Extension Proposal to CGIAR Consortium Office

April 25, 2014

Toward a Systems Approach

Working with integrated agro-ecosystems to improve rural livelihoods

Contents

1. Intermediate development outcomes, Theories of Change and Impact Pathways

1.1 Overview

This Extension Proposal sets out the key activities of the CGIAR Research Program on Dryland Systems for 2014-2016 and the results framework that guides them. It presents a sharpened *activities and outcomes framework* that improves the program's management and tracking of its progress and outcomes.

Program objectives

Dryland Systems aims to improve livelihoods in two distinct drylands agro-ecosystem types:

- **Marginal, low-productivity areas**, where people need support to mitigate vulnerability and solutions for resilience for food production.
- **Areas that have the potential to improve productivity**, where people need support to engage in the sustainable intensification of their agricultural production.

Program research-for- development architecture

Flagship Programs

- West African Sahel & Dry Savannas
- North Africa & West Asia
- East & Southern Africa
- Central Asia
- South Asia

Agricultural Livelihood Systems

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

1.2 Achievements to date (2013)

The program was launched in mid-2013. The key achievements and progress during this period are:

- **Dryland Systems in action: many systems-based projects integrated the program.** A wide range of formerly diverse projects – from the nine core partners, many NARS and local organizations – are now integrated into the Dryland Systems framework (see Figure 1). In the five Flagship Target Regions, some projects are at the *discovery* phase, others in *pilot testing* and others tested and *ready for out-scaling*. A new crop of proposals and project concepts is the first generation of *integrated agro-ecosystems projects* designed and developed by the partners in the Dryland Systems culture.
- **Innovation Platforms created**. 15 Innovation platforms linked to Action Sites were created in formal processes with all partners.
- **Gender strategy.** The program's Gender Strategy aims for more gender integration in agro-ecosystems. A Dryland Systems gender core team is in place, composed of two gender and one socio-economics/gender professionals in the lead center, and similar positions with partners.
- **Building the portfolio of new funding proposals for a systems approach.** Since 2011, research proposals by partners are targeting a systems approach and have explicit links to the Dryland Systems program.
- **Dryland Systems is a 'systems resource' and gateway for commodity CRPs.** As it develops its systems approach, the program offers a platform for testing and fine-tuning of technologies, in an integrated agro-ecosystems setting that reflects the daily reality of people living in dryland communities. Other programs will have a useful feedback loop on how their research can be most relevant to user communities in the world's drylands, validated in the program's Agricultural Livelihood Systems.
- **Business processes –** simplification and clarification of outcomes and result areas, staffing of most Action Sites. The program structure reflects the structure of the CRP Phase 2 Call planned for 2016.

1.3 Extension phase – plans, targets and investment for 2014-2016

In the program's Five Flagship Programs (regions), a range of activities and outputs is in progress. These are detailed in section 5. In summary, the Flagships are generating groups of outputs under five themes.

The program's key investments areas for the coming two years are:

- **Well-functioning innovation platform/value chains:** Developing and progressing work in 15 and more innovation platforms for Agricultural Livelihood Systems. Combining and testing integrated packages with communities, in areas such as crop-livestock systems, wheat legume systems, integrated watershed management, diversification of production systems, rangeland rehabilitation (forage-

livestock-crop-natural resource management), new income opportunities for women and communities for value added products (milk, cheese, wool products).

- **Assessments, methods, approaches, publications – strengthening the Dryland Systems evidence base.** A wide range of baseline studies, surveys and assessments, such as: crop variety resistance to pests and diseases; performance assessment of new crop varieties and farming practices, such as raised-bed planting, deficit and precision irrigation or conservation agriculture; socio-economic studies including monitoring and evaluation of work in progress, gender and women's access to resources, access to markets and the functioning of market mechanisms for value chains; natural resource management assessments (watershed, water harvesting).
- **Resilience and intensification options and approaches for communities** – packaging and testing options with communities for resilience in marginal areas and for intensification I higher potential locations in the program's action sites.
- **Putting knowledge sharing and learning into action** – progressing a strategy and approaches to ensure continuous learning, and the synthesis and exchange of information, linking between the program's Flagship Regions and Agricultural Livelihood Systems. Activities include design and delivery of knowledge sharing and learning processes and events, creation of value-added knowledge products and services derived from the on-going research (spatial data, maps and packaged data, policy-shaping information, tools, lessons learned, etc.); and delivering information management processes and structures for capturing and organizing all program information and making it available through Open Access standards.
- **Partnership & Capacity Strengthening** – progressing and strengthening a range of partnership and capacity building activities in all locations.

1.4 Looking ahead – Dryland Systems in 2014-2016 and positioning for CRP Phase 2

The activities described in this proposal and planned activities in the coming two years are on a continuum that feeds into the Phase 2 CRP Call. The results framework places each activity on a pathway ranging from discovery research to out-scaling and large scale implementation (see Figure 1). The goal is to actively progress each project from research to use. In this way, all current projects and proposals being started and developed in the coming three years are designed to feed into the CRP Phase 2 approach.

1.5 Making the systems approach work

A key challenge for Dryland Systems is to effectively apply a systems approach and understand how it can best be applied in the specific context and 'personality' of the different partnerships, innovations and regions. Critical success factors for making a systems approach work are: identifying diverse stakeholders and motivating them to work toward common goals; working in teams with divergent interests; and building a culture of continual sharing and exchange of ideas. Clearly establishing how Dryland Systems adds value to other CRPs and bilateral projects (and vice versa) is a target in this Extension Phase. Dryland Systems partners are making progress in adopting the systems approach and this experience is being shared across the Flagships. The program's sharpened impact pathway greatly facilitates the in-depth analysis of the activities and their role in bringing about outcomes, within and across Target Regions. The sharpened impact pathway is an effective guide and management tool (See Figure 1 and Table 1).

1.6 Tracking progress – Monitoring and Evaluation

Internal monitoring and evaluation (M&E) is an essential tool for Dryland Systems to track progress in and across the program, and to identify options for learning across Target Regions. To achieve this, the Flagships are implementing quantitative definitions of expected outputs by activity on the impact pathway to track if it is producing the targeted outcomes. This includes the timeframe in which the outputs are realized. Dryland Systems management will use these quantified achievements as the

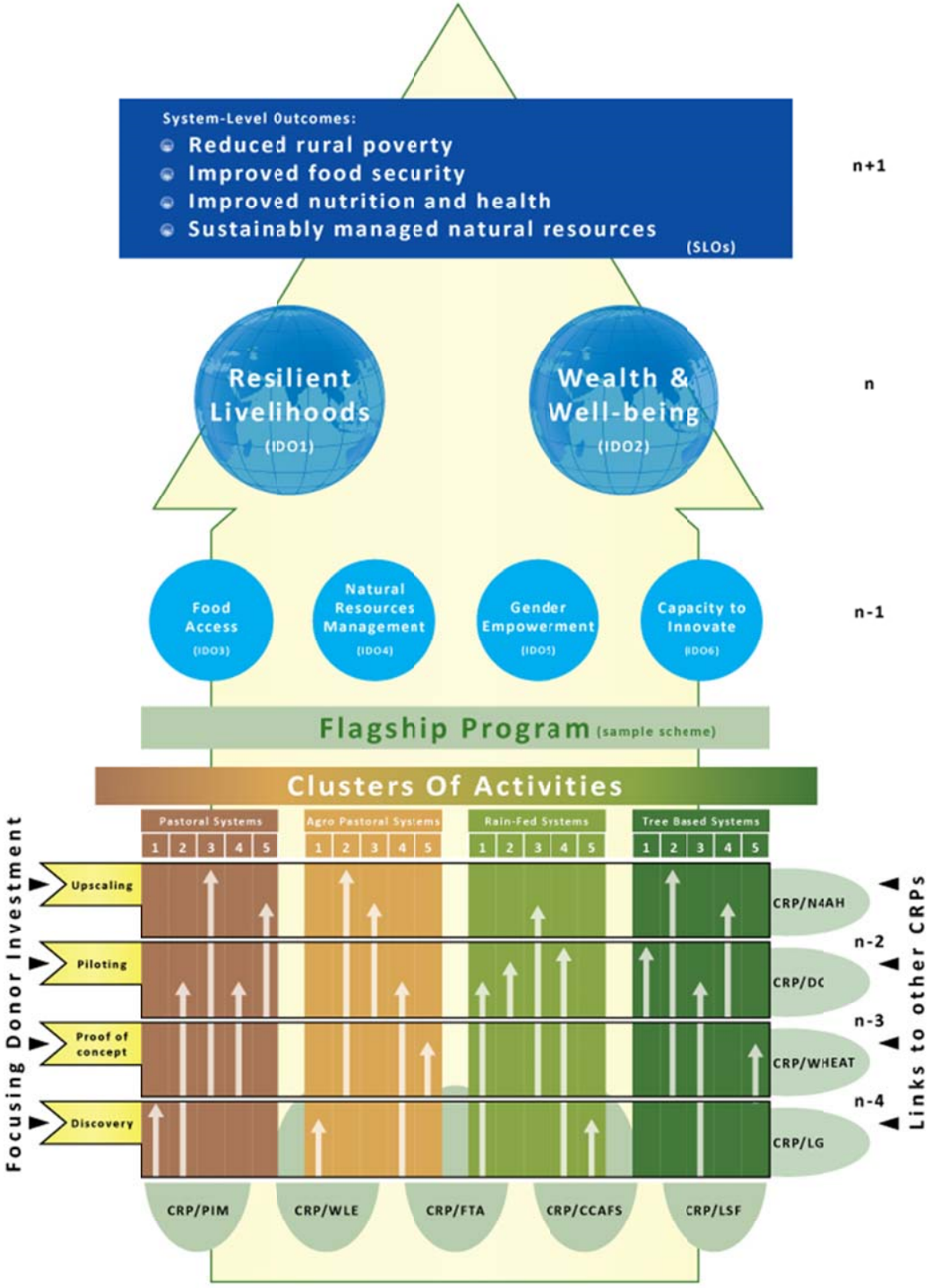
metrics for measuring progress and performance. This evaluation process will be repeated annually for internal M&E.

Potential changes over the coming decade that will influence the theory of change, partners or research questions

1. Partners are currently assessing developments that may occur in the coming decade that will change the ToC, affect the focus the program's focus and ability to deliver.
2. The Intergovernmental Panel on Climate Change (IPCC) stated that if the increase in global temperature moves from 2^{o}C to 3^{o}C or more, many of the advantages for crop growth of an increased level of CO_2 will be nullified or worse. Many drylands are currently already approaching temperature increases of around 3^{o}C compared to the IPCC benchmark.
3. Water scarcity is predicted to become an additional ingredient for potential civil strife, which will hit drylands soonest and hardest.
4. The world's drylands, as addressed in this program, are home to various livelihood systems, including nomadic and sedentary lifestyles. As arable land in drylands is, by definition, low, the pressure to expand sedentary agriculture into the rangelands is already resulting in violent clashes between farmers and pastoralists. As the tipping point is reached for pastoralists in terms of the reduction in rangeland, and arable land being increasingly used for food to feed growing populations, sustainable pastoralism becomes more difficult, and clashes could develop into local wars.
5. At the same time natural resources could become over- exploited to the point of no return. If the 70% of the drylands now dedicated to rangelands follows a downward spiral to become officially classified as desert, it will be next to impossible to bring these lands back to rangeland status. This trend will take many drylands populations from a win-win/zero-sum game to one where the pie is continually shrinking, as food demands grow. Rural to urban migration will reach intensities not seen before.
6. Donor interest is expected to further grow for Dryland Systems, as the realization grows that it works at one of the cutting edges of climate change impact, water scarcity. The research in Dryland Systems can be expected to have global relevance for regions presently not yet classified as drylands, including those of major donor countries.

Dryland Systems research-for-development architecture

Dryland Systems Results and Management Framework - This example shows how the program integrates the program's Activities and Outputs, and the 4-phased pathway for research results to progress to six intermediate development outcomes, and on to SLOs. It also shows entry points between Dryland Systems and other CRPs and how donors can target investments at specific parts of the program. Figure 1 (see also Annex 1).



Agricultural Livelihood Systems view – table 1

Agricultural Livelihood Systems – a new, practical unit of measure for systems research

The Dryland Systems science program and Target Regions are now centered and cross-linked around seven Agricultural Livelihood Systems that are common to 80% of activity clusters across Flagship Programs. This approach will greatly improve cross-program learning and integration.

Agriculture Livelihood Systems (ALS)	WAS&DS	NA&WA	E&SA	CA	SA
Pastoral systems: constrained by over- grazing, land degradation, climate variability and seasonal gaps in feed supply.	Sahelian long-distance transhumant		Pastoral (livelihoods are mainly anchored on the production of livestock and livestock products in marginal areas where crop production is extremely difficult);		Rangeland
Agro-pastoral systems: constrained by overgrazing, rangeland/forage feed imbalances, land degradation, soil erosion, pastoralists and crop growers' conflicts, and climate variability.	Transitional Sudano-Sahelian systems based on millet-cowpea-livestock, with high population densities, land fragmentation and degradation levels (Maradi, Katsina, Fakara, Ouahigouya)	Arid agro-pastoral where the system is facing serious threat of degradation and water scarcity; agricultural livelihood is based on small ruminant, barley crop, and small-scale irrigation (Tafilah-Salamieh transect; Beni-Khedache Sidi Bouzid transect; Karkheh river basin)	Agro-pastoral (livelihood mainly anchored on a combination of the production of livestock and livestock products with the production of some crops (cereals, annual legumes and vegetables))	Agro pastoral livelihood systems (Aral Sea, Rasht)	Agro-pastoral
Intensive rain-fed systems: constrained by land degradation, nutrient deficiencies, climate variability and water scarcity.	Sudanian, intensified cotton-cereal or cereal-legume based systems with cash crops, market demand and mechanization (Koutiala, Kano, Tolon)	Intensive rain-fed where wheat-based cropping system is prevalent, land fragmentation and where potential of aggregation is possible, horticulture (potato, tomato, fruit trees) is intensifiable and market-oriented including for export. Livestock is mainly intensive dairy cattle production (Meknes-Saies in Morocco and Karkheh river Basin in Iran)	Crop based systems (livelihoods depend on agriculture with a focus on cereal and legume crops, cassava, trees with a small number of livestock (livestock sedentary)). Mixed crop livestock, trees, and fish farms (rain fed and irrigated)	Mountainous mixed (horticultural) system (intercropping, apples, potatoes, agroforestry; fruit-agroforestry) (Rasht)	Crop-based
Tree-based systems: constrained by fast degradation from humans; livestock over grazing, land degradation, climate change.	Trees, fruit tree and staple crop based systems, with both subsistence and market orientations (Orodara, Cinzana)	Mixed tree-crop-livestock; this system is a variant of agro- pastoral and intensive rain-fed. In arid agro-pastoral conditions the mixed system is based on rain-fed olive tree cropping with figs, almonds together with barley (Jordan and Tunisia sites); while in intensive rainfed wheat is mixed with fruit trees and dairy cattle (Meknes site)		Tree based (fruit tree) systems (Fergana, Rasht)	High value crops/ species
Irrigated crop systems: land is constrained by groundwater depletion, salinization, and heat stress.		Irrigation-based prevalent mainly in the Nile Delta site where market-oriented vegetable and fruit tree cropping is practiced together with intensive and high yielding wheat and forages. Cattle production for dairy production is also prevalent; this system is facing serious problems of salinity.		Irrigated cotton/wheat/rice systems (Aral Sea, Fergana)	
Homegardens systems				Vegetable / fruit home garden systems (urban & rural) (small in area, significant in nutrition) (Fergana, Aral Sea)	
Traditional subsistence systems	Northern Guinean and Southern Sudanian systems characterized by high LULCC rates, low mechanization level, high land fragmentation and high intra-field diversity				

Intermediate Development Outcomes view - table 2

Newly-focused Intermediate Development Outcomes (IDOs)	Target (2025) & Data source	Indicator Name	Explanation/Metric
IDO 1 RESILIENCE: More resilient livelihoods for vulnerable households in marginal areas	25%; Baseline survey (BLS), follow-up surveys	Household food security	Number (or %) of HH food insecure before and after dissemination and adoption of program outputs. % of HHs with more secure food (with increased and more stable per capita food access from farm sources and local markets).
	30% decrease avoided; BLS, follow-up surveys	Herd stability	Control livestock survival & destocking rate & replacement rate and the relevant reasons. (Livestock survival = ratio of adult survival at the end of the year to adult survival at the beginning of the year; Destocking rate = ratio of number of animals sold or slaughtered to total number of animals; replacement rate = number of yearling animals to total number of animals).
	20%; BLS and follow-up	Tree density and resilience benefits	Through remote sensing the change in density of trees attributable to program outputs and estimate the number of settled drylands HH who benefit from these program outputs through a higher and more even supply throughout the year and particularly during the dry season of tree based foods, goods and energy and incomes derived from this.
IDO 2 WEALTH AND WELLBEING: More sustainable and higher income and well-being of per capita for intensifiable households	20%; BLS, follow-up surveys	Income	Number (and %) of all HH who increased their income by at least 20% after dissemination and adoption of program outputs. Estimate % of low income HH who increased their income by at least 20%.
IDO 3 FOOD ACCESS: Women and children in households have year-round access to greater quantity and diversity of food sources	30%; BLS, follow-up surveys	Women and children dietary improvement	Estimate number (and %) of HH who improved their dietary scores after dissemination and adoption of program outputs.
IDO 4 NATURAL RESOURCES MANAGEMENT: More sustainable and equitable management of land, water resources, energy and biodiversity	25%; Assessment and modeling at field and watershed levels	Reduced land degradation	Amount of carbon sequestered will be increased by 20% over the baseline survey estimates. NARS would adopt improved management of PSs with the demonstrations at action sites. Soil erosion reduced by 25% as measured through sediment load in runoff measured. Sediment yield and runoff losses reduced as a result of implementing soil and water conservation interventions.
	20%; BLS, follow-up surveys	Increased water productivity of crops, trees and livestock	Economic, livelihood and/or biophysical outputs derived from use of a unit of water (e.g. $/cubic meter); $ return from marketable crops and tree and animal products per unit of water transpired or used to produce these products (e.g. total water consumed by the crop, tree or animal).Trade-offs between land and water productivity (Maximum water productivity, Optimum land productivity). Levels of natural resources (water and land), as compared to the initial situations, when best-bet management techniques/technologies are applied.
	25%; BLS and follow-up	% of reduction in ABD decrease over time	Change in levels of agricultural biodiversity (ABD) maintained by households and uses derived from it. It takes into consideration the number of crop species grown by households during the year (crop species richness at the household level)
	1-2% increase in soils with low or average OC contents	Enhanced soil fertility	Increased soil organic matter content that improves soil nutrient and water dynamics, soil structure and productivity. Measured as organic carbon (OC) content of soil (%).
	50% farmers using BMP	Best Management Practices adopted	Soil nutrient status and productivity improved through use of fertilizer and nutrient best management practices (BMP)
	25%; BLS and follow-up surveys	Use or adoption of sustainable agro-ecosystem management	Change in number of land-users applying sustainable agro-ecosystem management, and effects on natural resources; Number of land-users applying sustainable agro-ecosystem management with measurable reduction of land & water degradation, reduced depletion of soil, water & biodiversity, or increased efficiency.

