of multi-input packages (technical, social, economic, institutional policy) through dissemination for adoption, and where necessary, controlled trials/The estimated 30% rate of post-harvest loss for tomatoes (entry point for the initial platform) is reduced by at least 50% for adopting farmers (in terms of marketable surplus volume) with higher farm gate revenues commensurate with the nature of volatility in prices received/Refined metrics are developed, tested and shared with research partners nationally and internationally, and related to the tracking of improvements in nutritional quality content (Vitamins A, D, micronutrients) resulting from the adoption of new production, harvesting and storage packages developed by the innovation platform (research output and outcome); and shared with national development partners who are engaged with value chain enhancement projects, for consideration of broad uptake, and towards fostering</p>	
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**Gender dimension:** (7) To understand the role of gender differences in benefitting from agricultural innovation (technological, social, and institutional) in irrigated areas, and how socio-economic, political-legal and cultural systems determine them To improve policies, development interventions and agricultural extension services on the basis of this understanding;

improvements in nutritional quality as a public good (development outcome)/Resources to implement the interventions identified by the innovation platform are committed and delivered by public, private and international organizations/Government pledges resources (financial or in-kind) to support the innovation platform/25 farming households trained (directly or through farmer-farmer) perceive benefits for the higher productivity as well as declined risks by adopting IPM technology;

(6) National partners use the results of livelihood and production systems analysis in their formulation of options to address constraints; Coping mechanisms for system vulnerability are adopted by decision makers;

(7) 3-5 decision-makers and 3-5 NGOs sensitized and engaged in dialogue on gender empowerment approaches in irrigated agriculture; 1-3 NGOs or development agencies adopt identified gender empowerment approaches.

**CD Results:**

(1) 25 female and male members of farming households trained on integrated crops livestock system approach;

(2) 100 farmers and 10 extensionists trained on raisedbed planting/30 farmers trained in fababean cultivation under raisedbed and IPM technologies/30 farmers Trained in wheat cultivation under raisedbed and IPM technology;

(3) At least 2 master students trained on the field surveys;

(4) 50 female and male members of farming households trained on the new proposed technologies;

(5) Training on participatory facilitation provided to all national focal points/10 national focal points trained on facilitation for 'innovation platforms/200 female and male members of farming households trained on best practices in tomato production, harvesting, and effective post-harvest techniques/2 national Innovation Platform facilitators are initially trained, together with facilitators for other sites identified within the WANA region, and over time trained as trainers, in order build up a national female and male cadre of innovation platform facilitators;

(6) 25 stakeholders trained on the developed climate change adaptation strategies for Nile Delta;

(7) 4 masters students trained on qualitative research in examining gender issues in irrigated agriculture/One gender PDF trained and mentored (WLE DS collaboration) on researching professional masculinities in irrigated agriculture.



**Gender Outcomes and Outputs:**

- (1) The role of women in terms of time and local knowledge in milk processing in Nile delta identified and reported;
- (2) Report on the role of women in scaling out and adopting of new farming systems produced;
- (3) Gender dimensions for future follow up will be identified through field work
- (4) 50% Biophysical scientists involved in the project include gender-differentiated impact analysis in their technology development;
- (5) Inclusivity of women's voice within the innovation platform (beyond participation at meetings) in terms of needs and aspirations, has led to a better understanding of trade-offs (economic, nutritional, household labour, tastes) in the choice of varieties planted,)/100 Women and youth access technical support to their identified needs; Choice of the varieties planted is taken in a participatory manner considering HH and nutritional aspects;
- (6) Gender disaggregated data collected/Biophysical scientists involved in the project include gender-differentiated impact analysis in their technology development;
- (7) Increased awareness of 4-7 biophysical scientists, 3-5 policy-makers, 3-5 NGOs and development agencies on role that gender has in innovation adaption and adoption in irrigated agriculture.



Level	level of Organization within the CRP	Description of planned key activities at each level of internal organization	Expected results of planned key activities	Planned Budget (\$ 000s)
3.1	Intensive Rainfed Systems interventions	<p><b>Location:</b> <a href="#">Chinyanja Triangle (Changara-Ntcheu/Dedza) Transect</a></p> <p><b>Overall Objective:</b> To improve profitability, resource use efficiency and benefit sharing equity (including of gender and the young) of intensive rainfed landscape through innovative, context-relevant sustainable land management (SLM) options (including integrated soil fertilizer management - ISFM) and stakeholders' capacity for managing systems transition into sustainable intensification</p> <p><b>Specific Objectives:</b>            (1) To create databases of (i) all the collected data (ii) current SLM (including ISFM) practices, (iii) integrated interventions to be tested by consulting multiple</p>	<p><b>Outputs in 6 months:</b>            (1) ISFM options tested on over 50 farmers, &gt;50% of them women;            (2) Data collected and ready for analysis;            (3) Key soil erosion variables identified and data collected;            (4) Database created;            (5) Water management options identified for testing;            (6) Protocol for setting up, facilitating and documenting IPs (see IRT Addis meeting); Contribution to DS systems thinking (see IRT Addis meeting); Stakeholder, institutions and network analysis (report); technical workshop convened to set up the IPs, incl. gender sensitive development pathways, identification and monitoring challenges and solutions, mode of IP operation and communications, flexible organizational structure(report);            (7) On-farm trials for 6 food feed crop technologies with 30 farmers 2014/2015 evaluated in a gender-disaggregated manner through PM&amp;E; review and gendered stakeholder feedback to inform 2015/16 crops and trial design; scaling out;            (8) 1 tool on assessing resilience evaluated; farm types and development pathways evaluated;            (9) 1 report on entry points for crop x livestock integration;            (10) Protocol for setting up, facilitating and documenting IPs (see IRT Addis meeting); Contribution to DS systems thinking incl. gender (see IRT Addis meeting); Gendered stakeholder, institutions and network analysis (report); technical workshop convened to set up the IPs, incl. gender sensitive development pathways, identification and monitoring challenges and solutions, mode of IP operation and communications, flexible organizational structure(report);            (11) One training;            (12) Sites for piloting interventions assessed.</p> <p><b>Outputs in 12 months:</b>            (1) Guidance and report on ISFM technology implementation;</p>	563,232



	<p>female and male stakeholders (farmers, NARS, NGOs, etc.);</p> <p>(2) To identify and characterize typical smallholder farm types regarding resource endowments and socio-economic and cultural ( gender) context;</p> <p>(3) To identify SLM (incl. ISFM) options being best fit to, or highly adopted by, smallholder groups (including gender differentiation)</p> <p>(4) To identify social, cultural, economic and ecological determinants of SLM/ISFM adoptions, including the gaining of clarity on why female and male farmers feel reluctant to adopt some technologies; thereby to develop gendered, group-specific strategies for facilitating SLM/ISFM transfers and packaging up- and out-scaling model;</p> <p>(5) To identify critical areas of soil loss that require prior management intervention by model the spatial distribution of spatially-explicit soil erosion modeling;</p>	<p>(2) Report on determinants of technology adoption;</p> <p>(3) Hotspot areas of erosion mapped;</p> <p>(4) Data made public and shared;</p> <p>(5) Documentation of female and male farmer responses to water management options;</p> <p>(6) Female and male stakeholders engaged in reconnaissance survey to explore market opportunities, resource bottlenecks, capacity development needs and options to address these/Quick wins that respond to stakeholder priorities identified and used to inform technology options and structures for knowledge sharing/ participatory gendered M&amp;E framework for assessing systems change;</p> <p>(7) Review of priorities for food feed crop trials (varieties, agronomy, seed production); design defined, tailored to farm types; food feed crops scaled out to 180 female and male farmers of different types, incl. resource poor female headed households;</p> <p>(8) Ex-ante impact assessment of technology packages, with regards to food security and livelihoods;</p> <p>(9) Female and male stakeholders engaged in reconnaissance survey to explore market opportunities, resource bottlenecks, capacity development needs and options to address these quick wins that respond to stakeholder priorities identified and used to inform technology options and structures for knowledge sharing Participatory M&amp;E framework for assessing systems change;</p> <p>(10) Two trainings;</p> <p>(11) Report on piloted interventions.</p> <p><b>Outcomes:</b></p> <p>(1) Local female and male farmers become aware of benefits and ISFM options and understood relevant agronomic practices;</p> <p>(2) Female and male stakeholders and partners devise improved adoption and dissemination approaches/female and male stakeholders and planners at various levels use erosion hotspot maps that can help them identify where priority interventions should be placed;</p> <p>(3) Extension workers and development agents use report to target their services, also in a gender-responsive manner;</p> <p>(4) Improved understanding on female and male stakeholders and networks, leverage points in the system, market opportunities and value chains, associated gaps in service delivery;</p>	
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	<p>(6) To identify entry points for introducing agricultural water management options, including potential for scaling out based on the gender-disaggregated baselines that were conducted in 2014;</p> <p>(7) To identify institutional set up of the IP functioning as mechanisms for facilitating transitions in farming systems and enhance capacities of gender-responsive farmer-extension-NARs in the process</p> <p>(8) To identify/revise development pathways and associated high-potential value chains, barriers to and solutions for systems improvement in a participatory manner with female and male stakeholders.</p> <p>(9) To develop and use tools for improving self-organization and multi-level learning in and across IPs;</p> <p>(10) Generate gendered lessons and data with farmers and extension services through trials that demonstrate yields of different food and fodder crops and forage legumes, and</p>	<p>(5) Priorities for food feed crops and forage development understood heterogeneity among farm types and need for tailoring technology packages understood in a gender-differentiated manner;</p> <p>(6) Better understanding of resilience level and farm typologies (gender-differentiated) informs the design of technology packages and interventions;</p> <p>(7) Crop x livestock potential evaluated;</p> <p>(8) Improved understanding on female and male stakeholders and networks, leverage points in the system, market opportunities and value chains, associated gaps in service delivery;</p> <p>(9) Partner capacity enhanced, also regarding gender mainstreaming of their organization, work and services;</p> <p>(10) Successful feed interventions evaluated in a gender-disaggregated manner.</p> <p><b>CD Results:</b></p> <p>(1) Training on integrated soil fertility management giving to over 100 households about 50% of them women-led;</p> <p>(2) Female and male extension agents, development workers and stakeholders trained on processes of better targeting households for improved technology adoption;</p> <p>(3) Female and male extension workers, development agents and local stakeholders trained on both participatory- and model-based identification of critical areas of degradation;</p> <p>(4) Decision makers have better information and understanding about the implications of socio-economic drivers on yield gap between households;</p> <p>5. NARS trained in water management options;</p> <p>(5) 2 IPs functional, with buy-in from female and male stakeholders at local, district and provincial levels; 2 journal papers; 1 book chapter;</p> <p>(6) Priority list of biomass-enhancing gender-responsive technology packages, by farm types, incl. food, feed, cash, fuel purposes and suitability to climate change adaptation;</p> <p>(7) ICRISAT discussion paper and data set/1 MPhil thesis/1 journal paper;</p> <p>(8) 2 IPs functional, with buy-in from stakeholders at local, district and provincial levels/2 journal papers/1 book chapter.</p> <p>(9) Gender-disaggregated number of partner staff trained.</p> <p>(10) Number of gender-responsive options piloted.</p> <p><b>Gender Results:</b></p> <p>(1) Women gained capacity in ISFM use and agronomic practices that can increase yield;</p>
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	<p>feeding experiments to women and men;          (12) Enhance partner capacity on gender-responsive crop x livestock integration.          (13) Pilot key interventions (gender-responsive) with partners (dry season feeding, improve quality of crop residues, formulate better rations).</p> <p><b>Methods:</b>          (1) Landscape-level narrative-based analysis (including context-option matrix characterization)          (2) Gendered household/farm typology analysis          (3) Adoption analysis methods (multivariate statistics, participatory appraisals, gender-differentiated)          (4) Landscape-level soil erosion modeling          (5) Gendered stakeholder network analysis          (6) Gender-mainstreamed integrated system modeling (e.g. multi-agent system and bio-economic models TBD)</p>	<p>(2) Gender differences in adoption and intervention preferences tested;          (3) Women engaged at IP forums, challenges and opportunities for women and men farmers to engage in IPs and associated value chains identified, capacity development designed for women and men farmers;          (4) Women priorities and constraints in food feed crop and forage development understood;          (5) Gender as component of the farm type analysis;          (6) Gender issues for adoption of crop x livestock assessed;          (7) Women engaged at IP forums, challenges and opportunities for women and men farmers to engage in IPs and associated value chains identified, capacity development designed for women and men farmers.          (8) Workshops organised for extension staff (state, NGO and private sector) to share the research findings, jointly develop ideas for gender-responsive extension services' implementation</p>	
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		<p>(7) Gender-mainstreamed value chain analysis (8) On-farm trials/experiments</p> <p><b>Gender dimension:</b> (1) To identify the differential challenges faced by female, male farmers and youths in accessing agricultural extension (2) To identify entry points for gendered agricultural extension approaches which address the specific requirements of female and male farmers as well as youths.</p>	
3.2	Pastoral Systems interventions	<p><b>Location:</b> <a href="#">Marsabit-Yabello-East Shewa Transect</a></p> <p><b>Overall objective:</b> To improve productivity, profitability and resource use efficiency of pastoral communities dominating landscape and the capacity of female and male farmers and other stakeholders (e.g. policy decision-makers) to cope with risks driven by unexpected climate change and/or uncertain contextual changes</p> <p><b>Objectives:</b></p>	<p><b>Outputs in 6 months:</b> (1) KNOWLEDGE, TOOLS, DATA - Causal model of system developed with stakeholders; (2) KNOWLEDGE, TOOLS, DATA - Map of land use and land cover changes in relation to key resource areas; (3) Establishment in a gender-sensitive manner of innovation platform/At least 1-2/crop farmer preferred cultivars identified/1-2 improved agronomic practices identified/1 community seed producing group established; Annual report prepared; (4) At least 2-3 genotypes/crop identified for further multiplication trials/At least one variety/crop selected by female and male farmers/Annual report prepared/One field day organized for variety selections with female and male stakeholders; (5) At least 2 technologies on feeding and goat selection validated/Best bet technologies on goat management and goat fattening demonstrated to female and male goat producers/Female and male goat producers linked to at least one abattoir or other buyer/Gender-differentiating annual report prepared; (6) Published gender-disaggregated report describing the beneficiaries and benefits of tree species on a range of ecosystem services and a description of the use and management of these tree species and the effect of this on the above benefits and beneficiaries;</p>