	30%; BLS, recording by the project team	Increased livestock performance	Live weight gain (LWG), score of body condition, lambing rate, milk yield and litter survival (LWG = difference between final live weight (i.e. end of the control period) and initial live weight (start of the control period); Score of body condition is assessed by class using the PET method; Lambing rate = number of females giving birth to total number of females, Milk yield = amount milk produced by animal during milking period; Litter survival = ratio of litter size at weaning to litter size at birth).
IDO 5 GENDER EMPOWERMENT: Women and youth have better access to and control over productive assets, inputs, information, market opportunities and capture a more equitable share of increased income, food and other benefits	30% of the countries; BLS and follow-up workshops	Out-scaling gender equitable development interventions by NARS and partners	Changes based on initial assessments of level of gender-sensitive options promoted by partners and methods used, determine changes; Number of NARS and other partners adopting procedures for institutionalizing out-scaling gender-equitable development interventions
	30% of the countries; BLS and follow-up workshops	NARS and development partners adoption of guidelines for empowering rural women and increased gender equity	Change in uptake of women-empowering actions; Number of development organizations (national, International, NGOs, etc.) applying DS guidelines for empowering rural women and gender equity.
IDO 6 CAPACITY TO INNOVATE - Increased and sustainable capacity to innovate within and among low income and vulnerable rural community systems, allowing them to seize new opportunities and meet challenges to improve livelihoods, and bring solutions to scale.	20% of the organizations involved; BLS assessment and follow-up workshops	Organizational innovation by local communities	Change in uptake of organizational innovations; Number of community organizations or CBOs adopting innovative organizational approaches promoted.

2. Flagship Projects

Contribution to IDOs is detailed in Annex 2 for each FP and ALS.

2.1 Flagship Program 1: West African Sahel & Dry Savannas

The West African Sahel & Dry Savannas (WAS&DS) Flagship is put into action in two Transects: for increasing resilience and mitigating risk from biophysical and socioeconomic shocks in the Kano-Katsina-Maradi Transect (Niger and Nigeria); for sustainable intensification of production systems to improve livelihoods in the Wa-Bobo-Sa Transect (Ghana, Burkina Faso, Mali).

2013 achievements: value chains were established but not yet fully-integrated innovation platforms that count all actors along the impact pathway. For example, Nigeria spends $4billion on annual wheat imports. Wheat trials with new high-yielding, heat tolerant wheat varieties transferred from Sudan demonstrated an increase from 1-2 to 5-6 tons/hectare. New seeds were provided to 1600 farmers. The full package of crop rotations, water productivity, market connections need further development.

On-going activities: Discovery, proof-of-concept, piloting and up-scaling activities, specifically: A review of past dryland systems work and drawing lessons from successes, failures and gaps in knowledge for vulnerability reduction and sustainable intensification; evaluating vulnerability and risk management strategies; development and testing of value-adding strategies for post-harvest, processing and use of agricultural produce and by-products, including tree products; promoting local and regional exchange for scaling-up of promising intensification options; on-farm testing and technology evaluation; quantifying resource use and associated trade-offs to optimize community-level decision making on sustainable intensification and vulnerability reduction; facilitating knowledge exchange among different actors for better market access; analysis and testing of community-based strategies for resource management including land tenure/fragmentation, seed systems, conflict management, access to markets and financial services.

2.2 Flagship Program 2: North Africa & West Asia

The research Action Sites in North Africa & West Asia (NA&WA) cover some 144,914.0 km2 and are home to 320,000 households. Project activities for increased resilience of vulnerable agro-ecosystems: Beni Khedache – Sidi Bouzid Transect (Tunisia) and Tafilah – Salamieh Transect (Jordan-Syria), using diversification to improve the efficiency of livelihood systems. Activities for sustainable intensification: Meknes-Saies (Morocco) and Nile Delta (Egypt). Both resilience and intensification are targeted in Iran's Karkheh River Basin.

2013 achievements: Conservation Agriculture. The successful study, piloting and out-scaling of conservation agriculture in parts of Iraq and Syria. On-farm yield gains 20% reached, with fuel savings reduced by up to 40 liters per hectare, with less time and labor needed and less herbicide. Adoption on 40,000ha by 5000 farmers. Profitability grew by $350 per hectare. Work on integrated irrigated production in Egypt and pest management - 30% yield increase. **Community-based breeding lessons** from Ethiopia have the potential of large significant flock improvement. Technologies increasing water productivity have been successful in such irrigated systems as the Nile Delta, where cereal-legume/forage rotations are common. Now additional technologies are being studied to further up this success. These include bed-planting that will reduce water, seed and fertilizer use. **Water productivity enhancing technologies** are being out-scaled to tree crops such as olives. Water productivity is increased, and trees already set fruit in their second year, and oil quality is better.

On-going activities: Resilience activities: Introducing integrated technical and policy innovations to increase resilience for rangeland systems. Enhancing barley-sheep systems and resilience including integrated policy and institutional improvements (feed, health, adapted breeds), and markets (capital, input and product); water harvesting, soil and water conservation practices to improve livestock productivity and reduce risks and vulnerability to agro-pastoral communities; system analysis using bio-economic modelling and market analysis to facilitate policy and institutional changes and the out-scaling of tested innovations; more effective participation of women and youth in the decision-making process. Intensification activities: increased access to innovations, improved market efficiency and value addition; rainfed wheat-based systems linked to crop-tree-livestock integration, natural resource

management innovations and institutional arrangements for pathways out of poverty; improved irrigated production systems from policies and institutions for efficient land and water use.

2.3 Flagship Program 3: East & Southern Africa

In East and Southern Africa (E&SA) the Action Site focusing on resilience extends from north-eastern Kenya to south-eastern Ethiopia. The sustainable intensification site is in the Ethiopian Highlands and the Chinyanja Triangle, covering central and southern Malawi, the eastern province of Zambia, and the Tête Province of Mozambique.

2013 achievements: Building value chains including many, but not all, partners considered relevant in a true innovation platform. **Introducing sustainable management of trees** in agricultural settings has complex aspects. Information has been gathered on such options that spread risk and can diversify diets and incomes. The information has been presented to policy-makers. **Index-based insurance** experience involving livestock, and the promise to stabilize livelihoods and degraded rangelands.

On-going activities: Strengthening of partnerships, mainly in pastoral, agro-pastoral, crop-based and mixed crops/livestock/tree systems. Priority activities are to explore and test intervention options that have potential to improve dietary diversity and diet quality for women and children. Supporting this is work on increasing productivity and income by applying systems approaches for sustainable land and water use. Both these areas of activity are at 'proof of concept' phase in the impact pathway. As activities progress to their 'pilot' phase in the pathway, the Flagships will verify and demonstrate integrated cereal-legume-forage-tree systems. Work on tenure security and land-use planning.

2.4 Flagship Program 4: Central Asia

Activities in Central Asia (CA) are put into action in three Action Sites. For activities to improve resilience: the Aral Sea Region (Turkmenistan, Uzbekistan and Kazakhstan), the Rasht Valley (Tajikistan and Kyrgyzstan). For sustainable intensification: the Fergana Valley (Kyrgyzstan, Tajikistan and Uzbekistan).

2013 achievements: Improving coordination and cooperation among communities formerly approached by single-solution agents, now realize the importance of both partners and production systems integration. Dialogues and travelling seminars were used as the methodologies to foment that closer cooperation. Women groups have adopted improved mohair, and felt production, making products of improved quality and new designs that are fetching global attention.

On-going activities: Move to piloting and out-scaling of integrated options, including crops, trees, livestock; strengthen innovation platforms with greater involvement of decision-makers, NGOs and the local private sector. Piloting the improvement of quality of local wool and mohair products with designs that attract a wider audience. Bringing options to rural households to engage in more sustainable practices, to improve resilience and to intensify sustainable food production. For improving resilience, activities address: management options for salt-affected croplands, water and energy efficiency for irrigation, livestock sector input and output value chains and seed systems. Sustainable intensification, activities are on knowledge sharing for monitoring and sustainable management of natural resources, and use of geo-informatics tools.

2.5 Flagship Program 5: South Asia

The South Asia program focuses on four agricultural livelihood systems – rangelands, agro-pastoral, crop-based and high value crops/species.

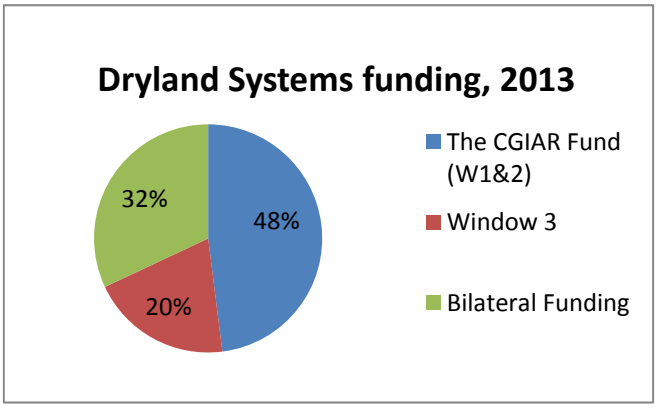
2013 achievements: A number of 'systems' outcomes are progressing toward impact (large scale-uptake of practices and technologies by rural households and communities) based on systems relevant legacy activities by partner organizations. Expansion of to 5.1 million ha in Karnataka, India, with integrated technology packages, reaching 3.6 million farmers. Total production increased to $75 million. More than 500,000 people trained.

On-going activities: Up-scaling to policy- and decision makers is being pursued so that the systems approach is institutionalized and taken further by the State Government. Lessons learned in reaching this large number of farmers to be brought to decision makers in other Indian States and other Dryland Systems Flagship regions. Assessment of the extent to which a full agro-ecosystem was implemented in

focus villages, what crucial elements were missed and exchange of experiences with other Flagships. 15 new villages have been identified for out-scaling. Technologies include encouraging the rapid adaption of conservation agriculture by smallholders, introducing cactus as a livelihood strategy, identifying options for system diversification.

2.6 Leveraging of funding sources

The program started its operation in January 2013, preceded by the 2012 inception phase of scoping, baseline data and site selection and description. In 2013 systems relevant legacy activities were integrated in a transition process with new initiatives. Some 32% of 2013 funding was from bilateral projects and 20% from Window 3, reflecting existing commitments.



The impact pathway of Dryland Systems has been very carefully constructed, so that the Program is very confident it will be able to attract considerable W3 and Bilateral funding for its support in implementation. The program's clarity on its impact pathways will ensure alignment, tangible outcomes and that a high return on investment is demonstrated to donors. The Dryland Systems fund raising strategy to be developed in 2014 aims to leverage additional Window3/bilateral funds, together with other CGIAR centers and secure initial financial support from non-traditional CGIAR donors, i.e. private foundations.
This will be done by:

- Developing strategic partnerships with organizations expert in delivering scaling up of solutions and interventions that bilateral donors are looking for, and approaching private foundations to invest in these ventures.
- Developing joint fundraising activities with partners to build on on-going projects that strengthen gender research, build capacity and stimulate the community's ability to innovate. There are significant regional funding opportunities to be explored with Morocco, Egypt, Russia, Italy, and the Netherlands.

Currently, the Australian Centre for International Agricultural Research (ACIAR) and the International Fund for Agricultural Development (IFAD) are two of the biggest donors supporting Dryland Systems work in the Target Regions.

3. Gender

3.1 Systematic Use and Increased Awareness of the Importance of Gender Analysis

Dryland Systems is committed to reducing gender inequalities, specifically by identifying the key factors that lead to inequalities and the key interventions that can enhance impact on achieving all six Intermediate Development Objectives. To support this effort, a sustained focus is placed on collecting gender-disaggregated data, in baseline surveys[i]; assessing technological needs, adoption, and respective impacts[ii]; identifying contributions and constraints in strategic value chains; and in understanding limitations in access to extension knowledge and other resources (e.g. seeds).

3.2 Flagship Outputs Related to Gender Analysis – table 3

Flagship	Outputs
West African Sahel and Dryland Savannas	- Gender analysis of potato production, marketing, and utilization in benchmark sites for Dryland Systems in Ghana iii
North Africa and West Asia	- Diagnosis of the prospects of a national initiative (Morocco Green Plan) on women's livelihoods in poor rural communitiesiv

	- Gender analysis of strategic value chains constraints and opportunities in Moroccov - Gender analysis and documentation of key knowledge and practices leading to climate change adaptation in a community in the rangeland regions of Jordanvi - Gender analysis of farmers' perceptions on water policies in Jordanvii
East and Southern Africa	- Gender disaggregated analysis of water technologies adoption in Kenyaviii - Project staff in Zimbabwe were trained in gender analysis
Central Asia	- Women-related enhanced livelihood options are tested and identified in Tajikistan, Kyrgyzstan, and Iranix and are capitalized on for Dryland Systems activities.
South Asia	- Household and agro-biodiversity surveys (1200) were conducted in Rajasthan to capture sex-disaggregated household and decision-making data for identified plants and animals to pave the way for realizing and understanding women's empowerment. In addition, a parallel detailed study on gendered roles in agricultural production was conducted.

3.3 Flagship Outputs Related to Gender-Responsive Interventions – table 4

Flagship	Outputs
West African Sahel and Dryland Savannas	- In Ghana, discussions with chiefs and elders were initiated to raise awareness and address tenure insecurities for women. - Men and women participated in decision-making for planning and farm management. - In Mali women and youth constituted at least 20% of the innovation platforms and received capacity development to attain employment, establish food banks using species, such as *Adansonia digitata* and *Moringa oleifera*, and receive training in value addition - In Mali 180 women farmers interviewed on dietary diversity for their children of 0 to 59 months
North Africa and West Asia	- Comprehensive literature review on gender-specific and youth empowerment strategies and initial diagnostic fieldwork in the Delta Region of Egyptx - Women empowerment opportunities validated through the analysis of INDH (National Initiative for Human Development) activities in Moroccoxi - A women dairy processing training module was developed using local knowledge, analysis of technical and marketing constraints, reduced water and energy requirements, and most importantly less labor. 19 women farmers from five villages in the Karak governorate of Jordan were trained, thereby increasing their income - Three women-based CBOs received entrepreneurial skills to initiate and manage small businesses reducing dependence on on-farm income, alleviating pressure on a fragile eco-system
East and Southern Africa	- In Zimbabwe 179 female farmers were trained on dry season feeding strategies, fodder conservation, use of equipment in conservation agriculture, and chemical use - 17 women trained by researchers in peer review approaches
Central Asia	- The Interdisciplinary Research Team (IRT) discussed and agreed on means to incorporate gender in research activities including tools and methods; and on catalyzing change agents to bring about more gender-equitable attitudes and behaviors among all stakeholders
South Asia	- Identified gender-disaggregated innovative opportunities to use "minor" species in the system to generate additional and complementary benefits in the action sites of Rajasthan

3.4 Gender in the Workplace

The CGIAR human resources policies call for respect for the dignity of employees without discrimination, with regard to gender differences, and the provision of equal opportunities to both genders in the workplace and the recruitment process. To encourage women scientists and improve the gender balance in the workplace, the program currently supports young women in leadership training and mentoring (of women scientists; female consultants; female graduate students) in some of its partner organizations. These activities will be expanded in the extension phase. This mentoring and support for women is strategic, as it enriches the gender-sensitive culture of the workplace and builds the capacity of the program and its partners to do gender-sensitive and gender-inclusive research. As gender-segregation is strict in many cultures relevant to the Dryland Systems program, women's involvement in research is critical to gain increased access and involvement of female participants in the program, and to provide role models to its target stakeholders. Dryland Systems will develop a competitive small grants program to be awarded based on research proposals led by women scientists, from national

research programs, of 35 years or younger, with the aim of developing these women's leadership skills in research.

4. Partnerships and regional collaboration

Strong partnerships are a key driver for the long-term impact of Dryland Systems, the core strategy is:

- **International cross-Flagship and cross-ALS research, learning and knowledge sharing**, and between partner countries. These activities are led by a core group of international research partners between lead center, ICARDA, and some eight CGIAR centers. NARS are target stakeholders.\
- **Flagship and Action Site-level research, learning and knowledge sharing**, for scaling-up. Here partnerships are being developed to link to networks and organizations with expertise at technology transfer and skill development at the local and national levels, and for informing and influencing national policy development. NGOs, CSOs and the private sector are encouraged to be involved.

4.1 Partnership between Dryland System and other CRPs

A priority for Dryland Systems in the Extension Phase is to strengthen partnerships with other CRPs. This includes: W**ith CRP/PI**M - joint development of research methods and models, data sharing at policy, institution and market levels. **With commodity crops CRPs** - livestock and fish will be enhanced, especially for multi-purpose food and feed species for human and animal consumption, and how soil health is maintained. **With CRP/Livestock and Fish -** value chains currently under analysis, for example, for small ruminants in Mali and Ethiopia and for the dairy sector in South Asia.
With CRP/A4NH – is a valuable partner for health and nutrition research, for example in marginal and intensifiable systems in Sub-Saharan Africa and South Asia. **With CRP/WLE** - Water, land and ecosystem models and approaches will be piloted and disseminated during out-scaling. With CRP/FTA - A research focus on agro-forestry, for example in the West Africa & Dryland Savannas, and East & Southern Africa Flagships. With CRP/CCAFS work on vulnerability assessment and risk management of dryland systems under climate-change scenarios, in the North Africa & West Asia, East and West Africa and Central Asia Flagship regions.

4.2 Partnerships with regional development organizations

Partnerships with regional development organizations in target regions will be enhanced over the coming two years. Some examples of ongoing collaboration:

Central Asia - with international partners and national and local organizations in the Action Sites:

- Khorezm Rural Advisory Support Service maps marginal lands for resiliency options - Aral Sea Action Site
- Scientific-Information Centre of the Interstate Coordination Water Commission improves water-use efficiency with innovative irrigation and cultivation - Fergana Valley Action Site
- Tajik Institute of Farming, Kashkadarya Institute of Breeding and Seed Production of Cere.

South Asia - with knowledge generating and translation institutions, on participatory research for development for inclusive market-oriented development public-private partnerships. The best example is 'Bhoochetana' which has developed a scaling-up model to reach millions of farmers.
West Asia – NCARE, Jordan's extension agency, for producer-to-producer knowledge exchange to mitigate problems in the dairy value chain with smallholders and cooperative processors.

East and southern Africa

- Total Land Care, Institute of Agricultural Research in Mozambique (IIAM)
- Zambian Agricultural Research Institute (ZARI)
- Southern Africa Development Community (SADC) and Agricultural Research Council (ARC).

North Africa & West Asia

- Institut National de Recherche Agronomique, Morocco (INRA Morocco)

- Institut Agronomique et Vétérinaire Hassan II (IAV Hassan II Morocco)
- Ecole Nationale d'Agriculture de Meknès (ENA Meknes, Morocco).
- Institut des Régions Arides, Medenine Tunisia (IRA Tunisia)
- Institut National de la Recherche Agronomique de Tunisie (INRA Tunisia)
- Institut National de Recherches en Génie Rural, Eaux et Forêts (INGREF, Tunisia)
- Agricultural Research Center (ARC Egypt)
- The National Center for Agricultural Research and Extension (NCARE, Jordan)
- Agricultural Research, Education and Extension Organization (AREEO, Iran)

South Asia

- Development Research Foundation
- Accion Fraterna Ecology Center
- Central Arid Zone Research Institution

4.3 Governance

The governance of the Dryland Systems is overseen by a number of partners, present in the program's Steering Committee (SC): ICARDA (lead center), ICRAF, ICRISAT, ILRI, IWMI, EIAR (Ethiopia), ICAR (India), INRA-Morocco, GFAR, CIRAD (France), CSIRO (Australia), FAO, IFAD, and the Howard Buffett Foundation, with the ISAC Chair, CRP/DS Director and an ICARDA BOT member as observers. The SC is advised by an Independent Science Advisory Council, which will be folded into the SC (not all members) following a recent decision by the CGIAR leadership. The high diversity in membership will be maintained, while still keeping total number of members reasonable.