	<p>(1) To assist stakeholders identifying promising interventions around land and resource management by using participatory inclusive causal system modeling;</p> <p>(2) To assess heterogeneity in distribution of biophysical systems, productivity and ecosystem services and health, and changes in these, in rangelands at the Action Site;</p> <p>(3) To analyze the institutional, political and management challenges and dynamics of NRM in developing country rangeland settings in a gender-differentiated manner, and to identify gender-responsive concepts and principles for the development of appropriate NRM, land tenure and land use planning policies and frameworks;</p> <p>(4) To introduce high yielding and drought tolerant barley and food legumes with associated crop management practices in the lowlands of East Shoa involving female and male stakeholders;</p>	<p>(7) One gender-sensitive multi-stakeholder platform established as measured by a detailed report with stakeholder profiles and potential contributions; (8) Database of climate, crop soil and management as required to calibrate and validate the models;</p> <p>(9) Field testing of intensification options initiated;</p> <p>(10) Training modules developed.</p> <p><b>Outputs in 12 months:</b></p> <p>(1) KNOWLEDGE, TOOLS, DATA #4 - Report analyzing utility of systems analysis tools for engagement of female and male stakeholders;</p> <p>(2) KNOWLEDGE, TOOLS, DATA #4 - Validated methodology for rangeland condition assessment. Indicator: 1 manual /TECHNOLOGIES/PRACTICES IN VARIOUS STAGES OF DEVELOPMENT #18 - management methodologies assessed in a gender-differentiated manner. Indicator:2 case study reports;</p> <p>(3) POLICIES IN VARIOUS STAGES OF DEVELOPMENT #28 - Policy/land use framework assessed; indicator: 1 field report;</p> <p>(4) 30-50 female and male farmers will use the newly identified crops and associated crop production technologies;</p> <p>(5) At least 1 variety/crop selected for seed multiplications;</p> <p>(6) NARES and female and male farmers work together and adapt diagnostic and systematic research approaches to promote improved goat production, fattening and marketing;</p> <p>(7) Report on research led by female and male farmers on optimization of the use and management of trees/Research paper describing the research;</p> <p>(8) One active IP involving a minimum of 10 organizations and with well-defined work plans and responsibilities as evidenced by a report/At least three planned interventions field tested as evidence by a report with findings;</p> <p>(9) A report on ex-ante assessment of potential options for productivity, profitability and sustainability (gender-differentiated);</p> <p>(10) First year report on tested options;</p> <p>(11) At least 20 female and male agricultural extension officers and 50 female and male farmers trained on better farm management.</p> <p><b>Outcomes:</b></p> <p>(1) 15% of seed producers will be female farmers;</p>	
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	<p>(5) To develop extra early genotypes with associated agronomic practices for diversification and intensification;          (6) To integrate small ruminant and crops production to improve productivity and income of female and male farmers on sustainable basis;          (7) To understand determinants of tree distribution across landscape, roles of tree on farms, on farm performance and household welfare (including gender equity) and alternatives;          (8) To form multi-stakeholder platform that brings together researchers, government and non-governmental development agents and private sector and serves as broad coalition with a common goal of achieving sustainable intensification by pooling their knowledge, resources and expertise, also regarding gender-responsiveness;          (9) To build on the baseline information collected last year</p>	<p>(2) At least one variety the fits the needs of female farmers identified; 6. 30% of the direct beneficiaries would be women;          (3) Female and male farmer’s attained increased awareness that optimal benefits in tree based landscapes requires careful planning and negotiation of tree management;          (4) Female and male smallholder farmers benefitted by improved access to improved technologies as measured by the number of farmers testing new technologies;          (5) All project partners accessing and using the database;          (6) 50 female and male farmers benefitted by testing the options;          (7) Female and male extension officers and progressive farmers are promoting and managing farms better.  <b>CD Results:</b>          (1) Trained local partners (2) in gendered systems analysis;          (2) Capacity enhanced among female and male farmers to review the benefits of trees and develop a vision and action to modify their management such as to optimize benefits from ecosystem services;          (3) One fully operational innovation platform with at least 10 different stakeholder groups involving women and men;          (4) One journal Article;          (5) One ICRISAT technical paper;          (6) Training modules and report.  <b>Gender Results:</b>          (1) KNOWLEDGE, TOOLS, DATA - Causal model of system (1) includes gendered analysis;          (2) POLICIES IN VARIOUS STAGES OF DEVELOPMENT #28 - Policy/land use framework assessed (1) includes gender analysis Indicator: field report;          (3) 50 farmers (20 female farmers) trained in crop production/ 20 extension staff, 10 young researchers and research technicians trained/10-15 female and male farmers trained in quality seed production; (4) 30 farmers; 20 extension staff, 10 young researchers and research technicians trained (all involving men and women);          (5) 40 farmers trained on improved goat production (feeding, health care and selection)/5 Farmers trained on fattening technology/6 NARS staff trained on smart marketing, breeding and marketing(all involving men and women);</p>	
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for further systems model-based ex-ante assessment of identified interventions on system performance;  
(11) To make comprehensive assessment of sustainable intensification options for their contribution to productivity, profitability and resource use efficiency of smallholder rain-fed systems in the face of uncertainty, thereby enhancing the capacity of female and male farmers and their support agents in making more informed decisions in planning and managing farming systems in a way that reduces risk and makes better use of available resources;  
(12) To create climate-smart landscapes through implementing integrated land and water management options.

**Methods:**

(1) Different types of gendered systems modeling (participatory causal system model, crop-soil simulation model, bio-economic

(6) Gender and youth disaggregated data on the use and benefits from trees. Data available;  
(7) Gender responsiveness of different options evaluated and promoted benefitting at least 50 women farmers;  
(8) Insights into gender responsiveness of various options leading to identification of gender friendly practices;  
(9) 15 women farmers tested different intensification options;  
(10) About 20 women farmers benefitted by the training and other materials provided.



model)  
(2) Qualitative regional analysis for identifying policy, institutional and management constraints and opportunities in a gender-differentiated manner  
(3) Ex-ante gender analysis of the socio-economic and cultural system (e.g. pastoralists) targeted by research

**Gender dimension:** Research To improve productivity, profitability and resource use efficiency of pastoral communities and capacity to cope with risks are gender-mainstreamed.



Level	level of Organization within the CRP	Description of planned key activities at each level of internal organization	Expected results of planned key activities	Planned Budget (\$ 000s)
4.1	Irrigated Crop Systems interventions	<p><b>Location:</b> <a href="#">Fergana Valley (Kyrgyzstan, Tajikistan and Uzbekistan)</a></p> <p><b>Overall objective:</b> To improve food productivity, quality, profitability, stability and benefit-sharing equity of favorable irrigated farming systems in Central Asia, as well as minimize agriculture-driven negative impacts on natural resources through innovative changes in intensification-diversification practices and value chain management.</p> <p><b>Objectives:</b> (1) To improve gender-differentiated understanding of strengths, opportunities and weaknesses, constraints of existing seed systems with respects to seed needs by irrigated crop production systems in Central Asia;</p>	<p><b>Outputs in 6 months:</b> (1) Strengths and weaknesses of current seed systems identified and reported/List of agencies involved in seed chain of crops identified and reported/Survey format developed to study inventory of present seed systems/Draft version of varietal descriptions of commercial varieties of wheat, barley and chickpea produced/List of female and male farmers to be included in seed production activity identified. At least 20 farms growing winter wheat will be selected to participate in crop rotations using 4 new, improved varieties of mung bean for seed production in wheat - mung bean- based system; (2) At least 25 new improved germplasm units of winter wheat planted as adaptive trial on one hectare/At last 20 new potato varieties planted in the field on 0.2 ha/At least 10 new crop varieties planted in three field demonstration trials/At least 4 local varieties of fruit trees with functional traits planted in four demonstration trials/At least 100 female and male farmers growing winter wheat selected to participate in crop rotations using two different crops (of winter cereals and legumes, vegetables, potato and fodder crops)/At least 10 female and male farmers selected for crop-rotation and resource conservation demonstrations/At least 5 new varieties of wheat planted by at least 50 female and male farmers on 50 ha; (3) Qualitative gendered goat meat value chain analysis (VCA) from production through to consumption in one pastoral community and representative Mohair goat farmers undertaken and reported/Current feeding systems surveyed, documented/Flock management practices and flock performance reported (gender differentiated) /Current regulations for access to rangeland documented at two field sites/Based on the above, gender-mainstreamed plans for interventions designed and implemented; (4) Scoping study, including socio-economic, gender, youth, capacity building, extension aspects conducted, covering 100 households/Gendered system approach for the Action Site articulated and research gaps identified/Protocols for data collection for comparative inventory of agronomic, socio-economic and institutional settings of farming systems agreed by local,</p>	1,943.464