4.4 Partnership: Dryland Systems Budget distribution by center – table 5

CG Center	% share of the budget
BIOVERSITY	4.77
CIAT	2.79
CIP	3.09
ICARDA	42.02
ICRISAT	29.68
ILRI	9.63
IWMI	5.68
ICRAF	2.34

Additional partners in the program have been clustered in Academia, Community Based Organizations, NGOs and NARS. The budget share for NARS for 2013-2014 has constantly increased and the overall budget in the extension proposal has been designed to reach 20% in 2015 and 25% in 2016.

4.5 Role of Partnership in Research - table 6

Partner	Flagship Project				
	WAS&DS	**NA&WA**	**E&SA**	**CA**	**SA**
Academia	Leadership on components; Leadership on assessment of vulnerability and risk (IDO 3,4,5)	Jointly implementing research (IDO 2,4,5)		Management & Governance; Capacity building; Research method support (IDO 4)	
CBOs		Enhance collective action (IDO 3,5)		Facilitation of collaboration between researchers and famers. (IDO 3,4,5)	
Global CG	Leadership on generating technology and innovations globally (IDO 5,6)				Committees Membership (IDO 3,5)
Global Others	Site Leader (IDO 3,4,5)	Jointly implementing research (IDO 6,7,5)		Leadership on components	
NARS	Site Leader; Leadership on components; Leadership on research in technology testing & validation at national level (IDO 3,4,6,5)	Management & Governance (IDO 1-5)	Implementation (IDO 4)	Committees Membership; Leadership on components (IDO 3,4)	Management & Governance (IDO 1-6)
NGOs	Team member; Leadership on components; Leadership on extension, facilitation of multi-stakeholders platforms & building capacity of farmers (IDO 3,4,5)	Leadership on components	Implementation; Community mobilization and implementation (IDO 4)	Leadership in baseline survey; Capacity building and knowledge dissemination among youth and women; Field work coordination as well as experiment in the WUA (IDO, 2,4,5)	Leadership on components

4.6 Achievements and expected results - NARS - table 7

Flagship Project	Description of success achieved	Next steps	Expected results at Regional level	Expected results at National level
WAS&DS	Implementation of biodiversity and dietary diversity surveys in Koutiala, Mali; Identification of potential feed resources for improved livestock production	Carry out Field research activities; Scaling up of feed-health package for improved small ruminant production	Role of crop diversity in pest and diseases control and yield increased; Use of local crop diversity for better diet	Yield increased in food crop and better conservation of local crop diversity; Use of local drop diversity for better diet
NA&WA	Five NARS teams established (100 scientists), NARS are conducting research on the ground	Follow up of previous activities	Joint achievement of n-1 and n-2 IDOs	Joint achievement of n-1 and n-2 IDOs
E&SA	Yield gap analysis, soil health assessment, testing of ISFM technologies			
CA	Characterization of Action sites; Assessment of on-farm and in-situ evaluation, multiplication; Development of technical manuals, training of farmers, experimental trials, research management coordination; Release of two potato varieties. Potato seed multiplication; Establishment of farmers association and proposal for national legislation on farm development; In-vitro seed potato multiplication; Assessment of adaptive traits of crops using molecular markers technology, training of young scientist (regional training center of molecular markers)	Joint on-field research; Out scaling and organization of trans-boundary seed potato association; Potato seed multiplication, potato and fruit varieties evaluation and releasing of new varieties; In-vitro seed potato multiplication assessment of adaptive traits of crops using molecular markers technology, training of young scientist (regional training center of molecular markers);; Assessment of on-farm and in-situ evaluation, multiplication; Development of technical manuals, training of farmers, experimental trials, research management coordination.	Knowledge sharing; Out scaling and organization of trans-boundary seed potato association. Potato seed multiplication, potato and fruit varieties evaluation and releasing of new varieties; In-vitro seed potato multiplication; Young scientist trained in regional training center on molecular markers; Outscaling and organization of trans boundary seed potato association.	Out scaling and organization of trans-boundary seed potato association; Potato seed multiplication, potato and fruit varieties evaluation and releasing of new varieties; In-vitro seed potato multiplication

4.7 Achievements and expected results - NGOs - table 8

Flagship Project	Description of success achieved	Next steps	Expected results at Regional level	Expected results at National level
WAS&DS	Participatory assessment of existing and potential feed resources and strengthening community awareness on local conventions governing natural resource management	Organization of validation workshops on local conventions and strengthening the capacity of farmers organizations	Strengthening local conventions governing community-based natural resource management	Sustainable use and conservation of natural resources
NA&WA				Contribution to IP activities, capacity development
E&SA	Yield gap analysis, soil health assessment, testing of ISFM technologies Promoting integrated systems with fish and irrigation Implementing partners conducting field trials, organizing communities	Extending the studies to Mozambique to Zambia Exploring options to expand Continue the ongoing work and expand to include market and communication	Sustainable knowledge of program deliverables through reliable partners	Sustainable knowledge of program deliverables through reliable partners
CA	Household survey among about 70 households in the vicinity of the identified degraded areas as to determine their present use and intentions of the land users. Public awareness raised on value and on local agro biodiversity for sustainable agricultural development (organizing agriculture theatre performances). Education of children on local diversity of fruit trees, nutrient value and importance of agricultural development culture and traditions. Supporting infrastructure establishment (potato storage) and capacity in male and female farmers increased for sustaining seed multiplication. Baseline data has been collected as well as key informants interview has been conducted. Informed key people at WUA about the objectives of DS CRP in Central Asia	Baseline survey Development of curricula for schools and kindergartens on fruit trees diversity and its adaptive value for agricultural development. Involving in nursery establishment, dissemination of technology. Out scaling the technology. Conduct In-depth semi-structured quantitative and qualitative survey In-depth semi-structured quantitative and qualitative survey Conduct key informants interview as well as conduct in-depth semi-structured quantitative and qualitative survey	Biophysical, and socio-economic data base for Aral sea action site Dissemination of curricula for children option for alternative potato seed production Outcomes will be up scaled to Fergana Valley WUAs	Aral sea action site Baseline data out scaling of curricula for children, N. of children aware of value of local diversity alternative seed production system established at least in N.1 location (true potato seeds) Institutional capacity improvement of on-farm water management

4.8 Overview of partnerships by Agricultural Livelihood System - table 9

Agricultural livelihood systems	Partners, Regions, activities
Pastoral systems:	- ICRISAT and ILRI - technical interventions on integrated watershed, water harvesting, nutrient management, market access, enterprise diversification; social interventions to empower women and other marginal groups. Mechanisms for infrastructure improvement for access to markets in rural areas – including, post-harvest storage systems water sources, and product processing plants. - ICRAF, ICRISAT, ILRI and the SSA-CP - interventions in Zimbabwe, Botswana, Namibia and Tanzania to reduce goat mortality, improve fodder and investment policies in livestock market infrastructure and veterinary services.
Agro-pastoral systems:	- Bioversity, CIAT, ICRAF, ICRISAT, ILRI and the SSA-CP - interventions in West and Central Africa (Mali, Niger, Chad and Nigeria) and East and Southern Africa (Ethiopia, Kenya, Tanzania) on matching livestock breeds to specific environments, improved livestock species, best-bet crop varieties, early warning systems for drought mitigation, conservation biodiversity and water harvesting; investment options are related to livestock markets, health and education, food storage systems and extension. - Bioversity and ICARDA – activities in North Africa, West Asia, Central Asia and the Caucasus on empowering livestock keepers (many of them women), use of native biodiversity to rehabilitate degraded rangelands, water harvesting, better management of grazing and livestock health management. - ICARDA, ICRAF, ICRISAT, ILRI and the SSA-CP - interventions in East and Southern Africa on improving access to water for livestock, increasing livestock productivity and quality assessing feasibility of carbon sequestration in rangelands. Also, investment options for increased market access for livestock products, communication technologies. Policy options for improved land management support to local governments and institutional strengthening in all research sites.
Intensive rain-fed systems:	- CIP, ICARDA, ICRAF, ICRISAT and ILRI - joint interventions for integrated watershed management; empowering rural communities to provide access to markets, investing in smallholder water management technologies such as check dams and a range of rainwater harvesting approaches. Policies support for investment collaboration between the ministries in partner countries are being introduced.
Tree-based systems:	- ICRAF plans work with partners on innovative technologies, economic incentives, and institutional approaches to enhance resilience of smallholders. Sustainable intensification focus is on crop-livestock-tree-integration, integrated soil-fertility management, and water productivity and profitability. Geo-informatics tools are used to monitor perennial tree crops in target areas. Strategic collaboration CRP Forest Trees and Agroforestry. Knowledge and tools planned for selecting and delivering tree germplasm and management options for integration into dryland production systems.
Irrigated crop systems:	- ICRAF, ICRISAT, ILRI, and IWMI work on improved water management and livestock, reduced competition for fodder, and using trees to improve water and nutrient cycling in northern China. Support to partner countries in policies for land and water management. - Africa Rice, CIAT, ICRAF, ICRISAT, IWMI and the SSA-CP - joint interventions African Sahel river basins to build farmers' capacity in irrigation and water management, enhanced fodder management, empower rural women on irrigation management, investment for small-scale irrigation for rural communities.

5. Phased workplan covering the 2 year extension period until 2016

The DS research portfolio for the years 2015/2016 builds on the work done in the design and inception phases and the first full year of operation. In-depth analysis of the current activities revealed that the majority of the research activities (as shown in the elaboration presented in section 6) are in the discovery and proof of concept phase reflecting the innovation needed when approaching R4D using a systems approach, but also the need to move system-based innovations along the impact pathway to positively influence livelihoods. One of the reasons is the need for new tools to assess the potential of scaling up integrated system improvements. Such tools are increasingly being developed and this is a major responsibility for all three systems CRPs. At the same time it has become evident that datasets for the assessment of vulnerability, resilience and sustainable intensification options are sparse, often in commodity phrasing and will need study, rephrasing and expansion. This is an activity to be undertaken with the communities and as such will become part of the effort to develop their abilities to innovate (IDO 6). The DS will utilize the additional funding received in the amount of +10% of the 2014 budget to initiate these strategic research activities across the FPs. Some of the priorities listed according to ALS are provided in the table below. The full list of program activities, their phases, outputs/outcomes and IDOs mapping is presented in **Annex 2**.

Strategic research activities – table 10

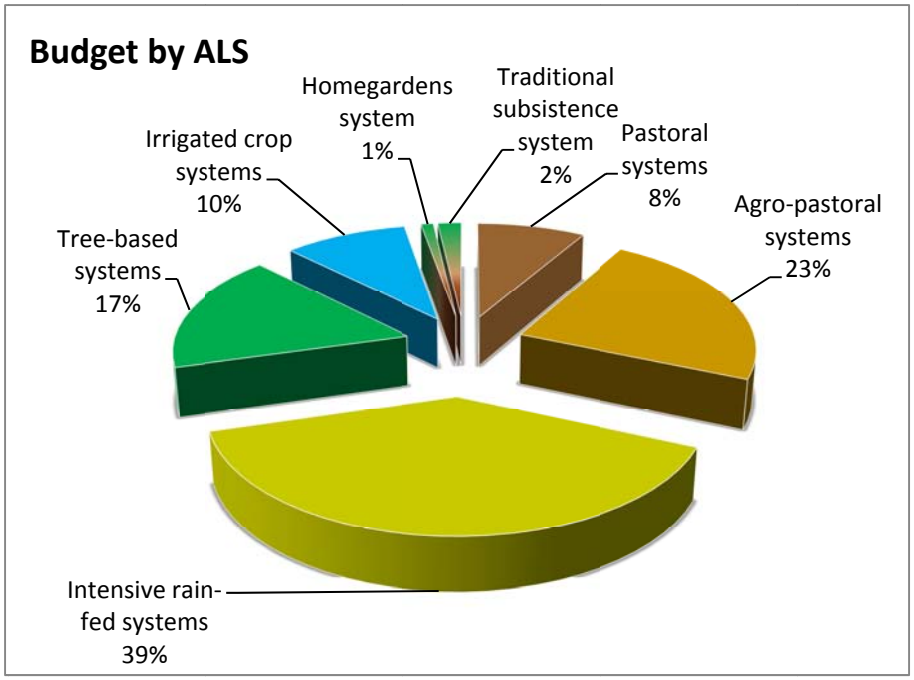
ALS	Activity name	Cluster investment	Discovery	Proof of concept	Pilot	Scaling up	IDOs n-1
			73%	**21%**	**4%**	**2%**	
Pastoral systems	- Vulnerability assessment: (1) identify the indicators. (2) survey Action Sites - Enhance farmers coping mechanisms: (1) develop decision tools for improved land and water management and collective action, (2) pilot and demonstrate selected/promising options (3) capacity to innovate building	**11%**	7%	4%			IDO 3,4,5
Agro-pastoral systems	- Vulnerability assessment: (1), develop indicators,(2) survey Action Sites, - Risk reduction: (1) develop decision tools for improved land and water management (2) identify efficient land and water management options, (3) pilot and demonstrate the selected promising NRM options as components in the agro-ecosystem. - Access to market: (1) assess market mechanisms (2) scope innovative marketing models (3) improve post-harvest management	**27%**	22%	5%			IDO 3,4,5
Rain-fed systems	- Resource conservation: (1) develop decisions tools for improved land and water management (2) analyze and close water and nutrient cycles (3) pilot conservation agriculture, - Coping mechanisms: (1) validation of promising technologies and risk quantification methods (2) test crop	**22%**	17%		5%		IDO 3,4,5

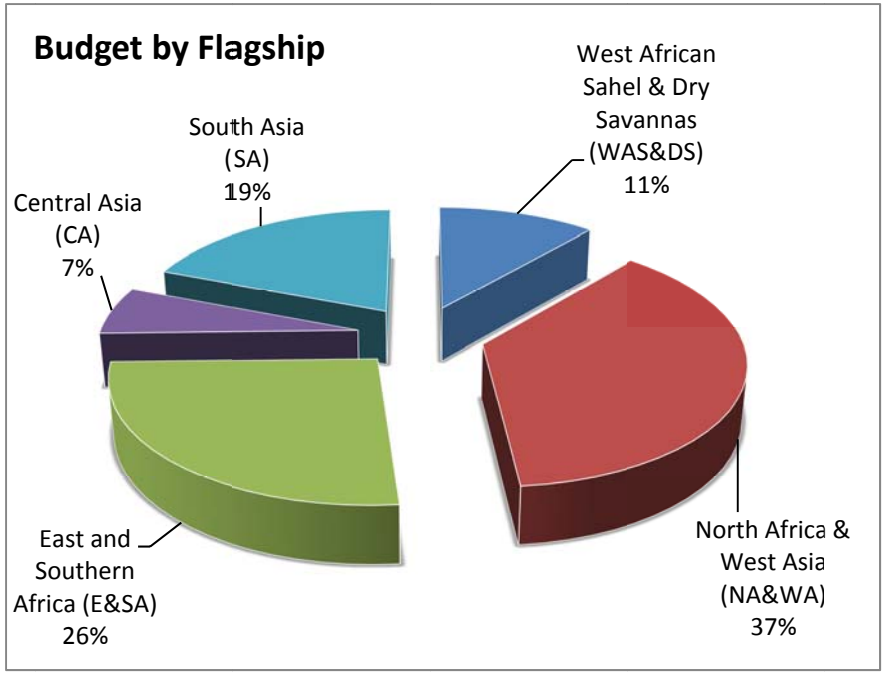
	insurance modalities (3) develop and implement collective action(innovation) and public-private-partnership models - Market access: (1) develop effective marketing strategies, (2) develop and test diversification options						
Tree-based systems	- Sustainability enhancement: (1) develop land degradation indicators (2) assess integrated water and land management options, including afforestation (3) assess input/output market effectiveness and vulnerabilities - Intensification: (1) identification of suitable technologies for providing supplemental irrigation (2) verification and demonstration of best bet cereal-legume-forage-tree systems - Markets and women: (1) develop and assess mechanisms for women access to markets (2) development of appropriate crop insurance products, - Improve dietary diversity and diet quality for women and children: exploration and testing of intervention options	**40%**	23%	12%	5%		IDO 3,4,5

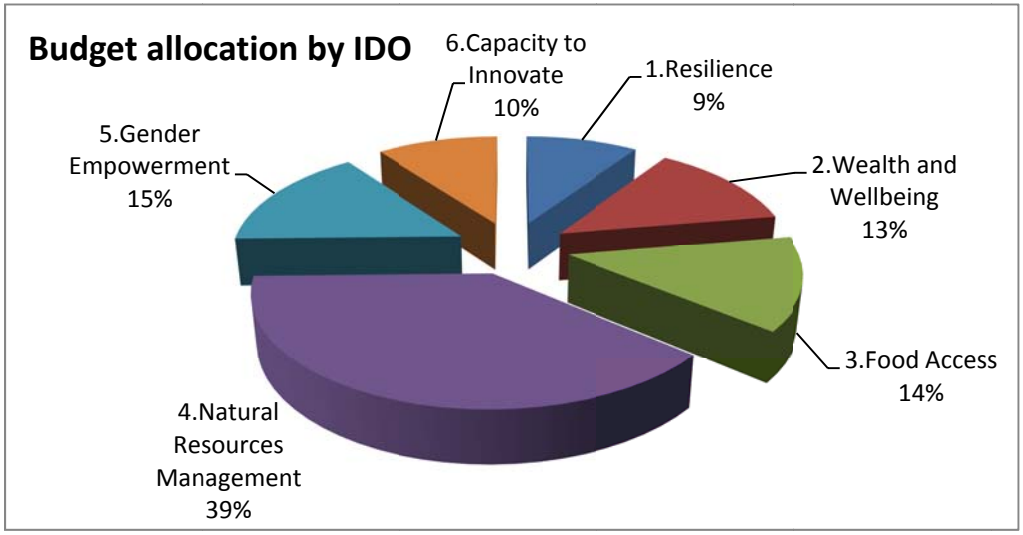
The DS has identified a need to further strengthen the in-house capacity in system analysis and will invest in the establishment of a System Analysis Group for within and across FP research and implementation. The DS program builds on the systems approach to integrate inventions from within and outside the CRP, assess the potential impact of the intermediate development outcomes and identify the target group and livelihood system with the ultimate aim of facilitating adoption and impact at scale. System analysis of these complex socio-ecological systems will provide insights into the interactions of communities with their natural resource base and their reaction to incentives or disincentives to reach certain goals such as efficient NRM (IDO 4) or improved access to food (IDO 3). There are a number of system analysis approaches, ranging from cropping system modeling (spatially or non-spatially explicit) (Keating et al., 2003; MacCarthy et al., 2010), farm nutrient balance models (Den Bosch et al., 1998), farm bio-economic modeling (Witcover et al., 2006), coupled components models of land-use and ecosystem service change (integrated with soil erosion, hydrological and/or climate models) (Fürst et al., 2010; Giller et al., 2011; Tamene et al., 2014; Osborne et al., 2007), multi-criteria decision models for trade-off analysis (Alary et al., 2008), and agent-based community-landscape modeling (Le et al., 2008; Le et al., 2010; Souchère et al., 2010; Le et al., 2012). The latter also would allow assessing the role of the gender factor in sustainable land management adoption and the impact on women as a separate group of agents thus contributing to IDO 5.

In order to provide sound support in this cutting–edge field of complexity modeling across the different FPs, the DS proposes to establish a Systems Analysis Support Group that will serve as a hub in support of modelling efforts in all FPs and in interacting with the various external groups that are active in this field (e.g. WUR, CIRAD, Reading, ZEF, ETH, CSIRO, and Santa Fe Institute). The DS will utilize the increased budget in the extension proposal to cover the expenses, estimated at US$500.000, for the first 2 years of operation of this unit. A full detail of program activities phased for the extension proposal 2015-2016 is present in **Annex 2**.