	<p>(2) To identify - jointly with multiple stakeholders - technical, management, and capacity building options for improving seed systems towards enhancing the availability, stability of seed/germplasm resources and equal accessibility to qualified seeds/germplasm. The focus will be major annual crops' seeds and fruit trees' planting materials, as well as improved income for female and male farmers who produce seeds/germplasm will be among the foci;</p> <p>(3) To identify crop and tree varieties best fit to integrated management of irrigated farms (e.g. multi-cropping, soil/water conservation practices) for improving and stabilizing farm productivity and incomes, and conserving soil, water and local seed/germplasm resources;</p> <p>(4) To increase the productivity of the livestock component and its synergistic links to other components of the irrigated farming landscape through</p>	<p>national and regional partners;</p> <p>(5) A book on promising SLM technologies compiled (20% contribution)/Web database of collected SLM practices produced (20% contribution)/Bias correction of downscaled Climate Change models undertaken;</p> <p>(6) Weather station network-based cropping and water advisory system established for participating Water Consumer Associations (WCA)/SMS technology based irrigation scheduling system for pilot canal implemented at the K. Umarov WCA field site/Report on water productivity for double crops prepared/Two models of predicting of water use efficiency for mung bean and potato reported/Report on water and energy productivity for double crops/Report on gender sensitivity and responsiveness to current practices at household level/Impact of institutional setup in Fergana Valley on water use efficiency at WCA level/Impact of double cropping on water use efficiency using conservation agriculture practices.</p> <p><b>Outputs in 12 months:</b></p> <p>(1) One workshop on seed systems organized, involving all relevant female and male stakeholders/Seed systems inventory completed and reported/Manual of practices for wheat, barley and chickpea, carrot and onion seed production developed/Manual of practices for production of planning material of fruit trees developed/Farmers successfully produce 100 ton high quality seed. At least 20 farms used two-crop rotation plans of winter cereals and legumes, vegetables, potato and fodder crops for seed production on 10 ha/Varietal description catalog distributed to at least 50 seed and planting material producers/Manual of practices distributed to at least female and male 50 farmers;</p> <p>(2) At least 40 new improved germplasm nurseries of different crops evaluated in the field/At least 15 new varieties evaluated in field demonstration trials/At least 20 potato germplasm evaluated in the field during second cropping seasons in lowland 0.2 ha/At last 4 new potato varieties evaluated in field demonstration trials 0.1 ha/At least 4 local varieties of fruit trees with functional traits evaluated in 4 demonstration trials (all trials involving men and women)/At least 50 farmers use two-crop rotation plans/At least five farmers use crop-rotation in combination with conservation agriculture practices/At least 5 new varieties of wheat cultivated by 50 farmers on 50 ha/At least two new varieties of chickpea cultivated by 20 farmers 10 ha; (testing and piloting farmers target especially female farmers)</p>	
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	<p>applying context-relevant technical/management options (e.g. improved feeding in winter, alternative rangeland management regulation);          (5) To identify major bottlenecks/challenges of meat value chains and relevant gendered technical, institutional interventions for improving the value chain performance;          (6) To achieve widespread understanding and application of SLM practices by the facilitation of dissemination (demo-sites) of SLM technologies and approaches through supporting existing agricultural service systems with newly accessible technological, gendered system-based management knowledge, data and tools (e.g. gender-mainstreaming), together with the development of management systems for transferring innovative technologies to local organizations (e.g. Water Users' Association -WUA).</p>	<p>(3) Rangeland access reported and a first set of maps on status and utilization produced/Current rangeland status utilization strategies documented for two field sites/Report on quantity and quality of feed produced and cost-benefits assessed/Implementation plan prepared for prioritized interventions for the two target pastoral communities/At least 2 improved management practices tested and evaluated with interested livestock keepers (20)/Angora goat genetic improvement program for improved Mohair quality with 6 elite (nucleus) goat farmers continued, documented; (farmers involved are women and men)          (4) A gender-disaggregated database established in Kyrgyzstan part of Fergana Valley/Research gaps/niches to ensure a gendered system approach in implementing CRP Drylands identified/Based on the gap analysis, 8 researchers participate in meetings and thematic consultations of rural advisory services, contributing to the development of a regional roadmap/50% of respondents contribute to comparative inventory of farming systems in the three countries/Policy seminar with female and male stakeholders to formulate more gender-responsive agricultural extension model/Policy brief produced for recommending more gender-responsive agricultural extension/50% of respondents contribute to determine most feasible SLM practices for gendered farming system for each country in Fergana Valley;          (5) Three video-infographics on selected SLM practices produced/Two national level similarity/suitability maps for selected SLM produced/One policy brief on SLM published;          (6) Eight field days targeting 200 farmers (at least 30% women)/Handbooks for farmers on recommended land and water management practices to maximize water use efficiency/Report on irrigation advisory system-potential and challenges/One manual for farmers on improving water use efficiency for winter wheat and mung bean.</p> <p><b>Outcomes:</b>          (1) Memorandum of Agreement among different agencies involved in seed systems signed/Varietal description catalog distributed and used by at least 50 seed and planting material producers/Manual of practices used by at least 50 farmers/At least 50 farmers produce 100 ton seed of at least three new varieties of wheat, 5 ton seed of two new varieties of chickpea, and 2 tons seed of one new variety of barley. At least one innovative crop rotation with higher farm productivity than previously adopted practices identified and implemented; (female and male farmers involved)          (2) At least 5 improved varieties of different crops identified and made available to 5 farmers</p>	
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		<p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>(1) Regional-level gendered seed systems analysis linked to farming livelihood systems</li> <li>(2) Spatially explicit context-option matrix approach applied for seed/germplasm management and SLM.</li> <li>(3) Multi-level gendered surveys for assessing seed needs</li> <li>(4) Bio-economic modeling</li> <li>(4) Gendered value chain analysis and modeling</li> <li>(6) Participatory technology development methods, equally involving men and women</li> </ul> <p><b>Gender dimension:</b> To identify the new allocation of labor within the various types of household, farm and water management as result of male migration in rural communities of Fergana Valley, Uzbekistan.</p>	<p>for demonstration trials in the following year/At least two new superior varieties of cereals and legumes selected and adopted by the 10 farmers on 30 ha in the following year/At least 4 improved potato varieties identified and at least 2 potato varieties selected by the farmers as having higher yield than that of the local variety/At least 2 fruit trees local varieties selected by farmers as highly tolerant to local stress conditions/At least one innovative crop rotation with higher farm productivity identified and adopted by the farmers/Resource conservation practices successfully demonstrated and used by at least one farm/New varieties of wheat producing at 10% higher yield than the previously grown old varieties of wheat/New varieties of chickpea produced at least 15% higher yield the previously cultivated local varieties; (female and male farmers involved)</p> <ul style="list-style-type: none"> <li>(3) Performance of meat value chains at the target site assessed (gender-differentiated) and marketing channels fully understood, documented; bottlenecks addressed through intervention plans including plans for collective actions, e.g. marketing/About 50 livestock keepers in two pastoral communities engaged in designing and adopting rangeland utilization and rehabilitation strategies/About 20 pilot livestock keepers engaged in testing and adopting improved herd management practices; (men and women, also in non-traditional roles included)</li> <li>(4) Joint IP strategy and action plan (at Action Site level) developed, agreed upon and adopted by the wider IP constituency/Research interventions to address gaps/niches in gendered system approach in implementing the Drylands CRP identified and adopted;</li> <li>(5) Awareness in the Action Site about SLM increased by 10%, including through the new web-based knowledge platform (measured through number of attendees and web analytics tools);</li> <li>(6) Knowledge gaps of female and male farmers on actual, achievable and potential yields overcome for different popular crops under local climatic and landscape conditions/Water savings that directly affect income of farmers in the participating WCAs through 10% increase of the water use efficiency/Gender sensitivity and responsiveness assessed with respect to currently applied and newly implemented technologies/Improved knowledge and practical skills of communities for applying new water and energy efficiency raising and small-scale gardening technologies/25 female and male farmers (approx. 150 ha) apply irrigation based on recommendations from irrigation advisory system/ 250 farmers (Female and male) have their knowledge on irrigation of winter wheat, mung bean and potato improved. Six WCAs formalize institutions for improvement of their operation including governance/ 200 farmers (Female and</li> </ul>	
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male ) have their knowledge on irrigation scheduling improved / 250 farmers (Female and male) have their knowledge on irrigation of winter wheat, mung bean and potato improved/Policy makers have their knowledge on energy expenses for different crops and potential to reduce energy losses improved/WCA staff and water managers have their knowledge on gender specifics of current practices improved/WCA staff have their knowledge on water use efficiency improved.

**CD Results:**

(1) One training course for wheat seed production developed/One two-week long training course on wheat seed production organized/One two-day long training course on farmer-based potato seed production organized/Two one-day training courses on production of quality seeds of carrot and onion and two one-day training courses on technical itinerary for planting and production of apple, grape and pomegranate organized/At least 50 representatives (men, women and youth) participate in the workshop on seed systems/At least one seed production and testing facility strengthened with additional equipment/At least 20 men and women farmers trained in wheat seed production; in mung bean seed production; in farmer-based potato seed production; in onion and carrot seed production; and in production of planting material of apple, grape and pomegranate/At least 50 female and male seed producers' capacity enhanced through the distribution of varietal description catalogues and seed producing manuals/Capacity of at least 50 female and male farmers strengthened in wheat seed production/One field day organized to observe and evaluate performance of new varieties in farmers' fields. At least 50 farmers (men and women) participate;

(2) At least one training workshop on skills development organized. At least 10 researchers (men and women) are trained on the management of field trials/At least two farmers' field days organized. At least 100 farmers (men and women) participate in field evaluation of demonstration trials and gain information on relative performance of varieties/At least two farmers' field days organized. At least 50 farmers (men and women) participate in the demonstration of crop rotation and gain information on relative performance of varieties/One field day organized to observe and evaluate performance of new potato varieties in farmers' fields. At least 40 farmers (men and women) participate in field evaluation of demonstration trials and gain information on relative performance of varieties/Two field days organized to observe and evaluate performance of local varieties of carrot and onion in demonstration plots



established in the farmers' fields. At least 25 men and 25 women participate in these field days and gained information on relative performance of local diversity of carrot and onion/Two field days organized to observe and evaluate performance of local varieties of apple, grape and pomegranate in demonstration plots established in the farmers' orchards. At least 25 men and 25 women participate in these field days and gained information on relative performance of local diversity of apple, grape and pomegranate;

(3) Toolkits and training events developed/Gender sensitive training events on feed production conducted and material developed/Increased capacity of national partner institutes in Uzbekistan and Tajikistan for conducting value chain analysis; field-tested toolkit for Small Ruminants Value Chain Analysis in Uzbekistan and Tajikistan/A toolkit for scaling rangeland monitoring developed/Gender sensitive training events on reproduction and feeding conducted and material developed;

(4) Thirty women and men smallholders trained on how to improve livelihoods by providing targeted gender-responsive extension services (15 men and 15 women)/Fifteen researchers participate in the training course on the design, implementation, M&E of Result-focused research/Two young researchers (male and female) trained to conduct bio-economic modeling;

(5) Five national researchers trained in analytical tools and around 50 farmers/producers/Two young researchers (male and female) trained to conduct bio-economic modeling;

6. Report on household survey in 3 villages with 100 household respondents: male-30%, female-70%/Training seminar for WCA staff (25 female participants)/Training seminar for WCA staff (50 female participants).

**Gender Results:**

(1) At least one woman representative and one young farmer are included in the seed system platform core team/At least 10% women farmers and 10% youth are included in the training courses/At least 10% women and 10% youth are among the recipients of the varietal description catalog, and included in the seed production practices/Seed producing farmers include at least 10% women and 10% youth/At least 10% of the farmers involved in cultivation of new varieties are women farmers;

(2) At least one woman farmer participates in varietal evaluation/Cultivation of improved crop varieties that result in more food for households and 10% higher farm income compared to cultivation of local varieties for men and women/At least two women farmers participate in on-



			<p>farm demonstration trials with new varieties/At least 10% women farmers involved in experimentation with crop rotation/At least one women farmer participated in crop-rotation using resource conservation practices field trials/At least 10% of the farmers involved in cultivation of new varieties are women farmers;</p> <p>(3) Gender-disaggregated Value Chain Analysis report/Gender sensitive intervention plans produced/adopted/Gender-disaggregated report on access to rangelands produced/Work sharing between men and women in sheep and goat management documented and targeted training proposed/Roles and responsibilities of men and women in livestock related activities translated in targeted interventions and on-the-job training for implementation of the interventions;</p> <p>(4) At least one gender-disaggregated database produced/One gender awareness training conducted, and 20 women and 25 men are trained for further raising of gender awareness in the Action Site;</p> <p>(5) Potential proportion of women/men audience approximated from statistics;</p> <p>(6) Impact assessment of male and female migration on water use efficiency; Gender sensitivity and responsiveness evaluated with respect to currently applied and newly implemented technologies as well to current water resource uses and management within the households/Draft Paper on Gender roles and implications for water management in agriculture;</p>	
4.2	Intensive Rainfed Systems interventions	<p><b>Location:</b> <a href="#">Aral Sea Region (Turkmenistan, Uzbekistan and Kazakhstan)</a></p> <p><b>Overall objective:</b> To increase production stability and social equity of intensive rainfed farming systems in Aral Sea region and reserve/restore agriculture-induced land and water degradation through promoting context-relevant</p>	<p><b>Outputs in 6 months:</b></p> <p>(1) Strengths and weaknesses of current seed systems identified and reported/List of agencies involved in seed chain of crops identified and reported/Survey format developed to study inventory of present seed systems/One training course for wheat seed production developed/Gender-equitable training program for local varieties of fruit trees and vegetables developed/Draft version of varietal descriptions of commercial wheat varieties produced/Ten farmers (8 men and 2 women) to be included in wheat seed production identified/Seed (200 kg) of four new, improved varieties of mung bean prepared for seed production by at least 20 farmers on at least 10 ha;</p> <p>(2) At least 100 new improved germplasm nurseries of different crops planted in the field/At least 10 new varieties of winter wheat, chickpea, mung bean and potato planted in demonstration fields/At least 20 farmers growing winter wheat selected to participate in crop</p>	<b>1,197.271</b>



	<p>SLM practices, technological development platforms and inclusive food value chains.</p> <p><b>Objectives:</b></p> <p>(1) To improve understanding of strengths, opportunities and weaknesses, constraints of existing seed systems (including social systems and gender dynamics) with respects to seed needs by the transition of current intensive rainfed crop production systems to more conservation;</p> <p>(2) To identify - jointly with multiple stakeholders – gendered technical, management, and capacity building options for improving seed systems towards enhancing the availability, stability of seed/germplasm resources and equal accessibility to qualified seeds/germplasm. The focus will be major annual crops' seeds and fruit trees' planting materials, as well as improved income for female and male farmers who produce</p>	<p>rotations using two crops (winter wheat and mung bean/halophytes/fodder)/At least 1 new variety of mung bean planted by at least 20 female and male farmers on at least 10 ha/At least 4 farmers (1 female) selected for demonstration of local fruit trees diversity adapted to frost and salinity/One crop demonstration demonstrating multiple crops planted in sequence established; 3. Review and assessment reports produced/Successes and failures of feed production on saline land reviewed and reported/Current feeding systems surveyed and reported/Current practices and flock performance reported/Regulations for access to rangelands (private, pastoral and forest) documented (reports all/Gendered qualitative value chain analysis (VCA) from production through consumption for nine target villages (about 60 livestock keeping households) undertaken and reported/Based on the above, plans for prioritized gender-responsive interventions designed for each target village/At least two promising options for feed production designed and planted;</p> <p>(4) One network established among national research partners and policy makers to develop a basis for institutional support for long-term salinity management strategies/Contact list of implementation partners and policy makers established (at least 30 personal contacts for at least 10 institutions);</p> <p>(5. Two on-farm demonstration trials (15 ha) established/Reports reviewed and assessed and alternative crops for double cropping under no-till identified/At least 5 farmers selected to implement demonstrations on crop-rotations and conservation agriculture practices/Reports reviewed and assessed and seed production of salt tolerant forage crops organized/Reports reviewed and assessed and alternative crops for double cropping under no-till identified; (involved farmers are men and women)</p> <p>(6) Baseline study, including socio-economic, gender, youth, capacity building, extension aspects conducted in the field site covering 100 households/Gendered system approach for the Action Site articulated, research gaps identified and reported;</p> <p>(7) A book on promising SLM technologies compiled (20% contribution)/Web database of collected SLM produced (20% contribution)/Bias correction of downscaled Climate Change models undertaken and reported; 8. Long-term weather data estimated -- last ten-year monthly average climate data will be estimated and used to plot Walter graphs/Object-based agricultural land use data using Landsat images/Distance and density of agricultural infrastructure be calculated for each crop field and given weight per criteria in order to find a</p>	
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	<p>seeds/germplasm;          (3) To identify in a gender-responsive manner crop and tree varieties best fit to conservation-oriented management of intensive rainfed farms (e.g. agroforestry, cost-effective and farmer-motivated multi-cropping practices) for improving and stabilizing farm productivity and incomes, and conserving soil, water and local seed/germplasm resources;          (4) To increase the productivity of the livestock component and its synergistic links to other components of the irrigated farming landscape through applying context-relevant gendered technical/management options (e.g. alternative regulation of herd-rangeland management);          (5) To identify major bottlenecks/challenges of meat value chains and relevant (incl. gender) technical, institutional interventions for improving the value chain performance;          (6) To achieve widespread</p>	<p>suitability level of crop fields/Weather station network-based cropping and water advisory system for all three participating WUAs/Base line data on soil physical properties for the soil conservation site/Irrigation amount applied under conventional and soil conservation practices.  <b>Outputs in 12 months:</b>          (1) One workshop on seed systems organized, involving all relevant stakeholders/One survey on seed system inventory completed/Varietal description of locally grown commercial wheat varieties compiled/Varietal description of local apple, pomegranate, apricot and grape adapted to soil salinity and frost compiled/One manual on the package of practices for wheat seed production developed/One manual on production of quality planting material of apple, pomegranate, apricot and grape developed/One manual on production of quality seeds of onion and carrot developed/Ten young researchers (8 male and 2 female) trained in wheat seed production/At least 4 new, improved varieties of mung bean cultivated by 20 farmers, producing at least 10 tons of seed;          (2) At least 200 new improved germplasm of different crops evaluated in the field/At least 12 new wheat varieties evaluated in field demonstration in two locations/At least 20 new potato varieties evaluated in field demonstration trials on 0.2 ha/At least 10 local apricot, apple and grape varieties evaluated in demonstration trials on 1 ha/At least 10 farmers adopted two-crop rotation plan/At least one new variety of wheat adopted by 20 farmers/At least one new variety of mung bean adopted by 10 farmers/One crop museum established;          (3) Current access of the livestock keepers to rangeland in the target villages reported/A first set of maps on rangeland status and utilization produced/Quantity and quality of feed and cost-benefits for the tested feed options assessed and reported/At least two improved management practices tested and evaluated with interested livestock keepers;          (4) Field-based management strategies within the broader regional salinity management strategy developed in cooperation with the CRP WLE;          (5) Current status of cropping systems evaluated and reported (gender-differentiated)/Two on-farm demonstration trials in Karakalpakstan completed and data on biomass, soil characteristics etc. collected/Preliminary assessment of double-cropped systems undertaken and reported/One video/e-blog on the Conservation Agriculture practices produced/One preliminary assessment of seed production of salt-tolerant forage varieties undertaken/Current status of seed production of forage crops assessed and reported/Economic implications of the</p>	
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understanding and application of SLM practices through continued facilitation of dissemination (demo-sites) of SLM technologies and approaches through supporting existing agricultural service systems with newly accessible gender-responsive technological, system-based knowledge, data and tools, together with the development of management systems for transferring innovative technologies to local organizations (e.g. Water Users' Association -WUA).

**Methods:**

- (1) Regional-level seed systems analysis in linking to farming livelihood systems (gender-sensitive).
- (2) GIS-based land degradation and/or restoration assessment
- (3) Spatially explicit context-option matrix approach applied for seed management and SLM for reversing land degradation.
- (4) Multi-level surveys for assessing seed needs.

introduction of salt-tolerant forages under CA assessed and reported.; 6. A gender-disaggregated database established in the Action site/Research gaps/niches to ensure a gendered system approach in implementing CRP DS verified with stakeholders in the Action Site/Eight researchers participate in meetings and thematic consultations of rural advisory services, contributing to the development of a roadmap for Central Asia/One Policy seminar held with stakeholders to co-formulate more gender-responsive agricultural extension model; (7) Three video-infographics on selected SLM practices produced/Two national level similarity/suitability maps for selected SLM produced/One policy brief on SLM produced; (8) Soil moisture simulation on different soil profiles completed and reported/Irrigation water application strategies published/Manual on using optimal water application for farmers/Three farmer field days targeting 200 farmers (at least 30% women)/Results presented at two International conference and one article is published in an international peer-reviewed journal /Training seminar for WUA staff (75 participants including 30% women)/Water use efficiency under conventional and soil conservation practices/Resource use intensity under conventional and soil conservation practices/Simulation of soil moisture as affected by soil conservation practices.