6. Budget 2015-2016







Budget allocation by IDO, FP and ALS – Table 11

2015

Budget per IDO				
Item	Budget			
	W1&2	W3	Bilateral	Total
Governance & Director's Office	1,500	-	-	1,500
Regional Coordination	1,250	-	-	1,250
Total	2,750	-	-	2,750
IDO				
1.Resilience	1,877	571	2,340	4,788
2.Wealth and wellbeing	2,069	751	3,749	6,568
3.Food access	2,295	1,030	3,759	7,084
4.Natural resources management	6,498	2,230	10,824	19,552
5.Gender empowerment	2,654	887	4,326	7,867
6.Capacity to innovate	1,858	317	2,994	5,168
Total	17,250	5,786	27,992	51,028
Grand total	20,000	5,786	27,992	53,778

Budget per Flagship Projects				
Item	Budget			
	W1&2	W3	Bilateral	Total
Governance & Director's Office	1,500	-	-	1,500
Regional Coordination	1,250	-	-	1,250
Strategic Gender	1,000	-	-	1,000
Total	3,750	-	-	3,750
Flagship Projects				
West African Sahel & Dry Savannas (WAS&DS)	3,445	550	1,444	5,439
North Africa & West Asia (NA&WA)	4,587	2,241	11,880	18,709
East and Southern Africa (E&SA)	3,287	1,964	7,854	13,105
Central Asia (CA)	1,684	879	646	3,209
South Asia (SA)	3,247	152	6,168	9,566
Total	16,250	5,786	27,992	50,028
Grand total	20,000	5,786	27,992	53,778

Budget per ALS				
Item	Budget			
	W1&2	W3	Bilateral	Total
Governance & Director's Office	1,500	-	-	1,500
Regional Coordination	1,250	-	-	1,250
Strategic Gender	1,000	-	-	1,000
Total	3,750	-	-	3,750
Agricultural Livelihood Systems				
Pastoral systems	1,219	365	2,588	4,172
Agro-pastoral systems	3,921	1,267	6,218	11,406
Intensive rain-fed systems	6,092	2,343	11,211	19,646
Tree-based systems	2,835	896	4,825	8,556
Irrigated crop systems	1,404	700	2,766	4,870
Homegardens system	249	129	95	473
Traditional subsistence system	530	85	290	905
Total	16,250	5,786	27,992	50,028
Grand total	20,000	5,786	27,992	53,778

2016

Budget per IDO				
Item	Budget			
	W1&2	W3	Bilateral	Total
Governance & Director's Office	1,650	-	-	1,650
Regional Coordination	1,375	-	-	1,375
Total	3,025	-	-	3,025
IDO				
1.Resilience	2,067	622	2,631	5,319
2.Wealth and wellbeing	2,287	773	4,256	7,315
3.Food access	2,500	1,225	4,071	7,796
4.Natural resources management	7,214	2,277	12,454	21,945
5.Gender empowerment	2,867	1,147	4,497	8,512
6.Capacity to innovate	2,041	320	3,370	5,730
Total	18,975	6,363	31,280	56,617
Grand total	22,000	6,363	31,280	59,642

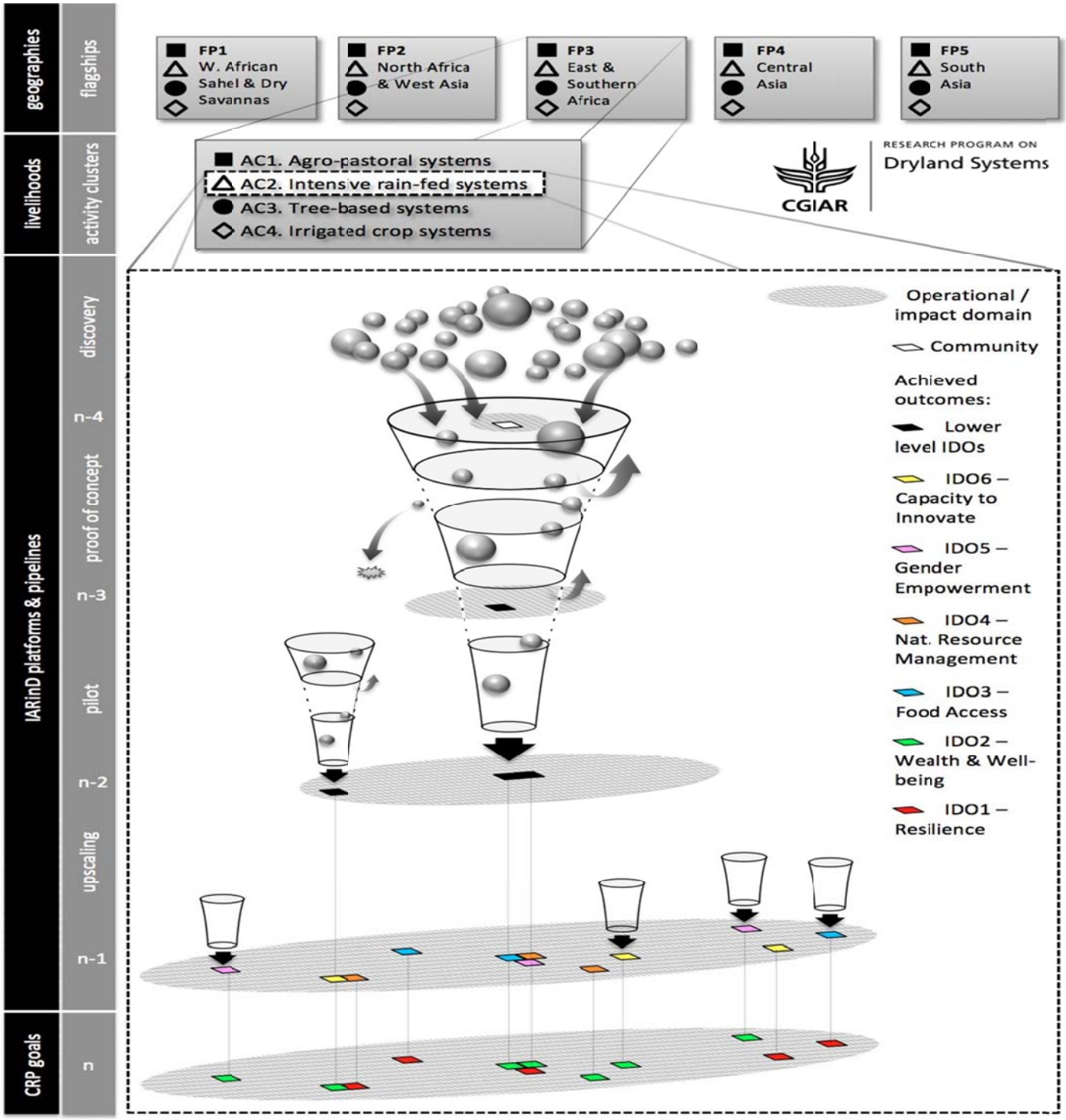
Budget per Flagship Projects				
Item	Budget			
	W1&2	W3	Bilateral	Total
Governance & Director's Office	1,650	-	-	1,650
Regional Coordination	1,375	-	-	1,375
Strategic Gender	1,100	-	-	1,100
Total	4,125	-	-	4,125
Flagship Projects				
West African Sahel & Dry Savannas (WAS&DS)	3,790	605	2,078	6,472
North Africa & West Asia (NA&WA)	5,046	2,465	13,068	20,579
East and Southern Africa (E&SA)	3,616	2,159	8,641	14,416
Central Asia (CA)	1,854	966	709	3,529
South Asia (SA)	3,569	168	6,784	10,521
Total	17,875	6,363	31,280	55,517
Grand total	22,000	6,363	31,280	59,642

Budget per ALS				
Item	Budget			
	W1&2	W3	Bilateral	Total
Governance & Director's Office	1,650	-	-	1,650
Regional Coordination	1,375	-	-	1,375
Strategic Gender	1,100	-	-	1,100
Total	4,125	-	-	4,125
Agricultural Livelihood Systems				
Pastoral systems	1,339	401	2,847	4,587
Agro-pastoral systems	4,313	1,393	7,329	13,036
Intensive rain-fed systems	6,702	2,578	12,334	21,613
Tree-based systems	3,119	986	5,305	9,410
Irrigated crop systems	1,546	769	3,042	5,357
Homegardens system	273	142	104	519
Traditional subsistence system	583	94	319	995
Total	17,875	6,363	31,280	55,517
Grand Total	22,000	6,363	31,280	59,642

Annex 1: Dryland Systems Schematic: phasing of research – discovery, proof-of-concept, piloting, up-scaling

Schematic representation of how the phasing of the research activities through "discovery", "proof-of-concept", "piloting" and "upscaling" results in many initial options being reduced in number, as some are discarded and others are better integrated to deliver on agro-ecosystem needs, constraints and opportunities. As the integrated approaches become more focused resulting in Outcomes, their domains of influence become larger as Outputs are adopted along the pathway by other entities, and finally, Outcomes are attained by a wider number of communities.

In this example: The Agricultural Livelihood System for intensive rain-fed systems in East & Southern Afirca.



Annex 2: Phased workplan for 2015 and 2016 including outputs and outcomes in each activity's phases.

IDO contribution is indicated as % between brackets.

Pastoral Systems

FP	IDOs	Activities	2015 Phase	Outputs/Outcomes	2016 Phase	Outputs/Outcomes
E&SA	1,4,5 (40,40,20)	Resilience - enhancing options	Proof of concept	Output:N.1 Framework for measuring resilience used in 2 more case studies and N.2 Papers published on resilience M&E frameworks (ILRI); N.1 Working paper on approaches to quantify resilience enhancement through trees, crops and livestock (ICRAF).Outcome:N.10. project partners and other stakeholders in Ethiopia, Kenya and the Chinyanja Triangle use resilience framework and communication materials. Researchers and NARES informed on approaches to assess and quantify resilience enhancement (ICRAF).	Proof of concept	Output: N.1 paper published on case studies measuring development process resilience (ILRI); N.1 paper applying approaches to quantify resilience enhancement through trees, crops and livestock (ICRAF).Outcome: N.3 countries using M&E to measure impact on resilience. Development partners informed on approaches to assess and quantify resilience enhancement (ICRAF).
E&SA	1,4,5 (40,40,20)	Develop and pilot approach to map rangelands	Pilot	Output: In Kenya rangeland management documented in N.10 ASAL counties. In Ethiopia, rangeland management documented in N.1 state (ILRI). Outcome: Local stakeholders participate in mapping and planning governance of rangelands for producing mentioned outputs.	Proof of concept	Output: In Ethiopia rangeland management documented in 5 states (ILRI). Outcome: Local stakeholders participate in mapping and planning governance of rangelands in 5 states of Ethiopia.
E&SA	4,5,6 (equal)	Test Extension approaches for NRM and land use plans	Proof of concept	Output: national level report on importance of maintaining livestock corridors in Kenya published in 2015 and 30 government employees trained. N. 3 more county level livestock corridor maps produced with maintenance plans (Kenya), N.2 state level livestock corridor maps produced in Ethiopia (ILRI) Support provided to innovation platforms, paper on capacity needs of innovation platforms (ICRAF) .Outcome: N.2 additional partners in northern Kenya offer service linked to Index-based Livestock Insurance. 50%of target clients in six counties in northern Kenya understand role and value of index-based insurance through outreach activities. Sales of IBLI increase (by 20%, target is 5000 pastoralists) ILRI. DGIS implementing partners use	Proof of concept	Output: Livestock corridor plans implemented across 5 counties in Kenya. Livestock corridor maintenance plans developed for 2 additional states in Ethiopia. Livestock corridor plans implemented in 2 districts of Tanzania. Outcome: 5 additional partners in northern Kenya offer service linked to Index-based Livestock Insurance. 70%of target clients in six counties in northern Kenya understand role and value of index-based insurance through outreach activities. Sales of IBLI increase (by 50% target is 10,000 pastoralists) ILRI, support provided to X+Y innovation platforms, paper assessing effects of capacity building in innovation platforms (ILRI). DGIS implementing partners use information to improve efficiency of innovation platforms (ICRAF)

				information to improve efficiency of innovation platforms (ICRAF)		
SA	4	Identification and demonstration of promising technologies	Proof of concept/ Pilot	Output: Improved matrix of options of technologies through vulnerability, risk, ex-post, tradeoff analysis generated; Outcome: Farmers and NARES use the improved methods, technologies and tools to improve productivity and sustainability / Output: Improved matrix of technologies and processes to enhance productivity piloted; Outcome: validated technologies and options are available for upscaling	Proof of concept/ Pilot	Output: Target domains and corresponding recommended/ proven technologies developed; Outcome: Influencing development and policy efforts through proved concept and technologies / Output: Matrix of technologies and processes, incorporating emerging technologies/issues to enhance productivity and income refined; Outcome: Validated technologies and options are available for upscaling
SA	4	Pre project impact analysis	Proof of concept	Output: Information and knowledge on emerging technologies (rainwater conservation, harvesting, supplemental irrigation, soil, nutrient , plant and pest management technologies on crop production and incomes)process generated	Proof of concept	Outcome: NARES and farmers use knowledge-based decision for new technologies and emerging issues.
SA	4	Establish reference situation / baselines for the action sites to support systems approaches	Proof of concept	Output: Interventions based on outputs from baseline-Biodiversity demonstrated; Outcome: stakeholders awareness on biodiversity conservation, uses and practices enhanced	Pilot	Output: Piloting of interventions based on outputs from phase II
SA	1,3 (equal)	Validate the household vulnerability model result of 2013	Proof of concept	Output: Scenarios to enhance farmers/system resilience to shocks developed;	Proof of concept	Outcome: proposed trajectories towards resilient system adopted
SA	2	Identify and document options for systems diversification, experiment and demonstrate the same to enhance farmers coping mechanism and achieving food security	Pilot	Output: Improved matrix of options for system diversification to enhance productivity generated; Outcome: Validated technologies and options are available for upscaling	Pilot	Output: Matrix of technologies and processes, incorporating emerging technologies/issues to enhance system diversification refined; Outcome: Validated technologies and processes are available for upscaling

SA	6	Capacity building of stakeholders for up scaling promising technologies	Pilot	Output: Training of smallholder farmers and stakeholders to create awareness and skills for up-scaling of promising technologies (Improved rainwater management, integrated nutrients management, improved cultivars and soil management technologies up scaling for enhancing productivity of pastoral systems and family incomes) delivered;	Pilot	Outcome: NARES and farmers improve capacity of and knowledge to upscale and monitor the performances of new technologies.
SA	4	Development of sustainability indicators	Discovery	Output: Sustainability indicators and index, developed; Outcome: Information and lessons used by NARES and stakeholders to enhance sustainability at system scale.	Discovery	Output: lessons from 2015 along with identification and validation of technologies demonstrated; Outcome: NARES use methods and process to enhance the system sustainability.
SA	4	Analyze and monitor trade-off, ex-ante impacts, for different options and development of decision tools for improved land and water management and collective actions	Discovery / Proof of concept	Output: information and knowledge generated on potential benefits and trade-offs of different technologies synthesized and shared with stakeholders; Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches / Output: promising options to create practical opportunities for stakeholders demonstrated and validated.	Proof of concept	Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches
SA	6	Build capacity on collective actions and conflict resolutions for smallholders	Discovery	Output: Source of conflict assessed. Better institutional framework for conflict resolution designed;	Proof of concept	Output: In continuation with 2015, source of conflict assessed. Better institutional framework for conflict resolution designed. Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches
SA	1,2 (equal)	Identify policy options to fill policy gaps and enhance adoption, resilience and intensification of agricultural systems	Discovery	Output: major agriculture system related policy gaps identified. Determinants for non-adoption of traditional water harvesting techniques reviewed and analyzed and dialogue with different stakeholders initiated	Discovery	Output: policy brief developed. Outcome: policy makers sensitized on policy gaps and options.

Agro-pastoral systems

FP	IDOs	Activities	2015 Phase	Outputs/Outcomes	2016 Phase	Outputs/Outcomes
WAS	3, 4 & 5 (equal)	Post Harvest	Proof of concept	Output: (Burkina Faso, KKM) Technical note on small-scale infrastructure and equipment for storage and agro-processing; Outcome: (Burkina Faso, KKM) Improved resilience options: 30% farmers adopt post-harvest technologies	Proof of concept / Scaling up	Work in progress
WAS	3, 4 & 5 (equal)	Agroforest and forest products	Proof of concept	Output: (Burkina Faso, KKM) Technical note on small-scale infrastructure and equipment for forage and agro-processing;	Proof of concept / Scaling up	Outcome: (Burkina Faso, KKM) Improved resilience options: 30% farmers adopt post-harvest technologies
WAS	3, 4 & 5 (50, 10, 40)	Dubbing in local language and airing on national TV and broadcasting on internet	Scaling up	Outputs: (Niger, KKM) N1. Stiga and Afraxtone 20,000 Videos dubbed into 2 different languages and diffused on local TVs Outcome:(Niger, KKM) Skills of NARS partners enhanced and NARES told used, methods and processes to generate and customize improved resilience options for targeted groups of vulnerable households; Farmers, NGOs, policy makers, are aware of constraints and opportunities of dryland agriculture; Fine tuning of innovative farming systems intensification that copes future needs;	Proof of concept / Scaling up	Outcome: Improved resilience options: 5000 farmers (60% rate) adopt post-harvest technologies
WAS	3, 4 & 5 (40, 40, 20)	Local crop diversity conservation and use	Proof of concept	Output: (Burkina Faso, WBS) N.1 synthesis book on synergies between farmers, practitioners and other agents of change;	Proof of concept	Work in progress
WAS	3, 4, 6 & 5 (equal)	Farmer managed natural regeneration trees	Proof of concept	Outcome:(Burkina Faso, WBS) Better informed farmers and farmer to farmer, district to district and region to region links for information flow.	Pilot	Work in progress
WAS	3, 4 & 5 (50,20, 30)	Local seed systems	Pilot	Output: Niger, KKM Seed farmers trained in quality seed production and local crop diversity conserved.	Pilot	Output: Biodiversity and dietary diversity surveys