**Outcomes:**

- (1) Memorandum of Agreement among different agencies involved in seed systems platform signed/Varietal description catalog distributed and used by at least 50 wheat seed producers/Manual on package of practices distributed and used by at least 50 farmers/At least 20 farmers produced seed of at least three new varieties of wheat/New varieties of mung bean produce at least 15% higher yield as compared to the previously cultivated local varieties; (female and male farmers involved)
- (2) At least 25 improved varieties of different crops identified and made available to farmers/At least two new superior varieties of cereals and legumes selected and adopted by the farmers/At least one innovative crop rotation with higher farm productivity identified and adopted by the farmers/At least 4 improved potato varieties salinity-tolerance identified, which increase productivity on 15% compared with regular potato cultivation/One new variety of wheat producing at least 10% higher yield than previously grown varieties selected and adopted by the farmers/One new variety of mung bean producing at least 15% higher yield or with anticipated maturity as compared to the local variety selected and adopted by the



	<p>(5) Bio-economic modeling (6) Meat value chain analysis and modeling (7) Participatory technology development methods</p> <p><b>Gender dimension:</b></p> <p>Roles and responsibilities of men and women in livestock, tree and fruit, mung bean, forage crops, seeds and conservation related activities translated in gender-responsive interventions, involvement in farm trials, stakeholder platforms and networks, and training sessions</p>	<p>farmers; (female and male farmers involved)(3) Identified livestock holders fully committed to the activities undertaken in 2015/Identified Livestock holders in the selected community fully committed to feed production/Performance of meat value chains at two sites assessed and marketing channels fully understood in a gender-differentiated way and bottlenecks addressed through intervention plans/Identified Livestock holders in the community fully committed to designing and adopting utilization and rehabilitation strategies/Identified Livestock holders fully committed to testing and adopting improved management practices; (men and women in traditional and non-traditional roles involved)</p> <p>(4) Improved interaction between research and policy makers in the Action Site related to salinity management;</p> <p>(5) At least 20 farmers are fully committed to the activities (area planted, number of crops)/At least 10 farmers adopt zero-tillage practices/At least two farmers use crop-rotation in combination with zero-tillage practices/Awareness of 20 farmers on forage crop and conservation agriculture increased/Awareness of 10 farmers on double cropping and conservation agriculture is increased/At least 10 farmers will adopt the seed supply package using CA. Awareness of 100 farmers on salt tolerant forage crops is raised; (female and male farmers involved)</p> <p>(6) Joint Innovation Platform strategy and action plan (at the level of the Action Site) developed, agreed upon and adopted by the wider IP constituency made up by women and men/Research interventions to address gaps/niches in system approach in implementing the Drylands CRP are identified and adopted in a gender-differentiated manner;</p> <p>(7) Awareness of female and male stakeholders in the Action Site of SLM practices is increased, including through the new web-based knowledge platform;</p> <p>(8) Filling of the identified knowledge gap on actual, achievable and potential yields of different crops under local climatic and landscape conditions/Saving of water and increase in income for farmers in the participating WUAs by means of higher water use efficiency/Possibility to test and reveal gender sensitivity and responsiveness to currently applied and newly implemented technologies as well to current water resource uses and management within the households/Improved knowledge and practical skills of communities for improving and applying new water and energy efficiency-raising and small scale gardening technologies/Twenty-five farmers start applying irrigation based on recommendation from</p>	
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irrigation advisory system/250 farmers improve their knowledge on irrigation of winter wheat, mung bean and potato/Six WUAs formalize informal institutions for improvement their operation as well as governance/At least 10 farmers are aware on water saving potential of soil conservation practices/At least 10 farmers using soil conservation technologies improve their irrigation practices. (in all activities for farmers and stakeholders, women and men are involved as equally as possible)

**CD Results:**

- (1) At least 50 representatives (men, women and youth) participate in the workshop on seed systems/At least one seed production and testing facility strengthened with additional equipment/At least 20 men and women farmers trained in wheat seed production/At least 20 men and women farmers trained in mung bean seed production/At least 50 seed producers' capacity enhanced through the distribution of varietal description catalogues and seed producing manuals/Capacity of at least 20 farmers strengthened in wheat seed production;
- (2) At least one training workshop on skills development organized/At least 10 researchers (men and women) received training in the management of field trials/At least four farmers' field days organized/At least 20 men and women farmers trained in potato seed production/At least 100 farmers (men and women) participated in field evaluation of demonstration trials and gained information on relative performance of varieties/At least 25 farmers (men and women) participated in the demonstration of crop rotation and gained information on relative performance of varieties/One field day organized to evaluate performance of new varieties in farmers' fields;
- (3) Toolkits and training sessions developed/At least two gender-sensitive training courses on feed production conducted and material developed/Capacity of national partner institutes in the Action Site for conducting value chain analysis increased/Toolkits for small-ruminant value chain analysis (VCA) field-tested/One toolkit for scaling rangeland monitoring developed/At least two gender-sensitive training courses on reproduction and feeding conducted and material developed;
- (4) At least three gender-sensitive training courses on seed production, livestock and poultry feeding conducted and by-products developed;
- (5) Capacities of national partners and farmers through short and long term training courses



and their full involvement in the design and implementation of the project activities are strengthened/At least two training courses on crop rotation no-till and double cropping held/At least two training courses on seed production of forage crops under no-till held/Network for seed growers of forage crops created;

(6) Fifteen researchers participate in at least two training courses on the design, implementation, monitoring and evaluation and Gender Sensitive Result-focused-Research; 7. Three national staff trained in analytical tools; 8. Handbook for farmers on how to manage irrigation water for their sites and crops/A policy brief on benefits of using weather station-based irrigation scheduling system/Two field days targeting the participation of 200 farmers (at least 30% women)/Well-calibrated decision support tools for irrigation water management/Heat units-based analysis report/article on potential yields.

**Gender Results:**

(1) Women and youth representatives (at least one each) included in the seed system platform core team/At least 10% women farmers and 10% youth are included in the training courses/At least 10% women and 10% youth are among the recipients of the varietal description catalog are included in the seed production practices/Seed producing farmers include at least 10% women and 10% youth/At least 10% of the farmers involved in cultivation of new varieties are women farmers;

(2) At least one woman farmer participated in varietal evaluation/Cultivation of improved crop varieties results in more food for the households and higher farm income for men and women/At least two women farmers participated in on-farm demonstration trials with new varieties/At least 10% women farmers are involved in field trials on crop rotation/At least 10% of the farmers involved in the cultivation of new varieties are women farmers;

(3) Roles and responsibilities of men and women in livestock activities translated in targeted interventions and training sessions/Work sharing between men and women in feed production documented and targeted training proposed/Gender-disaggregated VCA reported/Gender sensitive intervention plans produced/adopted for the nine target villages/One gender-disaggregated report on access to rangeland produced/Work sharing between men and women in sheep and goat management documented and targeted trainings for improved herd management and feeding practices proposed;

(4) Improved gender-aggregated data for communities collected and expected impact of



			interventions on salinity management and marginal lands reported; 5. Analysis of the roles of men and women in all farm and household activities undertaken; 6. At least one gender-disaggregated database produced/Gender awareness training conducted with 20 relevant change agents, and about 50 women and men trained for further out-scaling of gender awareness in the Action Site; 7. Potential proportion of female/male audience approximated from statistics; 8. Water savings that directly affect income of farmers in the participating WCAs by means of higher water use efficiency by 10%.	
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Level	level of Organization within the CRP	Description of planned key activities at each level of internal organization	Expected results of planned key activities	Planned Budget (\$ 000s)
5.1	Agro-Pastoral Systems interventions	<p><b>Location:</b> <a href="#">Chakwal (Pakistan)</a></p> <p><b>Objectives:</b></p> <p>(1) To identify sources of food and nutrition for women and children's: To assess the availability and alternative sources of food supply and; to assess the vulnerability of women and children;</p> <p>(2) To analyze climate variability risk analysis based on historical as well as future climate change scenarios and to develop crop model for supporting in planning for improved resilience and sustainable use of natural resources;</p> <p>(3) To quantify livestock feed resources in the agro-pastoral systems towards sustainable livestock production of the smallholders;</p> <p>(4) To validate promising</p>	<p><b>Outputs in 6 months:</b></p> <ol style="list-style-type: none"> <li>1. Questionnaire developed/Data collected;</li> <li>2. Well-calibrated and validated models for major cereal crops in the study area leading to preliminary report of opportunities to improve WUE and diversification options;</li> <li>3. Time series vegetation indices and GPP over the period of 2000-2014 reported, The vegetation and LST based phenological products over the period 2000-2014 reported;</li> <li>4. Water saving interventions evaluated, data collected and results generated for possible option to upscale;</li> <li>5. Suitable micro watershed for various slopes optimized and reported; Results of planning viable options for improved resilience available to stakeholders;</li> <li>6. Develop one factsheet on use of cactus as forage (local language); 1 field day organized on cactus feeding and 50 male farmers participated; One report on preliminary evaluation of cactus pads transplantation (mode, timing, etc) submitted;</li> <li>7. Develop 2 factsheets on key silvi-pasture species; 1 field day on agro-forestry (silvi-pasture) organized. 30 male farmers participated;</li> <li>8. Meeting held with the communities in 4 villages. 15 male and 15 female; Farmers selected for demonstration on 10 male farmers field; Demonstration conducted; Initial data collected; 2 Farmer field days conducted; 60 male farmers participated;</li> <li>9. Meeting held with the communities in 4 villages. 90 male and 30 female participated; 8 farmers selected for demonstration; Demonstration conducted; Initial data collected; 2 Farmer field days conducted;</li> <li>10. Meeting held with the communities in (2 village; 4 farmers selected for demonstration; Demonstration conducted; Initial data collected; Two Farmers' field days conducted;</li> <li>11. Meeting held with the communities in (2) villages); Four Farmers selected for demonstration; Demonstration conducted in 4 farmers field; Initial data collected; Two</li> </ol>	2,358.736



		<p>options for system intensification and improved income;</p> <p>(5) To develop option for improved resilience and sustainable use of natural resources;</p> <p>(6) To increase resilience and improved use of marginal lands of agropastoral production system;</p> <p>(7) To develop alternative farm enterprise options for diversification and livelihood security;</p> <p>(8) To ensure gender mainstreaming in farm enterprises and value addition; Capacity development to innovate, improve efficiency and diversify income generation options;</p> <p>(9) To assess the need and current level of value addition at household level and support women for active involvement in value addition and food preservation for improved food availability at household level;</p> <p>(10) To assess the technologies in terms of system compatibility</p>	<p>Framer’s field days conducted; 40 male participated;</p> <p>12. 2 gender inclusive trainings organized and 50 females participated; 13. 4 Number of farmers training through field days organized;</p> <p>14. Checklist prepared for conducting gender focused VCNA at field sites; 13. Activity/ technology specific questionnaire developed; Data collected for winter season trials; Data files in spread sheet; Results finalized; Technical report prepared;</p> <p>15. Activity/ technology specific questionnaire developed; Data collected for winter season trials; Data files in spread sheet; Results finalized; Technical report prepared;</p> <p>16. Activity/ technology specific questionnaire developed; Data collected for winter season trials; Data files in spread sheet; Results finalized; Technical report prepared;</p> <p>17. Progressive and active farmers/entrepreneurs engaged in seed business. 2 farmers involved.</p> <p><b>Outputs in 12 months:</b></p> <p>1. Questionnaire developed; Data collected; Data files in spread sheet; Results from analysis for gender segregated nutritional status; Technical report prepared;</p> <p>2. Analysis of generated data completed; 1 male and 3 female trained scientist trained; Model developed for scenario simulation;</p> <p>3. Assessment and annual dynamics of vegetation productivity;</p> <p>4. Training of communities on improved agricultural water management 150 male and 50 female participated; 8 Demonstration sites ready to facilitate adoption; Community-based service providers available for community support; Researchers and end users better able to access improved and relevant information on different water saving (HEIS) option and impacts on productivity and income;</p> <p>5. Training of communities on improved water harvesting 50 male trained; Demonstration sites ready to facilitate promotion and adoption of risk reduction micro watershed options;</p> <p>6. 40 elite cactus accessions introduced; One report on evaluation of cactus pre-screening for adaptation to Chackwal agro-ecological condition finalized;</p> <p>7. Impact of rational grazing management assessed (50 ha) in terms of productivity (quantity) and biodiversity (quality);</p> <p>8. Data collection completed; Data analysis finalized; Draft report completed; Promising variety of cereals and legumes identified;</p>	
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	<p>and farm resources and to provide feedback to scientists for improved planning and implementation of project activities;</p> <p>(11) To assess the processes of capacity building and dissemination activities and to provide feedback to scientists for improved planning and implementation of project activities;</p> <p>(12) To develop sustainable seed supply mechanism and to promote adoption of modern varieties at farmers field.</p> <p><b>Methods:</b></p> <p>(1) Narrative-based system analysis</p> <p>(2) Context-option matrix</p> <p>(3) On-farm experiment</p> <p>(5) Household surveys</p> <p>(4) Adoption analysis</p> <p>(5) Participatory technology development</p> <p>(6) Gender analysis</p> <p><b>Gender dimension:</b></p> <p>(1) To identify sources of food and nutrition for women and</p>	<p>9. Data collection completed; Data analysis finalized; Draft report completed;</p> <p>10. Data collection completed; Data analysis finalized; Draft report completed;</p> <p>11. Data collection completed; Data analysis finalized; Draft report completed;</p> <p>12. Value addition activities practiced at household level; 4 Number trainings and 120 numbers of women trained;</p> <p>13. Two Number trainings and 20 female trained; 80 Number of farmers trained and participated in 4 field days;</p> <p>14. 2 Workshops on VCNA conducted at intensification site; 15 male from 15 HH involved in the workshop; 15 Women from 15 HH participated in the workshop; HH and gender segregated VC need assessed; Need based priorities identified and shared with implementing partners; Report prepared;</p> <p>15. Activity/ technology specific questionnaire developed; Data collected for winter and summer season from all the 10 trails from at least 20 farmers at CRP activity clusters; Data collection finalized; Results finalized and report drafted;</p> <p>16. Activity/ technology specific questionnaire developed; Data collected from the 50 participants of Farmer field days; Data collected from 30 training participants; data collection finalized; Results finalized and report drafted;</p> <p>17. Ten Tons of improved seed and for number of crops produced at community level.</p> <p><b>Outcomes:</b></p> <p>1. Gender and age segregated nutrition status assessed; Household level year round food supplies documented; Gaps identified for planning options for improved food security and nutritional status especially for women and children;</p> <p>2. NARS adopts methods and process for Climate informed decisions for farmers; Planning of change in cropping pattern using crop model; One research article published on simulation;</p> <p>3. Spatial maps and database on the livestock feed-stock and watering resources finalized; Research article published describing improved methods and data set;</p> <p>4. Water saving increased by 70% in drip irrigation system and 30% in Bed-furrow planting; Labor saving by 30-40% in different water saving techniques; Yield of vegetables increased by 20% in drip irrigation and 30% in Wheat in Bed-furrow planting;</p> <p>5. Land preparation cost reduced by 40% due to strip cropping; Resource saving (Fertilizer and seed) saving by 40%;</p>	
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children.