WAS	3,4,5, 6 (10, 60,10, 20)	Develop soil fertility options	Proof of concept	Output: (Niger, KKM) Modeling successes informed on how best to allocate input resources (water and fertilizers)	Proof of concept	Output: (Niger, KKM) Modeling on water and fertilizer resources published; Report on Communities ability to fabricate field implements for erosion reduction out of local materials Outcome: (Niger, KKM) 20,000 stallholders upscaling best bets on water and fertilizer best bets
WAS	1,2,4, 5,6 (equal)	Conduct value chain analysis of cattle, sheep and goat value chains	Discovery	Output (Niger, KKM) Generating best bet and proven technologies with partners, promoting innovative & value chain approach outcome: (Niger, KKM) 5000 stallholders Scaling up of feed-health package for improved small ruminant production	Discovery	Work in progress
WAS	4	*In situ* agro biodiversity conservation and sustainable use	Discovery	Output: (Kano, Nigeria) status and threats to agro-biodiversity assessed; Outcome: increased awareness of key stakeholders on the importance of conserving agro-biodiversity	Pilot	Output: integrating on farm conservation within the diversification and intensification of the farming system; Outcome: Management plans (technological, socio-economic, institutional and policy options) developed and recommended for promoting on-farm conservation of prioritized species.
NA& WA	1,2,4 (10,4 0,50)	Conservation agriculture	Pilot	Output: (Tunisia and Jordan, Sidi Bouzid and El-Karak) 100 ha under zero-tillage system combined or not with alley cropping; A training course on CA for technicians and extension people is organized, farmer-traveling workshop to visit farms hosting CA combined or not with ally-cropping; increase of crop yields and economic return from CA are determined, 2 papers published in ISI journals; Outcome:(Tunisia and Jordan, Sidi Bouzid and El-Karak) Acceptance by farmers of CA combined or not with alley –cropping.	Scaling up	Output: (Tunisia and Jordan, Sidi Bouzid and El-Karak) 2 large meetings gathering farmers who experienced CA and those who did not from the target sites and from other sites to discuss with scientists and extension people their experience with CA, a synthesis on lessons learned from CA in Jordan and Tunisia is published. Outcome:(Tunisia and Jordan, Sidi Bouzid and El-Karak) CA is used by at least 90% of farmers in the target sites and expanding in other neighboring site; CA is included in national strategies targeting promotion of agriculture sector
NA& WA	1,3,4, 5 (equal)	Small ruminants productivity	Pilot	Output: (Tunisia, Sidi Bouzid) Current feeding systems and gaps analyzed and proposals for improved feeding calendars for 200 sheep flocks' owners; (Jordan, El-Karak; Tunisia-Sidi Bouzid) Animal performance recording, use of improved rams and artificial insemination for genetic improvement will be performed on 2000 sheep; Occurrence and epidemiology of	Scaling up	Output: (Tunisia, Sidi Bouzid) Current feeding systems and gaps analyzed and proposals for improved feeding calendars for 500 sheep flocks' owners; (Jordan, El-Karak; Tunisia-Sidi Bouzid) Animal performance recording, use of improved rams and artificial insemination for genetic improvement will be performed on 5000 sheep; Occurrence and epidemiology of enzootic

				enzootic diseases are screened and a prophylactic strategy set for 250 sheep flocks' owners; Improvement of small ruminants' products wholesomeness at 25 sheep milk processors (Jordan, El-Karak); Outcome: (Country, action site) Acceptance by community of a holistic approach to improve livestock profitability; Increased market competitiveness of small ruminants' dairy products.		diseases are screened and a prophylactic strategy set for 500 sheep flocks' owners; Improvement of small ruminants' products wholesomeness at 30 sheep milk processors reaching 6000 milking ewes (Jordan, El-Karak and other districts); Outcome: Acceptance by community of a holistic approach to improve livestock profitability; Increased market competitiveness of small ruminants' dairy products.
NA& WA	4	Policies on natural resources	Proof of concept	Output: Evidence-based policy recommendations on water, energy and land analyzed; Policy dialogue policy workshop reports and briefs produced and widely disseminated. Outcome: national media used results of policy analysis in at least 2 countries	Proof of concept	Output: Policy recommendations on water, energy and land tested. Outcome: Evidence-based policy recommendations Included in the national discussions of agricultural policies In 2 countries.
NA& WA	1,2 (equal)	System vulnerability	Proof of concept	Output: Comprehensive analysis of the production systems, livelihoods, opportunities and constraints Outcome: Development partners used the results of livelihoods and production systems analysis in their formulation of options for addressing constraints	Proof of concept	Output: Determinants of farmers' production choices Outcome: Development partners used results of determinants of farmer production choices to formulate more effective programs.
NA& WA	1,2,6 (equal)	Bio-economic farm models	Discovery	Output: Basic understanding of the production system developed, Modeling framework agreed upon, model skeleton developed and 50% of the data needed for the model collected.	Discovery	Output: Ex ante analysis of farmer resilience enhancing options using bio-economic modeling. Outcome: Farmers and policy makers used the results of bio-economic modeling and analysis to inform their farming decisions and in agricultural policy debates.
NA& WA	6	Innovation platforms & scenarios	Discovery	Output: Guidelines for implementing innovation platforms, with common understanding among scientists and partners, documented and utilized; Analysis of farm advisory services in the 4 livelihood systems completed in order to understand potential avenues available for enhancing adoption, adaptation, outscaling and upscaling of technologies and best practices. Outcome: 4 national innovation platforms established (2015);	Proof of concept	Output: Acceptance and documentation of operational guidelines for the 4 innovation platforms established; At least 2 policy relevant meetings held for each innovation platform to discuss methodologies tested within the learning alliances, which are amenable to broad uptake nationally; Potential resources and contextually relevant avenues for self-sustaining the functioning of the innovation platforms uncovered. Outcome: 4 innovation platforms operationalized and populated with key stakeholders that are best placed to inform and influence policy

NA& WA	1,2,5, 6 (20,2 0,30,3 0)	High-value chain clusters	Proof of concept	Output: Learning alliances established in Morocco, Tunisia, Egypt, Jordan; gender sensitive production and marketing opportunities and challenges of priority commodities identified and prioritized; Options (including partners, resources and methodology) for addressing and removing constraints to production, post-harvest loss and marketing tested. Outcome: The learning alliance approach effectively informing the innovation platforms established based on evidence of tested methods for alleviating farm household constraints and towards (policy) consideration for broad uptake nationally;	Proof of concept	Output: Contextually relevant approaches for developing learning alliances within the NAWA region documented, in collaboration with NARES partners, and disseminated broadly; Lessons drawn from the learning alliance approach within the NAWA region documented and published through a variety of communication means, including peer reviewed publications. Outcome: The learning alliances are institutionalized and hosted by national institutions of research and development; National institutions undertake further learning alliances in areas within and outside of CRP-DS action sites;
NA& WA	1,4 (equal)	Water harvesting & soil conservation	Pilot	Output: Soil and water conservation practices fine-tuned and tested under different conditions; Model to optimize the utilization of land and water resources calibrated under arid environment.	Scaling Up	Outcome: calibrated model is used by NARS to assess the impact of the implemented interventions on productivity and the environment. Outcome: soil and water conservation practices implemented by development programs and farmers to improve productivity and reduce degradation;
NA& WA	1,4 (equal)	Managing agropastoral rangelands	Proof of concept, Pilot, Scaling up	Output: (NAWA region) Crowd sourcing of rangeland conditions in arid and semi-arid of NAWA region: Approach and Applications; Identifying and quantifying rangeland ecosystem services (West Asia); Testing and developing new non-destructive techniques based on allometric equations to estimate biomass production of *Stipa tenacessima* plant community in Southern Tunisia; Testing integrated alley cropping and conservation agriculture (ACCA) in pastoral landscape depressions (Tunisia); Evaluation of spineless cactus under west Asia conditions (Jordan, Karak); New tools and protocols for rangeland vegetation monitoring and assessment tested (LIDAR) (Jordan). Study domestication of introduced halophytes (*Atriplex species* and *Salsola vermiculata*) under drip irrigation (Tunisia). 1 MSc student trained/supervised. 1 PhD trained/supervised. Initial protocols for using LIDAR (remote sensing) to estimate canopy cover/biomass;	Discovery, Proof of concept, Pilot, Scaling up	Output: Crowd sourcing of rangeland conditions in arid and semi-arid of WA region: Approach and Applications; (Jordan) Identifying and quantifying rangeland ecosystem services (North Africa); Protocols and tools for monitoring and assessing rangeland vegetation developed (Tunisia, and Jordan); / Output: Evaluation of best cactus accessions for west Asia; Evaluating integrated alley cropping and conservation agriculture (ACCA) in pastoral landscape depressions (Year 2) (Tunisia); Understanding livestock extensive production system (herd's mobility) in southern Tunisia using animal GPS Collars (Tunisia Bni Guedech); Study of potential productivity of cactus plantations in rangelands (Year 3) (Tunisia Sidi Bouzid); Outcome: Best two spineless cactus accessions accepted by agro-pastoralists in Jordan (Jordan); Best practices of integrated ACCA accepted by at least 30% of agro-pastoralists in Jordan; Recommendations for policy makers on how to sustain extensive livestock production

				Protocols and tools for estimating biomass of Stipa tenacessima developed (Tunisia, Bni Guedesh); / Output: Mapping rangeland vegetation resources in Southern Tunisia; Evaluation of Moringa as a multi-purpose species in West Asia (Jordan); Introduction of Medicago arborea as a forage species for West Asia region: Understanding livestock extensive production system (herd's mobility) in southern Tunisia using animal GPS Collars (Tunisia Bni Guedech); Study of potential productivity of cactus plantations in rangelands (Year 2) (Tunisia Sidi Bouzid) 2 ISI papers submitted/published. Outcomes: Phyto-ecological map of the target area (land cover) mapped (Southern Tunisia); / Output: Periploca lavigatae evaluated at farm level (Tunisia); Farmers and extensions (50) services trained on the importance of less known species; 4 field days organized (use of halophytes and development of pastoral landscape depressions); Outcome: Acceptance of high value range species increased by 30%. / Output: Protocols and tools for monitoring rangeland resources refined. Outcome: Protocols and tools for monitoring rangeland resources accepted by land managers.		systems endorsed (Southern Tunisia); Agronomic practices and economic value of spineless cactus evaluated. / Output: Using Moringa as a multi-purpose species in WA region; (Jordan) Using Medicago arborea as a forage species for West Asia; 2 ISI papers submitted/published. Outcome: Awareness of less known multi-purpose species increased by 30% / Outcome: NAWA region. Cactus (Opuntia ficus indica) introduced to 500 farmers; Capacity development of NARS partners enhanced; Dissemination of native well adapted range species through development agency in Tunisia (OEP)
NA& WA	2	Post- harvest & market access	Discovery/ Proof of concept	Outputs: Constraints to market access by small holder producers disaggregated by gender fully characterized; Options for addressing these constraints identified and communicated with development partners and policy makers. Outcome: Value chain actors are more aware of the constraints to market access and are willing to cooperate for increasing benefits in a win-win scenario and reducing post-harvest losses.	Proof of concept	Outputs: Gender-sensitive interventions for improving market access tested. Options for reducing post-harvest losses evaluated. Outcome: Development partners adopted market access interventions in their programs in at least 2 countries; Development partners applied programs for raising farmers in reducing post-harvest losses.

NA& WA	5	Gender in Drylands	Discovery / Proof of concept	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options developed / Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options evaluated	Pilot	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options tested
NA& WA	4	Water & land productivity in irrigated system	Pilot	Output: Mechanized raised bed package tested in selected sites for various crops and water management options in the Egypt Delta. Outcome: Packages communicated to NARES and potential development projects used in their fields and staff trained on using	Scaling up	Outcome: Water use efficient raised bed practice implemented in Egypt, Iraq, Sudan and Morocco using the developed machine and package. Outcome: Framers in out scaled areas gain 30-50% in yield and save 20-30% in water.
NA& WA	4	*In situ* agro-biodiversity conservation and sustainable use	Proof of concept	Output: Status and trends of agro-biodiversity and its threats assessed and monitored; Outcome: biodiversity hot spots identified and diversity conserved *in situ* and *ex situ*.	Pilot	Output: technological, socio-economic, institutional and policy options (management plans) for promoting in situ/on-farm conservation of agro-biodiversity recommended; Outcome: empowerment of local communities to conserve dryland agro-biodiversity
ESA	1,3,5 (equal)	Out scaling options for resilience	Pilot	Output: Ethiopian Highlands: 1-2 (addition to 2014) High yielding, adapted and farmer preferred wheat, barley, chickpea and forage crop varieties identified per crop ; N.10 tons seed of wheat, barley, chickpea and forage crops produced; Outcome: (Afar and Ethiopian Highlands) Knowledge and skills of200 male and female farmers improved to maximize yield of food and forage crops.	Pilot	Outcome: improved crop technologies adopted by 10% of farmers in the target regions; Farmers grow improved barley, wheat, chickpea varieties. Incomes of farmers improved through adoption of high yielding crop and forage varieties and access to seed;
ESA	4	Scaling up and out	Pilot	Outputs: Exact activities from DGIS project to be defined after inception year in 2014 (ICRAF)	Pilot	Outcome: same as above
ESA	1,2,3, 5,6 (equal)	Value chain characterization and development of interventions	Proof of concept	Output: Policy briefs on how market interventions enhance resilience disseminated by Kenya NDMA to all ASAL counties.	Discovery	
ESA	6	Develop capacity of Famer associations and cooperatives	Pilot	Output: To be defined after inception during year in 2014 (ICRAF).	Pilot	Outcome TBD after inception year in 2014 (ICRAF)

E&SA	4,5 (80,20)	Improve land use planning and tenure security,	Proof of concept	Output: N.1 conservancy management plan developed with purpose to enhance tenure security, N.1 paper compiling experiences on the effectiveness of LUP and management planning in enhancing tenure security. Outcome:N.2 project implementing partners use information to guide development of LUP's and management plans that target tenure security enhancement	Pilot	Output: N.1 document to inform N.50 conservancies in Kenya and beyond on experiences with PLUP and management plans enhancing tenure security. Outcome: N.50 communities interested in enhanced tenure security use information to plan for achieving this vision.
CA	1,2,4 (10, 40,50)	Marginal lands	Proof of concept	Output: Inventory and classification of agricultural production systems and marginal lands associated with different natural resources management scenarios. One dataset for the Aral Sea Basin on salinity in selected area. Networking with national partners and policy makers to develop a basis for institutional support for long-term salinity management strategies. A contact list of implementation partners, policy makers will be established; at least 15 personal contacts for at least 10 institutions. Outcome: Improved interaction between CRP Dryland Systems research and policy makers in the region related to salinity management.	Proof of concept	Output: Information booklet describing current farm and salinity management practices on high producing agricultural and marginal lands in the series of "Ideas books for salinity management". Inventory and classification of agricultural production systems and marginal lands associated with different natural resources management scenarios. Networking with national partners and policy makers to develop a basis for institutional support for long-term salinity management strategies, integrated to IP for Irrigated crop systems (Irrigated Cotton/Wheat/Rice systems). A contact list of implementation partners, policy makers will be established; at least 5 personal contacts for at least 10 institutions. Development of field-based management strategies within the broader regional salinity management strategy will be developed in cooperation with the CRP WLE. A document with “research for development” vision for Aral Sea Basin. Gender aggregated labor distribution and decision making processes for communities in salt affected agricultural production systems and marginal lands. A document with findings will be made available. Outcome: (i) Improved knowledge source for extension services in the Aral Sea Basin. (ii) Increased knowledge and inter linkage between regional salinity management and field based interventions in high producing and marginal lands. (iii) Improved interaction between CRP Dryland Systems research and policy makers in the region related to

						salinity management. (iv) Improved gender aggregated data for communities living in the Aral Sea Basin and expected impact of interventions on salinity management and marginal lands.
CA	1,4 (equal)	Livestock productivity	Discovery	Output: (Uzbekistan, Aral Sea) Analysis - sheep and goat production systems of 2 communities in one Action Sites; A set of interventions identified and prioritized to increase productivity and enhance participation by the poor along the value chain. Implementation plan produced for each prioritized intervention. At least one intervention to increase on-farm productivity and one intervention to improve market efficiency piloted with 150 hhs each. Outcome: (Uzbekistan, Aral Sea) Meat value chain channels fully understood and bottlenecks addressed; Livestock keepers engaged in testing improved practices as a way of organizing themselves for better access to markets and services	Proof of concept	Output: Full sheep and goat production systems analysis incl. qualitative value chain analysis from production through to consumption (and feed resource assessment) in in the two Action Sites representing approx. 400 small-ruminant keeping hhs (2200 persons). A set of interventions identified and prioritized to increase productivity and enhance participation by the poor along the value chain. At least one intervention to increase on-farm productivity and one intervention to improve market efficiency piloted with 150 hhs each. Outcome: Increased capacity of national partners for implementing value chain analysis; meat value chain channels fully understood and bottlenecks addressed. (ii) Livestock keepers engaged in testing improved practices as a way of organizing themselves for better access to markets and services.
CA	1,2,3, 4,5,6 (equal)	Varieties	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 50 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (10 Male and Female farmers). N.1farmer field day; Outcome: N. 4 candidate varieties identified of cereals, superior to the locally grown varieties; 5 young researchers (3 men and 2 women) trained in scientific methods of field experimentation;	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 10 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (50 Male and Female farmers). N.3 farmer field days. Outcome: At least 40 men and women farmers, seed producers, researchers and policy learned about new, improved varieties of field crops, vegetables, and potato.
CA	1,2,4, 6 (equal)	Seed system platform	Discovery	Output: Characterization report of the seed value chain and delivery system produced. 10 seed growers trained on seed storage (potato, cereals among them sorghum, pearl millet, alfalfa and fodder shrubs). 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-	Discovery	Output: 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-sprouting techniques. Seed multiplication of soybean and mungbean for the production of 1 and 35 tons of seed, respectively, organized. Outcomes: Increased local capacity in seed-related research. Demonstration seed

				sprouting techniques. Seed multiplication of sorghum pearl millet, alfalfa and perennial fodder shrub (Kochia prostrata) organized. Outcomes: Increased local capacity in seed-related research. Criteria identified for the selection of crop specific registered seed growers.		plots established and seed growers trained, including in post-harvest practices.
CA	1,2,3, 4,5,6 (equal)	Innovation Platform	Proof of concept	Output: (Tajikistan, Rasht Valley, Uzbekistan, Aral Sea) N.1 Baseline study (socio-economic, gender, youth, capacity building, extension) in at least one Action Site covering 30 households;	Discovery	Output: (Tajikistan, Rasht Valley, Uzbekistan, Aral Sea) Database on socio-economic, gender, youth, capacity building, extension indicators Outcome: Capacity of stakeholders increased through training program;
CA	1,2,4, 5,6 (equal)	Knowledge Management CACILM	Scaling up	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; Outcome: Knowledge about SLM in CA countries is synthesized, packaged; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources;	Scaling up	Output: ((Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; N.1 Stakeholder workshop and SLM technology evaluation - Capacity building in access to and dissemination of knowledge. Outcome: Knowledge about SLM in CA countries is synthesized, packaged and disseminated in forms that facilitate widespread uptake by decision makers in the region; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources; Established knowledge sharing process for coordination and policy dialogue for sustainable use and development of shared knowledge platform.
CA	1,2,4 (equal)	Geoinformatics capacities	Discovery	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Rasht Valley) One micro-meteorology station established for the Central Asia region. At least 3 partners/staff trained on Geoinformatics Applications. At least 1 refereed paper	Proof of concept	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Rasht Valley) 5 partners/staff trained on Geoinformatics Applications. Outcomes: Geo-informatics capacity development. Dissemination of geospatial data and products.

				on vegetation dynamics in Central Asia. Outcomes: Assessment of vulnerability of the dryland crops for pests and diseases. Assessment of spatio-temporal rangeland/grasslands condition under changing climate.		
SA	4	Identification and demonstration of promising technologies	Proof of concept / Pilot	Output: Improved matrix of options of technologies through vulnerability, risk, ex-post, tradeoff analysis generated; Outcome: Farmers and NARES use the improved methods, technologies and tools to improve productivity and sustainability / Output: Improved matrix of technologies and processes to enhance productivity piloted; Outcome: validated technologies and options are available for upscaling	Proof of concept / Pilot	Output: Target domains and corresponding recommended/ proven technologies developed; Outcome: Influencing development and policy efforts through proved concept and technologies / Output: Matrix of technologies and processes, incorporating emerging technologies/issues to enhance productivity and income refined; Outcome: Validated technologies and options are available for upscaling
SA	4,5,6 (equal)	Pre project impact analysis	Discovery	Output: Information and knowledge on emerging technologies process generated	Discovery	Outcome: NARES and farmers use knowledge-based decision for new technologies and emerging issues.
SA	1,4 (equal)	Enhancing the use of cactus (Opuntia focus indica) to promote better livelihoods in arid areas of India	Discovery	Output: Promising accessions demonstrated on-farm and monitoring of its performance recorded;	Discovery	Outcome: Increased awareness of cactus as multi-purpose species; Skills of NARS partners increased
SA	4	Establish reference situation / baselines for the action sites to support systems approaches	Proof of concept	Output: Interventions based on outputs from baseline-Biodiversity demonstrated; Outcome: stakeholders awareness on biodiversity conservation, uses and practices enhanced	Pilot	Output: Piloting of interventions based on outputs from phase II
SA	1,2,3 (equal)	Validate the household vulnerability model result of 2013	Proof of concept	Output: Scenarios to enhance farmers/system resilience to shocks developed;	Proof of concept	Outcome: proposed trajectories towards resilient system adopted

SA	2,4 (equal)	Identify and document options for systems diversification, experiment and demonstrate the same to enhance farmers coping mechanism and achieving food security	Proof of concept / Pilot	Output: Improved matrix of options of system diversification developed; Outcome: Farmers and NARES use the available options to diversify system and improved coping mechanisms for farmers / Output: Improved matrix of options for system diversification to enhance productivity generated; Outcome: Validated technologies and options are available for upscaling	Proof of concept / Pilot	Output: Target domains for system and livelihood diversification identified; Outcome: Influencing development and policy efforts through proved concept and technologies relevant for system diversification / Output: Matrix of technologies and processes, incorporating emerging technologies/issues to enhance system diversification refined; Outcome: Validated technologies and processes are available for upscaling
SA	6	Capacity building of stakeholders for up scaling promising technologies	Pilot	Output: Training of smallholder farmers and stakeholders to create awareness and skills for up-scaling of promising technologies delivered;	Pilot	Outcome: NARES and farmers improve capacity of and knowledge to upscale and monitor the performances of new technologies.
SA	1,2,4 (equal)	Development of sustainability indicators	Discovery	Output: Sustainability indicators and index, developed; Outcome: Information and lessons used by NARES and stakeholders to enhance sustainability at system scale.	Discovery	Output: lessons from 2015 along with identification and validation of technologies demonstrated; Outcome: NARES use methods and process to enhance the system sustainability.
SA	1,4 (equal)	Identify key land and water management options in the pastoral and agro pastoral areas and major institutional and understanding biophysical bottlenecks for sustainable uses	Proof of concept	Output: demonstration of technologies, methods and process to enhance productivity and ecosystem services will continue (CPRs/khadin system); Economic and environmental impact of new technologies will be assessed. Outcome: NARES and farmers use the consolidated land and water management options to enhance productivity and eco-system services. Community acceptance of new technologies to sustain natural resource base.	Proof of concept	Output: knowledge and information gathered over years will be synthesized to lead to the development of policy options for outscaling; Outcome: policy options and strategies for outscaling and from demonstration, stakeholders' capacity and perceptions on CPR management enhanced.

SA	1,2,4, 6 (equal)	Pilot and demonstrating selected NRM options for their performance in terms of enhancing production capacity and providing ecosystem services in representative systems	Proof of concept	Output: demonstration of technologies, methods and process to enhance productivity and ecosystem services will continue (CPRs); Economic and environmental impact of new technologies are assessed; Outcome: NARES and farmers use the consolidated land and water management options to enhance productivity and eco-system services. Community acquainted and used to new technologies to sustain natural resource base.	Proof of concept	Output: development of policy options for outscaling synthesized based on knowledge and information gathered over years; Outcome: policy options and strategies for outscaling and from demonstration, stakeholders capacity and perceptions on CPR management enhanced.
SA	4	Analyze and monitor trade-off, ex-ante impacts, for different options and development of decision tools for improved land and water management and collective actions	Discovery / Proof of concept	Output: information and knowledge generated on potential benefits and trade-offs of different technologies synthesized and shared with stakeholders; Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches / Output: promising options to create practical opportunities for stakeholders demonstrated and validated.	Proof of concept	Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches
SA	4	Build capacity on collective actions and conflict resolutions for smallholders	Discovery	Output: Source of conflict assessed. Better institutional framework for conflict resolution designed;	Proof of concept	Output: In continuation with 2015, source of conflict assessed. Better institutional framework for conflict resolution designed. Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches
SA	3,4,6 (equal)	Developing strategies for convergence and piloting	Discovery	Output: consecutive meetings to strengthen innovation platforms held; Synthesis report on areas of convergence and enabling policy generated. Innovation platform for PR4D at three sites strengthened;	Discovery	Output: Consecutive meetings to strengthen innovation platforms; Innovation platform for PR4D at three sites strengthened; Outcome: stakeholders sensitized to initiate convergence.
SA	1,4 (equal)	Identify policy options to fill policy gaps and enhance adoption, resilience and intensification	Discovery	Output: major agriculture system related policy gaps identified. Determinants for non-adoption of traditional water harvesting techniques reviewed and analyzed and dialogue with different stakeholders initiated	Discovery	Output: policy brief developed Outcome: policy makers sensitized on policy gaps and options.

		of agricultural systems				

Intensive rain-fed systems

FP	IDOs	Activities	2015 Phase	Outputs/Outcomes	2016 Phase	Outputs/Outcomes
WAS	1,4 (equal)	Soil and Water conservation technologies	Proof of concept	Output: N.6. functional and sustainable scaling up mechanisms established.	Pilot	Work in progress
WAS	1,2,4 (equal)	RS based crop advisories	Pilot	Output: Improved resilience options (components, interactions and their management; explicit consideration of buffer functions, managing trade-offs between production and risk; nested scale risk mitigation, including incentives to adopt them)	Discovery	Work in progress
NA& WA	2,4 (equal)	Conservation agriculture	Pilot	Output: (Morocco, Meknes) 100 ha under CA, farmers meeting (involved in CRP DS project and farmers not involved in the action site and those from outside) to discuss benefits from CA and weakness points based on their experience with this technology; Outcome:(Morocco, Meknes) Acceptance by farmers of CA.	Scaling up	Output: (Morocco, Meknes) At least 1000 ha are under CA system, at least 500 farmers are using CA package, large meeting on lessons learned from CA technology is organized with the participation of farmers, scientists, technicians and extension people; Outcome:(Morocco, Meknes) Acceptance by farmers of CA and improved income of farmers using the no-till practice.
NA& WA	2,4 (equal)	Small ruminants productivity	Pilot	Output: (Morocco, Meknes) The forage/cattle based production system analyzed for 150 herds' owners and improved feeding strategies developed for dual milk and meat cattle production; Outcome: Improved water efficiency for forage/dual purpose cattle production	Scaling up	Output: (Morocco, Meknes) The forage/cattle based production system analyzed for 300 herds' owners and improved feeding strategies developed for dual milk and meat cattle production; Outcome: Improved water efficiency for forage/dual purpose cattle production
NA& WA	4	Policies on natural resources	Proof of concept	Output: Evidence-based policy recommendations on water, energy and land analyzed; Policy dialogue policy workshop reports and briefs produced and widely disseminated. Outcome: national media used results of policy analysis in at least 2 countries	Proof of concept	Output: Policy recommendations on water, energy and land tested. Outcome: Evidence-based policy recommendations Included in the national discussions of agricultural policies in 2 countries.
NA& WA	1,2,4 (equal)	System vulnerability	Proof of concept	Output: Comprehensive analysis of the production systems, livelihoods, opportunities and constraints Outcome: Development partners used the results of livelihoods and production systems analysis in their formulation of options for addressing constraints	Proof of concept	Output: Determinants of farmers' production choices Outcome: Development partners used results of determinants of farmer production choices to formulate more effective programs.
NA& WA	1,2,6 (40,4	Bio-economic farm models	Discovery	Output: Basic understanding of the production system developed, Modeling framework agreed upon, model	Discovery	Output: Ex ante analysis of farmer resilience enhancing options using bio-economic modeling.

	0,20)			skeleton developed and 50% of the data needed for the model collected.		Outcome: Farmers and policy makers used the results of bio-economic modeling and analysis to inform their farming decisions and in agricultural policy debates.
NA& WA	6	Innovation platforms & scenarios	Discovery	Output: Guidelines for implementing innovation platforms, with common understanding among scientists and partners, documented and utilized; Analysis of farm advisory services in the 4 livelihood systems completed in order to understand potential avenues available for enhancing adoption, adaptation, outscaling and upscaling of technologies and best practices. Outcome: 4 national innovation platforms established (2015);	Proof of concept	Output: Acceptance and documentation of operational guidelines for the 4 innovation platforms established; At least 2 policy relevant meetings held for each innovation platform to discuss methodologies tested within the learning alliances, which are amenable to broad uptake nationally; Potential resources and contextually relevant avenues for self-sustaining the functioning of the innovation platforms uncovered. Outcome: 4 innovation platforms operationalized and populated with key stakeholders that are best placed to inform and influence policy.
NA& WA	2	High-value chain clusters	Proof of concept	Output: Learning alliances established in Morocco, Tunisia, Egypt, Jordan; gender aware challenges for production and marketing of priority commodities identified and prioritized; opportunities uncovered for addressing these challenges; Options (including partners, resources and methodology) for addressing and removing constraints to production, post-harvest loss and marketing tested. Outcome: The learning alliance approach effectively informs the innovation platforms established - on methodologies tested for alleviating farm household constraints and towards (policy) consideration for broad uptake nationally	Proof of concept	Output: Contextually relevant approaches for developing learning alliances within the NAWA region documented, in collaboration with NARES partners, and disseminated broadly; Lessons drawn from the learning alliance approach within the NAWA region are documented and published through a variety of communication means, including peer reviewed publications; Outcome: The learning alliances are institutionalized and hosted by national institutions of research or development; National institutions undertake further learning alliances in areas within and outside of CRP-DS action sites;

NA& WA	2,4 (equal)	Water & land productivity in rainfed systems	Pilot	Output (Meknes & Tadla): N. 20 on-farm demonstration trials on supplemental irrigation (SI) of wheat; N. 4 Deficit SI of olive trees (2), potatoes (1) and onion (1).; N. 2 Data on fertilizer management of wheat/food legume; Raised bed machine fine-tuned and evaluated, KRB: N. 02 on-farm data collected on fertilizers of wheat/food legumes; response of wheat to different levels of SI and nitrogen rates; (Meknes KRB): N. 2 field days fort each site for 50 farmers. Data on growth, development and water use for validating the Aquacrop model for use in irrigation scheduling collected for wheat (Tadla, KRB) and potato, onion (Meknes). Guidelines on deficit SI and fertilizers management prepared; Plant/soil/water data collected from the trials analyzed and the annual reports prepared. Outcome: The developed package of deficit SI for wheat used in NARS technology transfer programs at the provincial level in Tadla (Morocco).	Pilot/Scali ng up	Output: N. 50 Farmers exposed to improved packages \; Data on growth development and water use collected; Curve responses to irrigation water applications for potato and onion (Meknes); and to water and nitrogen applications for wheat (KRB); Response of olive trees to deficit irrigation (Meknes); Aquacrop model calibrated and tested on wheat (Tadla, KRB) and potato and onion (Meknes). Fertilizer application norms developed for wheat and food legumes (Meknes and KRB). Data collected, analyzed and reported; N. 6 journal articles submitted. Outcome: (Meknes and Tadla; KRB): Deficit SI package used by farmers for wheat in Tadla; Guidelines developed for deficit SI of wheat (Karkheh) and potato and onion (Meknes) conveyed and adopted; Fertilizer management for wheat/food legumes used by extension in their dissemination (Meknes and KRB); Aquacrop model used in irrigation scheduling (Meknes, Karkheh).
NA& WA	1,2,6 (40,4 0,20)	Post- harvest & market access	Discovery	Output: Recommendations for removing market constraints to market access of small holder.	Proof of concept	Output: Options for reducing post-harvest losses tested for selected commodities
NA& WA	3,5 (equal)	Gender in Drylands	Discovery / Proof of concept	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options developed / Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options evaluated	Pilot	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options tested
NA& WA	1,2,6 (equal)	Aggregation approaches for smallholder	Discovery	Outputs: Different approaches for smallholder farmer aggregation to improve services and market access analyzed in Morocco; Workshop reports and policy briefs produced and disseminated; Outcome: Stakeholders increased their awareness of different options of smallholder farmer aggregation	Proof of concept	Outputs: New approaches for aggregating smallholder farmers to improving services and market access initiated for tested and evaluating in Morocco; Stakeholder dialogue workshop reports on aggregation options and policy briefs produced and disseminated. Outcome: New approaches for aggregating smallholder farmers to improve services and market access initiated for tested and evaluation in Morocco.

NA& WA	4,6 (70,30)	Seed systems & dissemination	Discovery/ Proof of concept	Output: Quality seed of legumes produced by VBSEs at action site; Training of men and women technicians and pioneer farmers on quality seed production and enterprise management; Report on profitability analysis of on-farm seed production. Outcome: Better access to quality seed of new cereal and legume varieties by farmers; Knowledge based local seed business for delivery of quality seed in Morocco	Proof of concept/pilot	Output: Three self-financed and sustained VBSE established to produce and commercialize seeds. Outcome: Better access to quality seed of new cereal and legume varieties by farmers; Knowledge based local seed business for delivery of quality seed in 6 local communities with 600 farmers in 2016-17 in Morocco.
NA& WA	2,4,6 (equal)	Cereal & legumes systems adaptation	Pilot	Output: (Morocco, action site Meknes) in 2 locations. 30 Farmers (men and women) identify the most desirable lines for submission by NARS breeders to registration authorities in Morocco. Outcome: (Morocco, action site Meknes) Breeders consider the choice and requirements of farmers when they propose for registration of new varieties for better adoption; Selected lines by farmers produce at least 10% more or have better quality or resistance to diseases and pests.	Proof of concept	Output: Develop at least 2 permanent platforms for participatory selection of advanced lines allowing to select at least 5 superior lines of wheat and legumes
NA& WA	2,4,6 (30, 50, 20)	Cereal & legume system IPM-	Pilot	Output: (Morocco, Meknes, action site). Two to three IPM options for wheat and faba bean be developed; 100 farmers and extension personnel trained and one flyer prepared. Outcome: (Country, Morocco, Meknes action site) Reduction of the yield gaps of wheat (15%) and faba bean (30%) though technology adoption in the participating farmers; Reduced cost of production for purchasing pesticides up to 50% in the participating farmers; Trained farmers in IPM applied their knowledge in management pests affecting their wheat and faba bean.	Piloting & Scaling up	Output: at least one IPM option demonstrated in 50 farmers' fields that narrow the yield gaps by 20-30% in wheat and faba bean in the action site. Outcome: About 100 farmers adopted at least one IPM option and use their skills to manage pests in their fields in the action site
E&SA	2,4 (equal)	Baseline surveys	Proof of concept	Output: Zimbabwe (Chinyanga Triangle) and Ethiopia (Highlands) N.1. Improved planning of the research in 2016; DGIS project baseline developed and technical reports produced (ICRAF); Outcome DGIS implementing partners use baseline for M&E purposes (ICRAF)	Proof of concept	Output: Zimbabwe (Chinyanga Triangle) and Ethiopia (Highlands) Results from first year initiatives verified N.1 comprehensive report with major findings prepared, N.1 Journal article published, DGIS project M&E used to assess project performance, N.1 paper published on M&E (ICRAF). Outcome: DGIS implementing partners use baseline and M&E for project management purposes (ICRAF)

E&SA	2,4 (equal)	Understand research gaps and gap filling	Discovery	Output: N.1 report on ideas for intensification - proof of concept developed for the Chinyanja Triangle based on gaps identified in 2014.	Proof of concept	Output: N.1 report on results of intensification options from 2015 developed for the Chinyanja Triangle. Outcome: NARES in Malawi, Mozambique and Zimbabwe use information to better target interventions based on prioritized gaps for intensification.
E&SA	4	Research entry points	Proof of concept	Output: Zimbabwe (Chinyanga Triangle) and Ethiopia (Highlands) N.1 Field trials to test best bet options for the identified entry points initiated; N.1 Report on first year evaluation prepared;	Proof of concept	Output: Zimbabwe (Chinyanga Triangle) and Ethiopia (Highlands) Second year testing of best bets conducted; N. 1 Report on the performance of identified options prepared Outcome: Ethiopia (Highlands): Awareness about the potential best bets created
E&SA	3,5,6 (equal)	Youth and gender	Discovery	Output: Malawi (Chinyanja triangle) and Ethiopia (Highlands) Options to enhance the participation identified through focus group discussions N.1 Workshop on enhancing participation by youth in agriculture held; Insights on causes for low participation of youth in agriculture	Proof of concept	Output: Malawi (Chinyanja triangle) and Ethiopia (Highlands) Field testing of effectiveness of identified options for greater involvement of youth and women initiate; N.1 strong program for DS in ESA that addresses the gender issues established.
E&SA	2,4 (equal)	Technology transfer	Pilot	Output: Varieties identified for technology adoption tested on farmers' fields in Ethiopia. Outcome: Farmers use improved varieties of barley wheat, chickpea and forage legumes that boost productivity	Pilot	Work in progress
E&SA	4	Research-extension links	Pilot	Output: Zimbabwe N.5 functional Innovation Platforms established; Outcome: Improved crop, livestock productivity and farmer access to inputs, services and markets.	Pilot	Work in progress
E&SA	4	Test best bet interventions	Pilot	Outcome: Farmers yield improved through use of integrated soil fertility management technologies; Dry season livestock feed shortages reduced due to improved availability of forage seeds	Pilot	Outcome: Farmers grow improved barley, wheat, chickpea varieties
E&SA	3,5 (70,30)	Characterize Food systems and identify entry points	Proof of concept	Output: DGIS project sites in Kenya and Ethiopia; N.2 reports describing development and testing of interventions to mitigate constraints and ensure equal access to project benefits to different categories of farmers (ICRAF).	Pilot	Outcome: DGIS project sites in Kenya and Ethiopia; N.6 implementing partners use the information to develop mechanisms to ensure equal access to project benefits for the different categories of farmers among the 20,000 targeted project beneficiaries (ICRAF).
E&SA	4	Develop integrated system approaches to land and water	Pilot	Output: N 1 famers trained and using improved Technical Packages on land and water management for the Chinyanja Triangle	Proof of concept	Work in progress

		use for productivity and income				
CA	1,3,4 (equal)	Livestock productivity	Discovery	Output: (Uzbekistan, Aral Sea) Analysis - sheep and goat production systems of 2 communities in one Action Sites; A set of interventions identified and prioritized to increase productivity and enhance participation by the poor along the value chain. Implementation plan produced for each prioritized intervention. At least one intervention to increase on-farm productivity and one intervention to improve market efficiency piloted with 150 hhs each. Outcome: (Uzbekistan, Aral Sea) Meat value chain channels fully understood and bottlenecks addressed; Livestock keepers engaged in testing improved practices as a way of organizing themselves for better access to markets and services	Proof of concept	Output: Full sheep and goat production systems analysis incl. qualitative value chain analysis from production through to consumption (and feed resource assessment) in in the two Action Sites representing approx. 400 small-ruminant keeping hhs (2200 persons). A set of interventions identified and prioritized to increase productivity and enhance participation by the poor along the value chain. At least one intervention to increase on-farm productivity and one intervention to improve market efficiency piloted with 150 hhs each. Outcome: Increased capacity of national partners for implementing value chain analysis; meat value chain channels fully understood and bottlenecks addressed. (ii) Livestock keepers engaged in testing improved practices as a way of organizing themselves for better access to markets and services.
CA	2,3,4, 6 (equal)	Varieties	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 50 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (10 Male and Female farmers). N.1farmer field day Outcome: N. 4 candidate varieties identified of cereals, superior to the locally grown varieties; 5 young researchers (3 men and 2 women) trained in scientific methods of field experimentation;	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 10 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (50 Male and Female farmers). N.3 farmer field days Outcome: t least 40 men and women farmers, seed producers, researchers and policy learned about new, improved varieties of field crops, vegetables, and potato.