(2) To assess the availability and alternative sources of food supply and; to assess the vulnerability of women and children.

6. 30 % acceptability of cactus as a fodder species increased; 7. 20 % Increased awareness of sustainable management of rangeland resources for end users; 8. Best variety of wheat, lentil and chickpea adopted by 30% farmers in the activity cluster;
9. Improved fodder varieties increased 5 % in milk production of large ruminants;
10. Silage ensured the availability of fodder during lean period and maintained milk production of large ruminants;
11. New technology introduced in the rainfed areas; Improved 30% wheat production; Reduced 15% soil erosion; Evapotranspiration 20 % reduced; Reduced 50 % land preparation cost;
12. 6 number of value added products developed at HH level; Planning using crop models by scientists and research article published; Three Improved farming practices and technologies adopted by participating farmers;
13. Value addition activities practiced at household level; Number of value added products developed at HH level; Planning using crop models by scientists and research article published; Improved farming practices and technologies adopted by participating farmers;
14. Adoption of need based value added products increased by 20% in participating HH; Identified products included in future project activities; 15. Recommendation of technologies developed based on their viability and socioeconomic acceptance for upscaling; Feedback of target end users incorporated in project planning;
16. Change in knowledge and attitude supported in adoption of technologies; Feedback of target end users incorporated in planning future training and farmer field days;
17. 150 farms families benefited; Folder crops productivity improved (30 %).

**CD Results:**

1. 6 female graduates trained in data collection on HH level food consumption patterns; One scientist trained in nutrition and consumption analysis from HH survey data;
2. 1 women scientists trained on improving WUE & NUE; 1 M.S. degree on SWAT modeling of benchmark watershed NRM interventions for soil-water conservation initiated;
3. Dissemination of the spatial database to NARS and partners;
4. Dissemination of technologies through 3 farmer days (40-50 farmers/day) and 1 Professional training (20-30 participants/training); 5. Dissemination of technologies through 3 farmer days (40-50 farmers/day) and 1 professional training course (20-30 participants/training);
6. 5 male and 5 female farmers trained in feed formulation from cactus; 7. 1 MSc degree



initiated; 10 Framers trained in agro forestry practices; 8. 5 scientists trained in participatory on-farm planning and implementation of research activities; 10 farmers trained in participatory varietal selection;

9. Improved 40 %production and 20% higher income; 100 Farmer equipped with improved production technology of fodder crops; 10. 2 progressive farmers will be trained for silage making;

11. Manufacturer capacity of the local venders enhanced; Manufacture – farmer interaction developed; Knowledge transfer due to farmers and researchers interaction; 4 scientist of IRT trained; 30% Production increased and 40% more income generated;

12. 100 rural women trained in value addition and food preservation of 8 products;

13. 5 farmers trained in feed formulation and feeding of 5;

14. Capacity Development of 3 Female graduates in VCNA; 15 male and 15 male farmer trained in participatory VCNA;

15. 2 male and 2 female scientists trained in assessment of multidisciplinary on-farm trails;

16. 1 male and 1 female scientist trained in assessment of capacity building training; 6 progressive farmers will be trained in informal Seed production systems.

**Gender Results:**

1. Gender specific issues about nutrition level identified; Activities for improved food security and nutritional status incorporated in the work plan of implementing partners;

2. Results would help to develop logical options to improve resilience and mitigate risk; 1 female scientists trained in crop model;

3. Potential area for fodder supply will reduce women work load (Fodder related activities are mainly dealt by women at the Chakwal site) reported; Higher fodder supply will help to improve milk and income through surplus milk;

4. 8 value added products of fruits and vegetables (olive, citrus, fig, grapes, garlic ginger, bitter gourd, cereal milling and porridge making; 100 Trained rural women trained and able to prepare products; Market linkage established and reported;

5. Report on different options for water harvesting would help to reduce risk of crop failure and sustainable livelihood;

6. Role of woman in adopting new options such as cactus as a multi-purpose species evaluated and reported;



7. Role of woman in adopting new options for agro-forestry evaluated and reported;  
8. 10 percent increase in production will help women in improving food security at household level;  
9. 40 percent Improved supply of fodder and feed for women involved in livestock farming (70% women involved in livestock rearing at household level); 10% increase in milk and meat production will help women in improving food security at household level;  
10. 10% reduction in feed shortage during lean period and would help women involved in livestock farming (70% women involved in livestock rearing at household level); Maintain supply of milk for 3 months lean period that will help women in improving resilience during lean period;  
11. Reduced 30% cost will help to improve livelihood at household level;  
12. Women involvement in productive and income generation activities reported; 5% Improved supply of value added value added products to women and children in the participating HH;  
13. Supplemental feed through cactus will help rural women reduced burden on fodder collection by 10 percent;  
14. 15 females participated in conducting VCNA;  
15. Technology specific gender related issues identified and reported; Technology testing process in line with social norms and factors for encouraging higher women participation reported;  
16. Higher fodder supply will reduce 20% work load of women Fodder related activities are mainly dealt by women at the Chakwal site); Higher fodder supply will help to improve 20% milk and 5% income through surplus milk sale of dairy farmers.



5.2	Irrigated Crop Systems interventions	<p><b>Location:</b> <a href="#">Jodhpur, Barmer and Jaisalmer districts, Rajasthan (India)</a></p> <p><b>Objectives:</b>          (1.) To map site similarity mapping of all CRP1.1 study sites using satellite images and climate data;          (2) To assess climate variability risk analysis based on historical as well as future climate change scenarios;          (3) To understand the gender roles and identify options to improve women’s livelihood in small-scale crop-livestock systems;          (4) Dual purpose high yielding cultivars and context specific integrated crop management as part of intensification and resilience building for legumes and cumin, mustard;          (5) context specific management packages incorporating climate risk aspects for pearl millet based systems;          (6) Farm typology specific diversification options with</p>	<p><b>Outputs in 6 months:</b></p> <ol style="list-style-type: none"> <li>1. Crop intensity;</li> <li>2. Data collection for model building;</li> <li>3. Questionnaire developed and survey initiated;</li> <li>4. Laying out of field trials-Report;</li> <li>5. Layout of field trials-Report;</li> <li>6. context specific rainfed agro-horticulture systems -rainwater harvesting, irrigation methods &amp; survivability assessed- Report;</li> <li>7. species monitoring and SWC intervention in participatory mode common silvo-pastoral-report;</li> <li>8. sampling plan finalized, identify crops, CPRs and sites;</li> <li>9. Household (HH) livelihood assets, production systems and capacity to intensify assessed quantitatively and HH livelihoods and production strategies understood; secondary data compilation and questionnaire prepared/Well adapted cactus accessions to SA identified;</li> <li>10. Villages identified with CAZRI and GRAVIS in the targeted districts;</li> <li>11. Identifying sites and farmers;</li> <li>12. on-farm assessment of integrated farming systems under extreme dry conditions (arid);</li> <li>13. Trainings for women and men farmers;</li> <li>14. Group trained on gum inducing technology and goat breed and marketing; weight basis marketing of goats initiated;</li> <li>15. Data collection, FGDs, workshop related to management of CPRs;</li> <li>16. Analysis of data on shnkhpshpi cultivation and site selection for next season;</li> <li>17. site selection and sampling plan finalized, observation points identified, soil profile analysis completed -Data set;</li> <li>18. Innovation platforms, Meetings.</li> </ol> <p><b>Outputs in 12 months:</b></p> <ol style="list-style-type: none"> <li>1. LGP, Suitability matrix;</li> <li>2. Analysis of generated data;</li> <li>3. Report on gender roles and gender integration opportunities in crop-livestock systems;</li> <li>4. Analysis of data-Report;</li> <li>5. Analysis of data-Report; 6. evidence on context specific rainfed agro-horticulture systems -</li> </ol>	494.2
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	<p>resource conservation and high value crops (arid horticulture);          (7) To identify NRM options for sustainable management community silvi-pasture systems for enhanced biomass productivity, biodiversity &amp; livestock production;          (8) To identify best utility crops/cultivars and grasses under different management systems in crop-livestock systems;          (9) To investigate the current state of knowledge of farmers about this new technology, analyze farmers' willingness to adopt this technology into a quantitative framework while providing a set of explicative factors that might facilitate the adoption of this promising technology in India, and determine best season for planting cactus pads in the field (on-station trial);          (10) To out-scale already proven improved varieties and best practices identified in 2013. To identify new varieties better than previously selected ones.</p>	<p>rainwater harvesting, irrigation methods &amp; survivability assessed- Report;          7. Biomass productivity, species diversity assessment and livestock linked fodder harvesting and utilization;          8. Samples collected and analyzed- report;          9. State of knowledge of farmers about this technology assessed/Farmer's willingness to adopt this technology analyzed and determinants/drivers of this technology assessed;          10. Identified farmers were provided improved varieties' seeds i, and other inputs like fertilizers. Trials of different varieties were taken in participatory mode;          11. Field trials-Report;          12. Strategy for climate change ready farming systems;          13. Trainings for women and men farmers;          14. Evidence generated on innovations in goat marketing and enhanced gum production by women;          15. Institutional options for management of CPRs and khadin system- Local committees formed- Report; 16. Comparative benefits assessed and farmer market link institutionalized; 17. Data on soil profile moisture and impact parameters; 18. Workshops- Proceedings.  <b>Outcomes:</b>          1. NARES adopts the processes, methods for upscaling technologies; 2. NARES adopts methods and process for Climate informed decisions for farmers; 3. NARES uses the processes, methods and identified strategies on gender integration;          4. NARES adopts the processes, methods and evaluated options for enhanced resilience in most vulnerable region (Thar desert);          5. NARES adopts the processes, methods and evaluated options for enhanced resilience;          6. NARES adopts the processes, methods and evaluated diversification options for enhanced resilience under water scarce rainfed environment (indigenous technologies and modern science integrated);          7. NARES and community will have hands on practice and change their perception of NRM to improve productivity &amp; eco system services for sustainable management of common silvi-pasture, which has potential of upscaling to more than 800,000 ha area in arid Western Rajasthan;          8. NARES adopts the processes, methods and evaluated options fodder resource development;</p>	
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	<p>To enhance capacity development of farmers and extension agents through farmers' field school, training, field days, etc;</p> <p>(11) Assessment of potato crop as diversification strategy;</p> <p>(12) Develop small khadins as integrated farm systems- water ponding, contour bunding, crops &amp; trees and crop planning of traditional khadins;</p> <p>(13) Gender inclusive capacity strengthening of individuals, community and institutions;</p> <p>(14) Pilot women group based production &amp; marketing of small ruminant and gum from A. Senegal;</p> <p>(15) Drivers for sustainable management of CPRs- khadins &amp; common pasture and innovative options of collective action and governance;</p> <p>(16) Develop sustained value chain of medicinal plant- <i>Convolvulus pluricaulis</i> &amp; <i>Leptadenia reticulata</i> in Barmer;</p> <p>(17) Assessment of soil profile moisture under khadin systems for optimizing cropping systems</p>	<p>9. Main cactus accession for fruit and forage production disseminated to farmers/Farmers are aware of the advantages of cactus and have adopted it (Indicator: at least 50 farmers adopt cactus plantation)/Recommendations on good practices and well adapted cactus varieties are disseminated;</p> <p>10. Yield advantage with improved varieties will be documented and also farmers response on the crops. Best varieties will be recommended for coming years, Also farmers will be made aware on crop-diversification;</p> <p>12. NARES uses the processes, methods and IFS models for upscaling in similar dry areas;</p> <p>13. Capacity strengthening results into productivity enhancement;</p> <p>14. Input to matrix of resilience and intensification options;</p> <p>15. Established strategy for sustainable management of CPRs;</p> <p>16. NARES adopts the processes, methods and value chain development strategy;</p> <p>17. NARES use the processes, methods and hydrological information for crop planning and NRM interventions in similar areas;</p> <p>18. Platform is used for structure initiatives and convergence among stakeholders.</p> <p><b>CD Results:</b></p> <p>2. Farmer meetings;</p> <p>4. Farmers trained to take climate informed production decisions;</p> <p>5. Farmers trained to take climate informed production decisions;</p> <p>6. Seminar presentation on typology;</p> <p>7. community's capacity is strengthened on CPRs sustainable management and governance structure;</p> <p>9. Capacity building and networking of all stakeholders/Farmers Field Days/FFS/Trainings to enhance co-learning and farmer to farmer innovations will be organized;</p> <p>10) Capacity development of farmers on improved practices at selected field locations also on pre and post-harvesting to women farmers;</p> <p>11. Farmers learn on new crop production; 13. On-farm trainings and exposure visits; 18. Two workshops; 10 meetings with stakeholders.</p> <p><b>Gender Results:</b></p> <p>1. opportunities gender empowerment under crop-livestock system identified and shared with stakeholders;</p>	
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	<p>and assess impact of landscape level NRM interventions; (18) Strengthening convergence with govt. departments for institutionalizing R4D.</p> <p><b>Methods:</b> (1) Context Similarity mapping and context-option matrix approach (2) Context-option matrix (3) On-farm experiment (5) Household surveys (4) Adoption analysis (5) Participatory technology development (6) Gender analysis (7) Vulnerability analysis</p> <p><b>Gender dimension:</b> (1) To identify sources of food and nutrition for women and children's (2) To assess the availability and alternative sources of food supply and; to assess the vulnerability of women and children;</p>	<p>2. options addressing women food preferences, drudgery reduction are promoted; 3. options addressing women food preferences, drudgery reduction are promoted; 4. women empowered through women based small scale diversification options; 5. women are part of CPR management (sub committee for harvesting and sharing); 6.Role of woman in adopting new options such as cactus as a multi-purpose species evaluated; 7. Women are important stakeholders and in performs all the operations in agriculture and will be documented; 8 .strategy for women participation in operational management of common silvi-pastures;</p>	
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5.3	Irrigated Crop Systems interventions	<p><b>Location:</b> <a href="#">Anantapur and Kurnool districts, Andhra Pradesh (India)</a></p> <p><b>Overall objective</b></p> <p><b>Objectives:</b>          (2) Strengthen blue and green water resources for intensification and shifting to high value agriculture and improved livelihoods;          (3) Enhance water use efficiency;          (4) To promote and evaluate high quality and yielding fodder grasses/trees to strengthen livestock based livelihoods. Develop site of learning for technological and institutional interventions to manage CPRs and fodder augmentation;          (5) To promote economical ways of farm operations and reduce drudgery particularly of women;          (6) To assist farmers diversify some acreage into high value agriculture for regular and high incomes and improving family nutrition;</p>	<p><b>Outputs in 6 months:</b></p> <ol style="list-style-type: none"> <li>1. Implementation of participatory trials (300 no.) reported;</li> <li>2. Participatory identification/implementation of interventions (~10 water harvesting structures) reported;</li> <li>3. Participatory identification of farmers (~6 no.) and crops (at least 3) reported;</li> <li>4. Participatory planning and implementation of NRM, planting/maintaining fodder grasses/trees reported;</li> <li>5. Participatory planning and implementation of mechanization options (for sowing) reported;</li> <li>6. Participatory planning and implementation of crop diversification options reported;</li> <li>7. (1) Base line data on cropping systems, yields, aquifer related data, rainfall etc collected and prepared for modeling; (2) demarcation of the scale (micro-watershed) within the action site for developing a model; (3) Framed field experiment on water conservation and use decisions conducted with the members of the user group;</li> <li>8. Participatory planning and working out institutional mechanism for seed system reported; 9. Training (~12) of farmers (~300 farmers; at least 20% women) conducted before start of season;</li> <li>10. Training/exposure visit (At least 4 no.) of farmers conducted before start of season; 11. Platform partners meeting/workshop (at least one) conducted for orientation and synergizing actions for effective implementation of interventions;</li> <li>12. Participatory identification of farmers (~50 no.);</li> <li>13. Data collection and synthesis of results for post rainy 2014-15 season trials; participatory planning for rainy 2015 season and implementation of improved management reported.</li> </ol> <p><b>Outputs in 12 months:</b></p> <ol style="list-style-type: none"> <li>1. Crop cutting experiments conducted, data collected and synthesized; 2. Blue and green water conservation practices (~20 water harvesting structures) implemented;</li> <li>3. Participatory implementation of drip/sprinkler irrigation system on farmers' (~6 no.) fields;</li> <li>4. High yielding fodder grasses/trees planted on common property resources and farmers' fields (10 no.);</li> <li>5. Participatory planning and implementation of mechanization options (for sowing/intercultural/harvesting/threshing) reported; 6. Yield data recorded, results synthesized and reported;</li> </ol>	354.338
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	<p>(7) To boost productivity of the principal dry land crops in the action site through new institutional arrangements based on information generated by participatory modeling of social ecological systems;          (8) To put in place a business model of seed system to disseminate improved seeds to large number of farmers and generate a livelihood option;          (9) Capacity building of farmers and stakeholders for sustainability;          (10) Capacity strengthening of farmers to be effectively able to manage drip irrigation;          (11) To ensure effective convergence and collective action;          (12) Risk aversion for farmers from variations of weather; To take improved management to large number of farmer's fields for improving productivity and incomes.</p> <p><b>Methods:</b>          (1) Context Similarity mapping and context-option matrix</p>	<p>7. (1) Hydrological model generated and validated by stakeholders (Report); (2) Agent-based model on role of information on decisions of resource management (Report);          8. Seed bank established with HY seeds of major crops;          9. Training (~20) of farmers (~500 farmers; at least 20% women) conducted before start of season and during mid-season; Field days (4 no.; &gt;200 farmers with at least 20% women) conducted in all villages;          10. Training/exposure visit (~8 no.) of farmers conducted before start of season and during mid-season;          11. Proceedings of the meeting(s)/workshop;          12. Participatory implementation of weather based crop insurance;          13. Data collection and synthesis of results for rainy 2015 season trials/participatory planning for post rainy 2015-16 reported.</p> <p><b>Outcomes:</b>          1. Enhanced crop yields by &gt;20% in participating farmers fields;          2. More blue water (additional ~1000 m3) available for intensification;          3. Enhanced water use efficiency (&gt; 25%);          4. High yielding and nutritious fodder grasses/trees established. Enhanced productivity (0.5 t fodder ha-1);          5. Enhanced efficiency (doubled) of operations and reduced (halved) drudgery particularly for women; 6. Enhanced incomes (~double) from diversified areas and family nutrition through consumption of diversified food;          7. (1) Rules for water conservation and sharing created by the user group; (2) Successful irrigation of the groundnut crop of all members in user group at critical growth stage; (3) Significant yield increase in groundnut crop;          8. Availability of HY seed (for &gt;20 ha) enhanced and women empowerment as is mainly women focused activity;          9. Enhanced awareness and skills of farmers and stakeholders (~500 farmers; at least 20% women); More number of farmers (at least 100 farmers with at least 10% women) convinced and motivated to adopt improved management;          10. Enhanced awareness and skills of farmers and stakeholders (~200; at least 10% women);          11. Enhanced synergy through collective action by partners.</p>	
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	<p>approach            (2) Context-option matrix            (3) On-farm experiment            (5) Household surveys            (4) Adoption analysis            (5) Participatory technology development            (6) Gender analysis            (7) Vulnerability analysis</p> <p><b>Gender dimension:</b>            (1) To identify sources of food and nutrition for women and children's            (2) To assess the availability and alternative sources of food supply and; to assess the vulnerability of women and children;</p>	<p>12. Farmers (50 no.) secured from losses through variations of weather; 13. Enhanced productivity (&gt;20%) realized on large number (&gt;10000 no.) of farmers fields.</p> <p><b>CD Results:</b>            1. Enhanced skills of participating farmers (&gt;300 no.) in soil fertility and improved varieties management;            2. Enhanced skills of farmers in harvesting rainwater for intensification and livelihoods improvement;            3. Farmers (~6 no.) capacity strengthened in implementing drip/sprinkler irrigation technology as pilot testing;            4. Enhanced awareness and skill development in common property natural resource management. Capacity strengthening of farmers (~10 no.) in growing high yielding fodder grasses/trees;            5. Awareness and skill development in efficient farm mechanization;            6. Farmers (~50 no.) skills improved in successfully diversifying to high value crops;            7. Development of hydrological models with community participation enhanced awareness of farmers and non-farmers and lead to social (re)construction of the water scarcity problem. Community's decisions of improved resource management measured through the enhanced and informed participation of members in collective action;            8. Capacity strengthening in institutionalizing seed systems (at least 1 self help group) for ensuring availability of high quality seeds and as livelihood option;            9. Enhanced awareness and skills of farmers and stakeholders (~500 farmers; at least 20% women); More number of farmers (~90 men and 10 women) convinced and motivated to adopt improved management; 10. Enhanced awareness and skills of farmers and stakeholders (~200 farmers; at least 10% women);            11. Awareness about plan of work implementation enhanced amongst partners;            12. Farmers (50 no. including 5 women farmers) awareness increased about risk aversion methods;            13. Enhanced skills of participating farmers (&gt;10000 no.) in improved management practices.</p> <p><b>Gender Results:</b>            1. Trials/demonstrations with women farmers (~20 no.) are promoted;            2. Women focused interventions like kitchen gardening, vermi-composting etc. Promoted;</p>	
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			<ol style="list-style-type: none"> <li>3. Water saving for implementing women focused interventions like kitchen gardening;</li> <li>4. Gender empowerment through bigger role in management;</li> <li>5. Reduced (halved) drudgery for women farmers;</li> <li>6. Women empowerment because of being women-centered activity;</li> <li>7. Impact of information related to ecological dynamics on enhanced participation of women farmers assessed by the agent based model which includes women farmers;</li> <li>8. Women empowerment as is mainly women focused activity;</li> <li>9. Enhanced awareness and skills of women farmers and stakeholders (~100 no.); More number of women farmers (at least 10) convinced and motivated to adopt improved management;</li> <li>10. Enhanced awareness and skills of women farmers and stakeholders (~20 no.);</li> <li>11. Women farmers (~5 no.) secured from losses through variations of weather;</li> <li>12. Gender empowerment through inclusion of large number of women farmers.</li> </ol>	
5.4	Irrigated Crop Systems interventions	<p><b>Location:</b> <a href="#">Bijapur district, Karnataka (India)</a></p> <p><b>Objectives:</b></p> <p>(1) To have better understanding of the existing crop and tree diversity on farm, in the market and in the diet;</p> <p>(2) To understand if the existing diversity is sufficient to empower farmers for climate change adaptation for household food and nutrition security;</p> <p>(3) to plan intervention for genetic base-broadening of farming system for resilience agricultural production;</p>	<p><b>Outputs in 6 months:</b></p> <ol style="list-style-type: none"> <li>1. Baseline survey across all sites in India completed and data analyzed &amp; reported;</li> <li>2. report/ working paper on estimation of systems resilience prepared;</li> <li>3. Derivation and validation of representative households reported;</li> <li>4. Data collected for model building;</li> <li>5. Report on layout of field trials prepared;</li> <li>6. Report on layout of field trials prepared;</li> <li>7. site (3) and farmers (30 farm families) selected and trials planned;</li> <li>8. Interventions plans for three action villages;</li> <li>9. Report on layout of field trials (4) prepared;</li> <li>10. Construction of typology specific options-report;</li> <li>11. Construction of water recharging/harvesting structures (4 farmers) and identify sites for in-situ moisture conservation;</li> <li>12. Data collected for estimating WUE;</li> <li>13. Trainings for women (30) and men farmers (100);</li> <li>14. Data collected on feasibility and potential benefits of CPRs- Questionnaire developed;</li> <li>15. Innovation platforms, Meetings;</li> <li>16. Data collection and synthesis of results for post rainy 2014-15 season trials; participatory planning for rainy 2015 season and implementation of improved management reported.</li> </ol>	<b>434.021</b>