CA	1,2,3, 5,6 (equal)	Seed system platform	Proof of concept	Output: Characterization report of the seed value chain and delivery system produced. 10 seed growers trained on seed storage (potato, cereals among them sorghum, pearl millet, alfalfa and fodder shrubs). 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-sprouting techniques. Seed multiplication of sorghum pearl millet, alfalfa and perennial fodder shrub (Kochia prostrata) organized. Outcomes: Increased local capacity in seed-related research. Criteria identified for the selection of crop specific registered seed growers.	Proof of concept	Output: 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-sprouting techniques. Seed multiplication of soybean and mungbean for the production of 1 and 35 tons of seed, respectively, organized. Outcomes: Increased local capacity in seed-related research. Demonstration seed plots established and seed growers trained, including in post-harvest practices.
CA	4	Innovation Platform	Discovery	Output: (Tajikistan, Rasht Valley) N.1 Baseline study (socio-economic, gender, youth, capacity building, extension) in at least one Action Site covering 30 households;	Proof of concept	Output: (Tajikistan, Rasht Valley) Database on socio-economic, gender, youth, capacity building, extension indicators Outcome: (Tajikistan, Rasht Valley) Capacity of stakeholders increased through training program;
CA	1,2,4 (equal)	Knowledge Management CACILM	Scaling up	Output: (Tajikistan, Kyrgyzstan, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; Outcome: Knowledge about SLM in CA countries is synthesized, packaged; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources;	Scaling up	Output: (Tajikistan, Kyrgyzstan, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; N.1 Stakeholder workshop and SLM technology evaluation - Capacity building in access to and dissemination of knowledge. Outcome: Knowledge about SLM in CA countries is synthesized, packaged and disseminated in forms that facilitate widespread uptake by decision makers in the region; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources; Established knowledge sharing process for coordination

						and policy dialogue for sustainable use and development of shared knowledge platform.
CA	1	Geoinformatics capacities	Discovery	Output: (Tajikistan, Kyrgyzstan, Rasht Valley) One micro-meteorology station established for the Central Asia region. At least 3 partners/staff trained on Geoinformatics Applications. At least 1 refereed paper on vegetation dynamics in Central Asia. Outcomes: Assessment of vulnerability of the dryland crops for pests and diseases. Assessment of spatio-temporal rangeland/grasslands condition under changing climate.	Proof of concept	Output: (Tajikistan, Kyrgyzstan, Rasht Valley) 5 partners/staff trained on Geoinformatics Applications. Outcomes: Geo-informatics capacity development. Dissemination of geospatial data and products.
SA	1,2,6 (equal)	Capacity building of stakeholders for up scaling promising technologies	Pilot / Scaling up	Output: Training of smallholder farmers and stakeholders to create awareness and skills for up-scaling of promising technologies given; / Output: Evidence based capacity building programs for stakeholders on outscaling provided;	Pilot / Scaling up	Outcome: NARES and farmers improve capacity of and knowledge to upscale and monitor the performances of new technologies. / Outcome: National/local institutions capacity to enable upscaling of promising technologies improved
SA	2,4,6 (equal)	Adapting conservation agriculture for rapid adoption by smallholder farmers	Proof of concept	Output: On-station and on-farm demonstration and monitoring of the performance of CA undertaken	Proof of concept	Outcome: Stakeholder's understanding of CA in terms of context/niche for outscaling
SA	1	Enhancing the use of cactus (Opuntia focus indica) to promote better livelihoods in arid areas of India	Discovery	Output: Promising accessions demonstrated on-farm and monitoring of its performance recorded;	Discovery	Outcome: Increased awareness of cactus as multi-purpose species; Skills of NARS partners increased
SA	4	Establish reference situation / baselines for the action sites to support systems approaches	Proof of concept	Output: Interventions based on outputs from baseline-Biodiversity demonstrated; Outcome: stakeholders awareness on biodiversity conservation, uses and practices enhanced	Pilot	Output: Piloting of interventions based on outputs from phase II

SA	1,2,3, 4 (equal)	Validate the household vulnerability model result of 2013	Proof of concept	Output: Scenarios to enhance farmers/system resilience to shocks developed;	Proof of concept	Outcome: proposed trajectories towards resilient system adopted
SA	4	Identification, validation, and out scaling of technology (all agro-ecosystem based)	Pilot / Scaling up	Output: Technologies, methods and processes to enhance productivity and improve resilience identified and documented; / Output: Lessons from existing convergence models synthesized and strategies for outscaling formulated and shared with actors;	Pilot / Scaling up	Outcome: Farmers in SA adopt improved productivity enhancement options thru out-scaling model of knowledge; Farmers, NARES use improved options, technologies and tools to contribute to resilience-building, enhanced productivity. / Outcome: NARES adopt innovative convergence models for out-scaling
SA	2,4 (equal)	Identify and document options for systems diversification, experiment and demonstrate the same to enhance farmers coping mechanism and achieving food security	Proof of concept / Pilot	Output: Improved matrix of options of system diversification developed; Outcome: Farmers and NARES use the available options to diversify system and improved coping mechanisms for farmers / Output: Improved matrix of options for system diversification to enhance productivity generated; Outcome: Validated technologies and options are available for upscaling	Proof of concept / Pilot	Output: Target domains for system and livelihood diversification identified; Outcome: Influencing development and policy efforts through proved concept and technologies relevant for system diversification / Output: Matrix of technologies and processes, incorporating emerging technologies/issues to enhance system diversification refined; Outcome: Validated technologies and processes are available for upscaling
SA	3,4,6 (equal)	EX-ante impact analysis	Discovery	Output: Information and knowledge on emerging technologies process generated;	Discovery	Outcome: NARES and farmers use knowledge-based decision for new technologies and emerging issues.
SA	6	Capacity building of stakeholders for up scaling promising technologies	Pilot	Output: Training of smallholder farmers and stakeholders to create awareness and skills for up-scaling of promising technologies delivered;	Pilot	Outcome: NARES and farmers improve capacity of and knowledge to upscale and monitor the performances of new technologies.
SA	4	Development of sustainability indicators	Discovery	Output: lessons from 2014 along with identification and validation of technologies demonstrated	Discovery	Output: update of methodologies, sustainability indices based on lessons from previous years; Outcome: NARES use methods and process to enhance the system sustainability.

SA	4	Pilot and demonstrating selected NRM options for their performance in terms of enhancing production capacity and providing ecosystem services in representative systems	Proof of concept	Output: demonstration of technologies, methods and process to enhance productivity and ecosystem services will continue (CPRs); Economic and environmental impact of new technologies are assessed; Outcome: NARES and farmers use the consolidated land and water management options to enhance productivity and eco-system services. Community acquainted and used to new technologies to sustain natural resource base.	Proof of concept	Output: development of policy options for outscaling synthesized based on knowledge and information gathered over years; Outcome: policy options and strategies for outscaling and from demonstration, stakeholders capacity and perceptions on CPR management enhanced.
SA	4	Analyze and monitor trade-off, ex-ante impacts, for different options and development of decision tools for improved land and water management and collective actions	Discovery / Proof of concept	Output: information and knowledge generated on potential benefits and trade-offs of different technologies synthesized and shared with stakeholders; Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches / Output: promising options to create practical opportunities for stakeholders demonstrated and validated.	Proof of concept	Outcome: NARES and farmers use knowledge-based decisions for technologies adoption and identification of their niches
SA	4	Develop and assess mechanisms to improve farmers access to market	Discovery	Output: existing farmers' market options, networks and bottlenecks and suggested improved mechanisms	Discovery	Output: Report on existing farmers' market options, networks and bottlenecks and improved mechanisms suggested; Outcome: more comprehensive, and generally accepted understanding of the mechanisms and strategies to improve farmers' access to market.
SA	1,2,6 (40,40,20)	Developing strategies for convergence and piloting	Discovery	Output: consecutive meetings to strengthen innovation platforms held; Synthesis report on areas of convergence and enabling policy generated. Innovation platform for PR4D at three sites strengthened;	Discovery	Output: Consecutive meetings to strengthen innovation platforms; Innovation platform for PR4D at three sites strengthened; Outcome: stakeholders sensitized to initiate convergence.

SA	1	Identify policy options to fill policy gaps and enhance adoption, resilience and intensification of agricultural systems	Discovery	Output: major agriculture system related policy gaps identified. Determinants for non-adoption of traditional water harvesting techniques reviewed and analyzed and dialogue with different stakeholders initiated	Discovery	Output: policy brief developed Outcome: policy makers sensitized on policy gaps and options.

Tree-based systems

FP	IDOs	Activities	2015 Phase	Outputs/Outcomes	2016 Phase	Outputs/Outcomes
WAS	3,4 (equal)	Reviews	Discovery / Scaling up	Output: (Burkina Faso, KKM) N.1 Baseline studies and participatory characterization in Burkina Faso used to identify and prioritize options for natural resource management, agricultural intensification and development of market opportunities and associated value chains N.2 Compendium - development of successful stories and options to improve traditional land and water management practices. Outcome:(Burkina Faso, KKM) Skills of NARS partners enhanced and NARES told used, methods and processes to generate and customize improved resilience options for targeted groups of vulnerable households; Farmers, NGOs, policy makers, are aware of constraints and opportunities of dryland agriculture	Discovery / Scaling up	Work in progress
WAS	3,4 (equal)	Agroforest and forest products	Proof of concept	Output: Burkina Faso, WBS -Reports identifying capacity building needs among innovation platforms, extension services and other institutions. Outcome: Implementing partners use the information to develop innovation platforms with farmer organizations, service providers and national initiatives that will benefit N. 10,000 farmers.	Proof of concept / Scaling up	Work in progress
WAS	3,4,6 (equal)	Soil and Water conservation technologies	Proof of concept	Outcome: N.60. research and extension agent capacities strengthened;	Proof of concept	Work in progress
WAS	4,6 (60,40)	Farmer managed natural regeneration trees	Pilot	Output: (Burkina Faso, WBS). Journal paper on Farmer Managed Natural regeneration Outcome: (Burkina Faso, WBS) 30000 farmers adopt Farmer Managed Natural regeneration	Pilot	Work in progress

WAS	3,4,6 (equal)	Develop soil fertility options	Discovery / Scaling up	Output:(Burkina Faso, WBS) Due to erosion losses, possible planning on training of extension agents to train farmers on reduced soil losses and improved productivity; Improved land use visioning on how best to restore degraded areas Outcome: (Burkina Faso, WBS) 5000 smallholders understanding and adopting land restoration technologies	Proof of concept	Output: (Burkina Faso, WBS) 10,000 smallholders upscaling land restoration technologies
WAS	3,4 (equal)	Water management options	Discovery / Scaling up	Output: (Burkina Faso, WBS) N.5 agricultural land and soil management practices mapped and analyzed to develop technical packages for on-farm integrated soil and water management; N.1 journal article on water management issues; Outcome: (Burkina Faso, WBS) Partners, 5000 smallholders, use packages to support uptake of integrated soil and water management;	Discovery / Scaling up	Outcome: (Burkina Faso, WBS)Partners, 2000 smallholders, use packages to support uptake of integrated soil and water management;
NA& WA	4	Small ruminants productivity	Pilot	Output: Improvement of small ruminants' products wholesomeness at 20 local processors of goat milk and study of goat milk value chain (Morocco, Chefchaouane); Outcome: Increased market competitiveness of small ruminants' dairy products.	Scaling up	Output: Improvement of small ruminants' products wholesomeness at 30 local processors of goat milk collecting from over 500 small goat keepers owning between 5000 and 7000 goats (Morocco, Chefchaouane); Outcome: Increased market competitiveness of small ruminants' dairy products; empowerment of local milk processors and increased outcome form milk sales
NA& WA	4	Policies on natural resources	Proof of concept	Output: Evidence-based policy recommendations on water, energy and land analyzed; Policy dialogue policy workshop reports and briefs produced and widely disseminated. Outcome: national media used results of policy analysis in at least 2 countries	Proof of concept	Output: Policy recommendations on water, energy and land tested. Outcome: Evidence-based policy recommendations included in the national discussions of agricultural policies in 2 countries.
NA& WA	1,2,4 (equal)	System vulnerability	Discovery	Output: Comprehensive analysis of the production systems, livelihoods, opportunities and constraints Outcome: Development partners used the results of livelihoods and production systems analysis in their formulation of options for addressing constraints	Proof of concept	Output: Determinants of farmers' production choices Outcome: Development partners used results of determinants of farmer production choices to formulate more effective programs.
NA& WA	1,2,3, 4 (equal)	Bio-economic farm models	Discovery	Output: Basic understanding of the production system developed, Modeling framework agreed upon, model skeleton developed and 50% of the data needed for the model collected.	Discovery	Output: Ex ante analysis of farmer resilience enhancing options using bio-economic modeling. Outcome: Farmers and policy makers used the results of bio-economic modeling and analysis to inform their farming decisions and in agricultural policy debates.

NA& WA	6	Innovation platforms & scenarios	Discovery	Output: Guidelines for implementing innovation platforms, with common understanding among scientists and partners, documented and utilized; Analysis of farm advisory services in the 4 livelihood systems completed in order to understand potential avenues available for enhancing adoption, adaptation, outscaling and upscaling of technologies and best practices. Outcome: 4 national innovation platforms established (2015);	Proof of concept	Output: Acceptance and documentation of operational guidelines for the 4 innovation platforms established; At least 2 policy relevant meetings held for each innovation platform to discuss methodologies tested within the learning alliances, which are amenable to broad uptake nationally; Potential resources and contextually relevant avenues for self-sustaining the functioning of the innovation platforms uncovered. Outcome: 4 innovation platforms operationalized and populated with key stakeholders that are best placed to inform and influence policy.
NA& WA	2	High-value chain clusters	Proof of concept	Output: Learning alliances established in Morocco, Tunisia, Egypt, Jordan; gender sensitive production and marketing opportunities and challenges of priority commodities identified and prioritized; Options (including partners, resources and methodology) for addressing and removing constraints to production, post-harvest loss and marketing tested; Outcome: The learning alliance approach effectively informing the innovation platforms established based on evidence of tested methods for alleviating farm household constraints and towards (policy) consideration for broad uptake nationally.	Proof of concept	Output: Contextually relevant approaches for developing learning alliances within the NAWA region documented, in collaboration with NARES partners, and disseminated broadly; Lessons drawn from the learning alliance approach within the NAWA region documented and published through a variety of communication means, including peer reviewed publications. Outcome: The learning alliances are institutionalized and hosted by national institutions of research and development; National institutions undertake further learning alliances in areas within and outside of CRP-DS action sites;
NA& WA		Post-harvest and market access	Discovery/ Proof of concept	Output: Constraints to market access by small holder producers disaggregated by gender fully characterized; Options for addressing these constraints identified and communicated with development partners and policy makers. Outcome: Value chain actors are more aware of the constraints to market access and are willing to cooperate for increasing benefits in a win-win scenario and reducing post-harvest losses.		Output: Gender-sensitive interventions for improving market access tested; Options for reducing post-harvest losses evaluated. Outcome: Development partners adopted market access interventions in their programs in at least 2 countries; Development partners applied programs for raising farmers in reducing post-harvest losses.
NA& WA	3,5 (equal)	Gender in Drylands	Discovery / Proof of concept	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options developed / Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options evaluated.	Pilot	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options tested.

CA	1,2,4 (equal)	Marginal lands	Proof of concept	Output: Inventory and classification of agricultural production systems and marginal lands associated with different natural resources management scenarios. One dataset for the Aral Sea Basin on salinity in selected area. Networking with national partners and policy makers to develop a basis for institutional support for long-term salinity management strategies. A contact list of implementation partners, policy makers will be established; at least 15 personal contacts for at least 10 institutions. Outcome: Improved interaction between CRP Dryland Systems research and policy makers in the region related to salinity management.	Proof of concept	Output: Information booklet describing current farm and salinity management practices on high producing agricultural and marginal lands in the series of "Ideas books for salinity management". Inventory and classification of agricultural production systems and marginal lands associated with different natural resources management scenarios. Networking with national partners and policy makers to develop a basis for institutional support for long-term salinity management strategies, integrated to IP for Irrigated crop systems (Irrigated Cotton/Wheat/Rice systems). A contact list of implementation partners, policy makers will be established; at least 5 personal contacts for at least 10 institutions. Development of field-based management strategies within the broader regional salinity management strategy will be developed in cooperation with the CRP WLE. A document with “research for development” vision for Aral Sea Basin. Gender aggregated labor distribution and decision making processes for communities in salt affected agricultural production systems and marginal lands. A document with findings will be made available. Outcome: (i) Improved knowledge source for extension services in the Aral Sea Basin. (ii) Increased knowledge and inter linkage between regional salinity management and field based interventions in high producing and marginal lands. (iii) Improved interaction between CRP Dryland Systems research and policy makers in the region related to salinity management. (iv) Improved gender aggregated data for communities living in the Aral Sea Basin and expected impact of interventions on salinity management and marginal lands.
CA	3,4,6 (40,40,20)	Water use efficiency	Pilot	Output: 1 farmer field days; 1 Presentation at International and national conference. I chapter for international conference paper; 1 paper at national conferences. Outcome: (i) 300 farmers in 4-5	Pilot	Output: One journal paper and one international conference paper. Two papers at national conferences. Outcome: One-hundred women in 4-5 communities in the two Action Sites will benefit from their improved

				communities in the two Action Sites will be trained on improving water use efficiency.		knowledge on water use efficiency.
CA	1,2,3, 4 (equal)	Varieties	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 50 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (10 Male and Female farmers). N.1farmer field day Outcome: N. 4 candidate varieties identified of cereals, superior to the locally grown varieties; 5 young researchers (3 men and 2 women) trained in scientific methods of field experimentation;	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 10 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (50 Male and Female farmers). N.3 farmer field days Outcome: At least 40 men and women farmers, seed producers, researchers and policy learned about new, improved varieties of field crops, vegetables, and potato.
CA	3,5,6 (60,2 0,20)	Seed system platform	Pilot	Output: Characterization report of the seed value chain and delivery system produced. 10 seed growers trained on seed storage (potato, cereals among them sorghum, pearl millet, alfalfa and fodder shrubs). 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-sprouting techniques. Seed multiplication of sorghum pearl millet, alfalfa and perennial fodder shrub (Kochia prostrata) organized. Outcomes: Increased local capacity in seed-related research. Criteria identified for the selection of crop specific registered seed growers.	Pilot	Output: 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-sprouting techniques. Seed multiplication of soybean and mungbean for the production of 1 and 35 tons of seed, respectively, organized. Outcomes: Increased local capacity in seed-related research. Demonstration seed plots established and seed growers trained, including in post-harvest practices.
CA	3,6 (60,4 0)	Innovation Platform	Discovery	Output: (Tajikistan, Rasht Valley, Uzbekistan, Fergana Valley) N.1 Baseline study (socio-economic, gender, youth, capacity building, extension) in at least one Action Site covering 30 households;	Proof of concept	Output: (Tajikistan, Rasht Valley, Uzbekistan, Fergana Valley) Database on socio-economic, gender, youth, capacity building, extension indicators Outcome: Capacity of stakeholders increased through training program;

CA	1,2,4, 6 (equal)	Knowledge Management CACILM	Scaling up	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Fergana Valley, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; Outcome: Knowledge about SLM in CA countries is synthesized, packaged; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources;	Scaling up	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Fergana Valley, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; N.1 Stakeholder workshop and SLM technology evaluation - Capacity building in access to and dissemination of knowledge. Outcome: Knowledge about SLM in CA countries is synthesized, packaged and disseminated in forms that facilitate widespread uptake by decision makers in the region; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources; Established knowledge sharing process for coordination and policy dialogue for sustainable use and development of shared knowledge platform.
CA	4	Geoinformatics capacities	Discovery	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Fergana Valley, Rasht Valley) One micro-meteorology station established for the Central Asia region. At least 3 partners/staff trained on Geoinformatics Applications. At least 1 refereed paper on vegetation dynamics in Central Asia. Outcomes: Assessment of vulnerability of the dryland crops for pests and diseases. Assessment of spatio-temporal rangeland/grasslands condition under changing climate.	Proof of concept	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Fergana Valley, Rasht Valley) 5 partners/staff trained on Geoinformatics Applications. Outcomes: Geo-informatics capacity development. Dissemination of geospatial data and products.
SA	6	Capacity building of stakeholders for up scaling promising technologies	Pilot / Scaling up	Output: Training of smallholder farmers and stakeholders to create awareness and skills for up-scaling of promising technologies given; Output: Evidence based capacity building programs for stakeholders on outscaling provided;	Pilot / Scaling up	Outcome: NARES and farmers improve capacity of and knowledge to upscale and monitor the performances of new technologies. / Outcome: National/local institutions capacity to enable upscaling of promising technologies improved