(4) To measure household's resilience and influencing factors and quantify the implications and tradeoff of technology and resource constraints at household level;  
 (5) Assess climate variability risk analysis based on historical as well as future climate change scenarios;  
 (7) Dual purpose high yielding cultivars and context specific integrated crop management as part of intensification and resilience building for legumes and cumin, mustard;  
 (8) context specific management packages incorporating climate risk aspects for post-rainy sorghum based systems;  
 (9) evaluate improved dual purpose crops and possible trade offs in crop residue use between feeding and soil improvements; (10) evaluate improved dual purpose crops and possible trade offs in crop residue use between feeding and soil improvements;  
 (11) Testing new practices with

**Outputs in 12 months:**

1. Intervention plans for crop diversification finalized for implementation;
2. livelihood strategy identified- Paper;
3. Report on whole farm scenario analysis of technologies;
4. Analysis of generated data;
5. Analysis of data reported;
6. Analysis of data reported;
7. trials (30) implemented and trade offs analyzed;
8. Intervention plans at project sites in place and intervention activities initiated (180 farmers);
9. Economics of new interventions/adaptation methods-Report;
10. Typology specific technologies- Field trials for 25 farmers;
11. Working paper/report on benefits due to moisture availability and intensification quantified;
12. Data collected and analyzed for Nitrogen use efficiency & WUE; 13. Trainings for women (70) and men (200) farmers;
14. Analytical report on options and feasibility for CPRs;
15. Workshops attended by >50 IP members;
16. Data collection and synthesis of results for rainy 2015 season trials; participatory planning for post rainy 2015-16 reported.

**Outcomes:**

1. Farmers (at least 180) across four of the project sites agreed to maintain and use an increased availability to diversity of indigenous crops and tree species which enhances adaptation, resilience and improves income generation opportunities and become members of Farmers Experimental Network;
2. NARS adopts the processes, methods for enhancing resilience;
3. NARS adopts the tools, methods for farming system development;
4. NARS adopts methods and process for Climate informed decisions for farmers;
5. NARS adopts the processes, methods and evaluated options for enhanced resilience;
6. NARS adopts the processes, methods and evaluated options for enhanced resilience;
7. NARES adopts the processes, methods and evaluated options for enhanced resilience;
8. Farmers (at least 180) across four of the project sites maintain and use an increased



	<p>Micro irrigation in selected sites;          (12) Farm typology specific diversification options with resource conservation and high value crops (arid horticulture);          (13) Harnessing green water and blue water for enhanced crop productivity under rainfed farming systems;          (14) Crop management decision options based on seasonal rainfall forecast for enhanced WUE, NUE;          (14) Identifying the drivers for sustainable management of CPRs- common pasture; (15) Strengthening convergence with govt. departments for institutionalising R4D;          (16) to upscale the identified most promising technological options for enhancing productivity and farmers livelihoods.</p> <p><b>Methods:</b>          (1) Context Similarity mapping and context-option matrix approach          (2) Context-option matrix</p>	<p>availability to diversity of indigenous crops and tree species which enhances adaptation, resilience and improves income generation opportunities;          9. NARS adopts the processes, methods and evaluated options for enhanced resilience of production system in a water scarce environment;          10. NARS adopts the processes, methods and evaluated diversification options for enhanced resilience under water scarce rainfed environment;          11. NARS adopts the processes, methods and options for enhanced access to blue and green water for increased climate resilience;          12. NARES adopts methods and process for Climate informed decisions for farmers;          13. Capacity strengthening results into productivity enhancement;          14. Options for sustainable management of CPRs shared with NARS (IP); 15. Platform is used for structure initiatives and convergence among stakeholders; 16. Enhanced productivity (&gt;15%) realized on large number (&gt;10000 no.) of farmers' fields.</p> <p><b>CD Results:</b>          1. 4 farmers groups organized; 2. Seminar presentation (1) - 50 participants (30% women);          3. one training on whole farm analysis to scientist - 12 participants (25% women);          4. Farmer meetings (3): 160 farmers (25% women);          5. Farmers trained to take climate informed production decisions (200 men and &gt;50 women farmers);          6. Farmers trained to take climate informed production decisions (200 men and &gt;50 women farmers);          7. Resulted shared through innovation platform (&gt;50 persons);          8. Resulted shared through innovation platform; 10. one seminar presentation on typology building approaches (30 male and 15 female participants);          8. Farmer field day (2); 12. Farmer meetings (2);          9. On-farm trainings and exposure visits (70 women and 200 men farmers);          10. Two workshops; 10 meetings with stakeholders;          11. Enhanced skills of participating farmers (&gt;10000 no.) &amp; extension agents in improved management practices.</p> <p><b>Gender Results:</b></p>	
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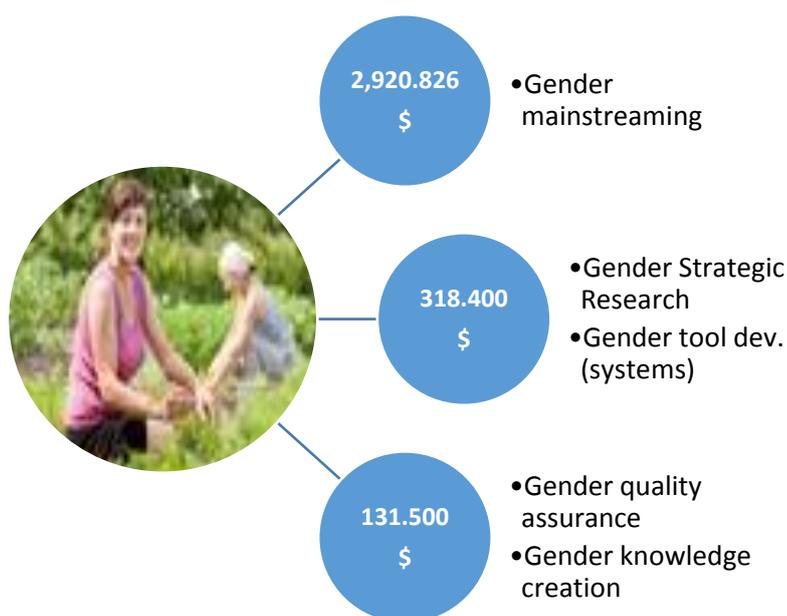
	<p>(3) On-farm experiment (5) Household surveys (4) Adoption analysis (5) Participatory technology development (6) Gender analysis (7) Vulnerability analysis</p> <p><b>Gender dimension:</b> (1) To identify sources of food and nutrition for women and children's (2) To assess the availability and alternative sources of food supply and; to assess the vulnerability of women and children; (15) To build capacity women and youths in vulnerability management</p>	<p>1. At least 4 self help groups involving 50 women's organized to promote the value of crop diversity; 2. options addressing women food preferences, drudgery reduction are promoted (dual purpose crops &amp; mechanization) &gt;50 women; 3. Options addressing women food preferences, drudgery reduction are promoted; 4. Women choose better dual crops; 5. at least 4 self help groups are formed involving 50 women farmers growing traditional varieties and learning the value added advantages of these crops and varieties; 6. Women capacity strengthened-two trials; 7. Women empowered through diversification options (at least 5 women); 11. 25% are women farmers; 8. At least 70 women farmers' capacity strengthened. 9. Gender empowerment through inclusion of large number of women farmers (at least 20%).</p>	
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## Table 2 Gender Research

Gender concerns are mainstreamed into research and work plans of CRP Dryland Systems of 2015. This ensures that all stakeholder and actor relevant activities are gender-responsive and gender-sensitive. This enhances the quality and development impact of these activities as the perspective of all stakeholders, women and men, is taken into consideration, and thus the contribution of all, women and men, to research, trials, innovation and policy planning is taken into account; ultimately, the access to the benefits of CRP DS interventions into value chains and agro-economic systems is equitably open to women and men, contributing to gender equality and leading, of course, to a decisive contribution to overall development goals such as poverty reduction.

To achieve specific IDOs and related outcomes, specific gender research is required, as it is to refine approaches and methods of gender analysis and a systems approach including social, economic and cultural systems (which pertains also to gender). To improve knowledge on gender, gender experts of the five flagships of CRP Dryland Systems coordinated among themselves research on gender-responsive agricultural extension services and on wage gap, workers conditions and decision making of income of female agricultural laborers (five surveys and studies). Honing out gender research approaches especially regarding systems approaches, is done by systems and gender experts within the CRP Dryland Systems PMU, and tested in two researches carried out in three flagships on diversity management and decision making on farm household level. This is reported under the Flagship Overarching Program.

To ensure high quality of work regarding gender across CRP DS, knowledge sharing and creating on gender approaches is budgeted as well. Gender will be a subject in all Interdisciplinary Research Team (IRT) and other relevant coordination bodies, it will be a focus in at least ten training events, and it will receive specific attention in all virtual and physical meetings of the Gender Working Group.





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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