SA	1,2,3 (20,20,60)	Validate the household vulnerability model result of 2013	Proof of concept	Output: Scenarios to enhance farmers/system resilience to shocks developed;	Proof of concept	Outcome: proposed trajectories towards resilient system adopted
SA	4	Identification, validation, and out scaling of technology (all agro-ecosystem based)	Pilot / Scaling up	Output: Technologies, methods and processes to enhance productivity and improve resilience identified and documented; Output: Lessons from existing convergence models synthesized and strategies for outscaling formulated and shared with actors;	Pilot / Scaling up	Outcome: Farmers in SA adopt improved productivity enhancement options thru out-scaling model of knowledge; Farmers, NARES use improved options, technologies and tools to contribute to resilience-building, enhanced productivity./ Outcome: NARES adopt innovative convergence models for out-scaling
SA	4	Identify and document options for systems diversification, experiment and demonstrate the same to enhance farmers coping mechanism and achieving food security	Proof of concept / Pilot	Output: Improved matrix of options of system diversification developed; Outcome: Farmers and NARES use the available options to diversify system and improved coping mechanisms for farmers / Output: Improved matrix of options for system diversification to enhance productivity generated; Outcome: Validated technologies and options are available for upscaling	Proof of concept / Pilot	Output: Target domains for system and livelihood diversification identified; Outcome: Influencing development and policy efforts through proved concept and technologies relevant for system diversification / Output: Matrix of technologies and processes, incorporating emerging technologies/issues to enhance system diversification refined; Outcome: Validated technologies and processes are available for upscaling
SA	4	EX-ante impact analysis	Discovery	Output: Information and knowledge on emerging technologies process generated;	Discovery	Outcome: NARES and farmers use knowledge-based decision for new technologies and emerging issues.
SA	6	Capacity building of stakeholders for up scaling promising technologies	Pilot	Output: Training of smallholder farmers and stakeholders to create awareness and skills for up-scaling of promising technologies delivered;	Pilot	Outcome: NARES and farmers improve capacity of and knowledge to upscale and monitor the performances of new technologies.
SA	3,4 (80,20)	Develop and assess mechanisms to improve farmers access to market	Discovery	Output: existing farmers' market options, networks and bottlenecks and suggested improved mechanisms	Discovery	Output: Report on existing farmers' market options, networks and bottlenecks and improved mechanisms suggested; Outcome: more comprehensive, and generally accepted understanding of the mechanisms and strategies to improve farmers' access to market.
SA	6	Developing strategies for convergence and	Discovery	Output: consecutive meetings to strengthen innovation platforms held; Synthesis report on areas of convergence and enabling policy generated. Innovation	Discovery	Output: Consecutive meetings to strengthen innovation platforms; Innovation platform for PR4D at three sites strengthened; Outcome: stakeholders sensitized to

		piloting		platform for PR4D at three sites strengthened;		initiate convergence.
SA	4	Identify policy options to fill policy gaps and enhance adoption, resilience and intensification of agricultural systems	Discovery	Output: major agriculture system related policy gaps identified. Determinants for non-adoption of traditional water harvesting techniques reviewed and analyzed and dialogue with different stakeholders initiated	Discovery	Output: policy brief developed Outcome: policy makers sensitized on policy gaps and options.

Irrigated crops systems

FP	IDOs	Activities	2015 Phase	Outputs/Outcomes	2016 Phase	Outputs/Outcomes
NA& WA	4,6 (equal)	Policies on natural resources	Proof of concept	Output: Evidence-based policy recommendations on water, energy and land analyzed; Policy dialogue policy workshop reports and briefs produced and widely disseminated. Outcome: national media used results of policy analysis in at least 2 countries	Proof of concept	Output: Policy recommendations on water, energy and land tested. Outcome: Evidence-based policy recommendations included in the national discussions of agricultural policies in 2 countries.
NA& WA	1,2,3, 4 (equal)	System vulnerability	Proof of concept	Output: Comprehensive analysis of the production systems, livelihoods, opportunities and constraints Outcome: Development partners used the results of livelihoods and production systems analysis in their formulation of options for addressing constraints	Proof of concept	Output: Determinants of farmers' production choices Outcome: Development partners used results of determinants of farmer production choices to formulate more effective programs.
NA& WA	3,4 (equal)	Bio-economic farm models	Discovery	Output: Basic understanding of the production system developed, Modeling framework agreed upon, model skeleton developed and 50% of the data needed for the model collected.	Discovery	Output: Ex ante analysis of farmer resilience enhancing options using bio-economic modeling. Outcome: Farmers and policy makers used the results of bio-economic modeling and analysis to inform their farming decisions and in agricultural policy debates.
NA& WA	6	Innovation platforms & scenarios	Discovery	Output: Guidelines for implementing innovation platforms, with common understanding among scientists and partners, documented and utilized; Analysis of farm advisory services in the 4 livelihood systems completed in order to understand potential avenues available for enhancing adoption, adaptation, outscaling and upscaling of technologies and best practices; Outcome: 4 national innovation platforms established (2015);	Proof of concept	Output: Acceptance and documentation of operational guidelines for the 4 innovation platforms established; At least 2 policy relevant meetings held for each innovation platform to discuss methodologies tested within the learning alliances, which are amenable to broad uptake nationally; Potential resources and contextually relevant avenues for self-sustaining the functioning of the innovation platforms uncovered; Outcome: 4 innovation platforms operationalized and populated with key stakeholders that are best placed to inform and influence policy
NA& WA	2,4,6 (equal)	High-value chain clusters	Proof of concept	Output: Learning alliances established in Morocco, Tunisia, Egypt, Jordan; gender aware challenges for production and marketing of priority commodities identified and prioritized; opportunities uncovered for addressing these challenges; Options (including partners, resources and methodology) for addressing	Proof of concept	Output: Contextually relevant approaches for developing learning alliances within the NAWA region documented, in collaboration with NARES partners, and disseminated broadly; Lessons drawn from the learning alliance approach within the NAWA region are documented and published through a variety of communication means,

				and removing constraints to production, post-harvest loss and marketing tested. Outcome: The learning alliance approach effectively informs the innovation platforms established - on methodologies tested for alleviating farm household constraints and towards (policy) consideration for broad uptake nationally.		including peer reviewed publications. Outcome: The learning alliances are institutionalized and hosted by national institutions of research or development; National institutions undertake further learning alliances in areas within and outside of CRP-DS action sites.
NA& WA	3,5 (equal)	Gender in Drylands	Discovery / Proof of concept	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options developed / Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options evaluated.	Pilot	Output: Gender analysis mainstreamed in technology development; Gender-sensitive women empowering options tested.
NA& WA	4	Managing salinity	Discovery/p roof of concept	Output: Field data on the response to salinity management alternatives of wheat and legumes in Egypt and KRB collected and analyzed. / Output: Salinity distribution and extent maps for central Iraq and Egypt produced.	Pilot	Output: Salinity control options and crops(wheat and faba beans) response to levels of salinity in Egypt Delta developed and communicated to partners; Field date on crops and soil health in response to designed salinity management options of main crops in CA and KRB collected and analyzed.
NA& WA	4	Post-harvest & market access	Discovery/ Proof of concept	Output: Constraints to market access by small holder producers disaggregated by gender fully characterized; Options for addressing these constraints identified and communicated with development partners and policy makers. Outcome: Value chain actors are more aware of the constraints to market access and are willing to cooperate for increasing benefits in a win-win scenario and reducing post-harvest losses.	Proof of concept	Output: Gender-sensitive interventions for improving market access tested. Options for reducing post-harvest losses evaluated. Outcome: Development partners adopted market access interventions in their programs in at least 2 countries; Development partners applied programs for raising farmers in reducing post-harvest losses.
NA& WA	4	Cereals & legumes system adaptation	Pilot	Output: (Egypt, Nile Delta action site) in 2 locations. 30 Farmers (men and women) identify the most desirable lines for submission by NARS breeders to registration authorities in Morocco. Outcome: (Egypt, Nile Delta action site) Breeders consider the choice and requirements of farmers when they propose for registration of new varieties for better adoption; Selected lines by farmers produce at least 10% more or have better quality or resistance to diseases and pests.	Proof of concept	Output: Develop at least 2 permanent platforms for participatory selection of advanced lines allowing to select at least 5 superior lines of wheat and legumes.
NA& WA	4	Cereals and legumes systems	Pilot	Output: (Egypt, Nile Delta Action site)1-2 new pesticides, 1-2 IPM options and 2-3 elite lines each of	Piloting & Scaling up	Output: at least one IPM option demonstrated in 50 farmers' fields that narrow the yield gaps by 20-30% in

		IPM		faba bean and wheat with high yield and pest resistance identified; 1-2 Plant Growth Promoting Rhizobacteria (PGPR)identified in managing diseases of wheat and faba bean in Nile Delta site. Outcome: (Egypt, Nile Delta): Reduction of the yield gaps of wheat (15%)and faba bean (30%) through technology adoption by participating farmers; Reduced cost of production for purchasing pesticides up to 50% in the participating farmers.		wheat and faba bean. One candidate PGPR and elite faba bean and wheat genotypes tested in 50 farmers' fields in the action sites. Outcome: About 100 farmers adopted at least one IPM option and use their skills to manage pests in their wheat and faba bean fields in the action site.
CA	4	Marginal lands	Proof of concept	Output: Inventory and classification of agricultural production systems and marginal lands associated with different natural resources management scenarios. One dataset for the Aral Sea Basin on salinity in selected area. Networking with national partners and policy makers to develop a basis for institutional support for long-term salinity management strategies. A contact list of implementation partners, policy makers will be established; at least 15 personal contacts for at least 10 institutions. Outcome: Improved interaction between CRP Dryland Systems research and policy makers in the region related to salinity management.	Proof of concept	Output: Information booklet and Ideas books for salinity management". Networking with national partners and policy makers to develop a basis for institutional support for long-term salinity management strategies, integrated to IP for Irrigated crop systems (Irrigated Cotton/Wheat/Rice systems). A contact list of implementation partners, policy makers will be established; at least 5 personal contacts for at least 10 institutions. Development of field-based management strategies; Outcome: (ii) Increased knowledge and inter linkage between regional salinity management and field based interventions in high producing and marginal lands. (iii) Improved interaction between CRP Dryland Systems research and policy makers in the region related to salinity management.
CA	4	Water use efficiency	Pilot	Output: 1 farmers field days; 1 Presentation at International and national conference. I chapter for international conference paper; 1 paper at national conferences. Outcome: (i) 300 farmers in 4-5 communities in the two Action Sites will be trained on improving water use efficiency.	Pilot	Output: One journal paper and one international conference paper. Two papers at national conferences. Outcome: One-hundred women in 4-5 communities in the two Action Sites will benefit from their improved knowledge on water use efficiency.

CA	2,3,4, 6 (equal)	Varieties	Proof of concept / Pilot	(potato) Output: 30 farmers male and female are involved in in-field testing of potato varieties and agro-technics; 1 farmer field days; 10 young researchers (15 men and 10 women) trained in scientific methods of field experimentation; / (cereals) Output: (Uzbekistan, Aral Sea) 50 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (10 Male and Female farmers). N.1farmer field day. Outcome: N. 4 candidate varieties identified of cereals, superior to the locally grown varieties; 5 young researchers (3 men and 2 women) trained in scientific methods of field experimentation;	Pilot	(cereals) Output: (Uzbekistan, Aral Sea) 10 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (50 Male and Female farmers). N.3 farmer field days Outcome: At least 40 men and women farmers, seed producers, researchers and policy learned about new, improved varieties of field crops, vegetables, and potato.
CA	1,2,3, 4,6 (equal)	Seed system platform	Pilot	Output: Characterization report of the seed value chain and delivery system produced. 10 seed growers trained on seed storage (potato, cereals among them sorghum, pearl millet, alfalfa and fodder shrubs). 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-sprouting techniques. Seed multiplication of sorghum pearl millet, alfalfa and perennial fodder shrub (Kochia prostrata) organized. Outcomes: Increased local capacity in seed-related research. Criteria identified for the selection of crop specific registered seed growers.	Pilot	Output: 10 selected seed growers trained in land preparation, field isolation, cultivation practices, seed multiplication techniques, storage, potato pre-sprouting techniques. Seed multiplication of soybean and mungbean for the production of 1 and 35 tons of seed, respectively, organized. Outcomes: Increased local capacity in seed-related research. Demonstration seed plots established and seed growers trained, including in post-harvest practices.
CA	6	Innovation Platform	Proof of concept	Output: (Uzbekistan, Aral Sea, Fergana Valley) N.1 Baseline study (socio-economic, gender, youth, capacity building, extension) in at least one Action Site covering 30 households;	Discovery	Output: (Tajikistan, Rasht Valley) Database on socio-economic, gender, youth, capacity building, extension indicators Outcome: (Tajikistan, Rasht Valley) Capacity of stakeholders increased through training program;

CA	4,6 (60,40)	Knowledge Management CACILM	Scaling up	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Fergana Valley, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; Outcome: Knowledge about SLM in CA countries is synthesized, packaged; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources;	Scaling up	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Fergana Valley, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; N.1 Stakeholder workshop and SLM technology evaluation - Capacity building in access to and dissemination of knowledge. Outcome: Knowledge about SLM in CA countries is synthesized, packaged and disseminated in forms that facilitate widespread uptake by decision makers in the region; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources; Established knowledge sharing process for coordination and policy dialogue for sustainable use and development of shared knowledge platform.
CA	4	Geoinformatics capacities	Proof of concept	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Fergana Valley) One micro-meteorology station established for the Central Asia region. At least 3 partners/staff trained on Geoinformatics Applications. At least 1 refereed paper on vegetation dynamics in Central Asia. Outcomes: Assessment of vulnerability of the dryland crops for pests and diseases. Assessment of spatio-temporal rangeland/grasslands condition under changing climate.	Pilot	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Fergana Valley) 5 partners/staff trained on Geoinformatics Applications. Outcomes: Geo-informatics capacity development. Dissemination of geospatial data and products.

Home gardens systems

FP	IDOs	Activities	2015 Phase	Outputs/Outcomes	2016 Phase	Outputs/Outcomes
CA	3	Water use efficiency	Discovery	Output: 1 farmer field days; 1 Presentation at International and national conference. I chapter for international conference paper; 1 paper at national conferences Outcome: (i) 300 farmers in 4-5 communities in the two Action Sites will be trained on improving water use efficiency. (ii) One-hundred women in 4-5 communities in the two Action Sites will benefit from their improved knowledge on water use efficiency.	Discovery	Work in progress
CA	2,3,4,6 (equal)	Varieties	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 50 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (10 Male and Female farmers). N.1farmer field day. Outcome: N. 4 candidate varieties identified of cereals, superior to the locally grown varieties; 5 young researchers (3 men and 2 women) trained in scientific methods of field experimentation;	Proof of concept	(cereals) Output: (Uzbekistan, Aral Sea) 10 advanced lines of cereals evaluated by farmers; training course on planning, management and evaluation of field experiments ; training course on using statistical software in data analysis, results presentation and interpretation, reporting (50 Male and Female farmers). N.3 farmer field days. Outcome: At least 40 men and women farmers, seed producers, researchers and policy learned about new, improved varieties of field crops, vegetables, and potato.

CA	4,6 (60,40)	Knowledge Management CACILM	Scaling up	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Fergana Valley, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; Outcome: Knowledge about SLM in CA countries is synthesized, packaged; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources;	Scaling up	Output: (Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Turkmenistan, Aral Sea, Fergana Valley, Rasht Valley) N.1 Synthesis and selection of 10 high potential SLM technologies and approaches and 2-3 are prioritized using criteria for selection to target 4 agro-ecosystems (rainfed, rangelands, irrigated, mountain); N. 1Shortlisted technologies presented in database (WOCAT template); N. 5 similarity country maps for each intervention; N.1 Calibration of 1 downscaling model of Climate Change and 10 trained national staff; N.1 Development of a web-based SLM knowledge platform; N.1 Stakeholder workshop and SLM technology evaluation - Capacity building in access to and dissemination of knowledge. Outcome: Knowledge about SLM in CA countries is synthesized, packaged and disseminated in forms that facilitate widespread uptake by decision makers in the region; knowledge platform to provide updated information about SLM accompanied by a strategy to ensure sustainability and link with worldwide resources; Established knowledge sharing process for coordination and policy dialogue for sustainable use and development of shared knowledge platform.

Traditional Subsistence systems

FP	IDOs	Activities	2015 Phase	Outputs/Outcomes	2016 Phase	Outputs/Outcomes
WAS	3,4 (40,60)	Local crop diversity conservation and use	Proof of concept	Output: N.2000 farmer field schools and 5 rural resources centers established;	Proof of concept	Work in progress
WAS	1,2,4 (equal)	Soil and Water conservation technologies	Proof of concept	Output: N.6 exposure trips organized for the poor farmers in the action sites;	Proof of concept	Work in progress

[i] The baseline surveys for CRP DS have been engendered, and in North Africa and West Asia Flagship it is expected that baseline data collection will be completed by June 2014.

[ii] A cross-country study on gender analysis of technology adoption, impacts, and dissemination is being conducted as part of the Global comparative research initiative, entitled "Innovation and Development through Transformation of Gender Norms in Agriculture and Natural Resource Management".

[iii] "Characterization of six sweet potato production communities, using Focus Group Discussions in Ghana" by John Kanburi and BIDZAKIN Kwabena ACHEREMU (58ps).

[iv] "On the role of Moroccan Institutions in Mainstreaming Gender Empowerment in the Food Legume Value Chain" by Maria Marzouk (35ps).

[v] "The contribution of women and men to socio-economic processes of barley in the cultivation and production value chain – with a special focus on Morocco" by Andrea Pape-Christiansen (35ps).

" Women's empowerment and gender equity through value chains: The example of legumes in Morocco" by Maria E. Fernandez, Aden Aw-Hassan and Latifa Mehdi (19ps).

"Understanding gender and poverty dimensions of high value agricultural commodity chains in Sou-Massaa-Draa region of southwestern Morocco" by Patricia Janzano, Shinan Kassam, and Aden Aw-Hassan (72ps).

[vi] "Local Knowledge & Gender Impact Assessment on Agro- Pastoral Community kin the BANI HASHEM HIMA SITE Jordan". IUCN International Union for Conservation of Nature – Regional Office for West Asia (37ps).

[vii] "FARMERS' PERCEPTIONS ON WATER POLICIES: A CASE STUDY FROM THE JORDANIAN BADIA Water and Livelihood Initiative (WLI)" by Samia Akroush and Roberto Telleria (15ps).

[viii] "Gender-disaggregated analysis of adoption of agricultural water management technologies in Kenya" by Jayanth Kannaiyan (43ps). The thesis can be accessed at "http://issuu.com/knyn/docs/dissertation_rev_3.0__final__jk_pri"

[ix] Please refer to http://www.icarda.org/creating-opportunities-vulnerable-women for more information.

[x] "Collection of secondary data and preparation of a literature review of previous and on-going studies on gender research in the Nile Delta of Egypt" by Aman Ali Elgarhi and Mervet Sedky (38 ps).

[xi] "Identifying empowerment opportunities of rural women: The case of projects in the framework of INDH in the province of Meknes" by Abdel Rehim Bentaibi (21 ps).