CACILM Multicountry Partnership Framework Support Project on

Sustainable Land Management Research

ADB TA 6357

FIRST HALF YEARLY REPORT

(July- December, 2007)

International Center for Agricultural Research in the Dry Areas

CAC Regional Office, Tashkent, Uzbekistan

First Half Yearly Report, July -December 2007

ADB TA 6357: Central Asian Countries Initiative for Land Management Multi-country Support Project

CACILM Multi-country Partnership Framework Support Project
On
Sustainable Land Management Research

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Overview for SLM Research

1. Agriculture is an important sector of the economies in the CAC region, accounting for 22% of GDP and employing some 40% of the labor force. This may well be an underestimate of the true contribution of agriculture. As a result of structural reforms, household plots now generate a large part of the agricultural output and these have offered an important safety net for rural households struggling to cope with the economic transition. There is a huge potential for improving the productivity of agriculture to meet national food demands and to generate rural employment and incomes. However, production is constrained by variable and uncertain rainfall, cold winters and hot dry summers, which limit cropping options.

3. One of the major reasons for low agricultural productivity is poor natural resource management and especially the inefficient use of water. The poor management of irrigation systems and drainage and the dismantling of former state-operated large-scale irrigation systems have led to wide spread resource degradation. Land degradation represents diminished ability of ecosystems or landscapes to support and sustain livelihoods functions and services attributed to these ecosystems. Land degradation takes many forms such as water and wind erosion, terrain deformation (gully and shifting sands), pollution, nutrient depletion, reduced plant cover, loss of soil organic matter, soil compaction, salinity and waterlogging, etc. Faulty land-use and water-use decisions can have enormous negative implications through changes in the regional and global hydrological cycles to threaten the ecosystem sustainability. Shrinking of the Aral Sea is a classical example of the consequence of excessive water withdrawal from the Syrdarya and Amudarya river systems for irrigation, adversely affecting the land and water productivity, as well as the quality of the water resources in Central Asia. The main cause of land degradation is inappropriate use of agricultural lands.

4. Land degradation adversely affects livelihoods of smallholder farmers in Central Asian countries as they directly rely on these land resources. Land degradation results in declining total factor productivity of inputs including labor, adversely affects human health, increases production costs and malnutrition rates and pollutes the drinking water supplies. It is a common knowledge that water supplies of the Amudarya and Syrdarya rivers almost reach brackish water quality thresholds during the summer season.

5. Areas with the greatest potential for land and water degradation are those with highly weathered soils, steep slopes, areas denuded of vegetation (degraded ranges and pasture lands and forested lands), inadequate or excess rainfall, and high temperatures. These are also the areas that appear to correspond closely with areas of the highest rural poverty and malnutrition.

6. Land degradation is driven by a complex interplay of bio-physico-chemical, socio-political and techno-economic factors. Policy and livelihood decisions that fail to take into account the longer-term consequences of cause-effect relationships of the human actions often result in land degradation. Insecure land tenure, top-down and

inappropriate land use planning, often distance the resource users from management decisions. Inflexible policy environments and poor infrastructure can discourage innovations and adoption improved agronomic and crop management practices, and machinery prototypes needed to reduce drudgery and promote ecosystem resilience.

7. Integrated solutions that form an important component of the regional strategy for sustainable rural development should enhance productivity for food security, ecosystem biodiversity, improve employment opportunities, environmental quality and results in resource conservation and poverty alleviation. Thus, the convergences of objectives of sustainable land management also imply a *multi-functional role of agro-ecosystems.* Therefore, it becomes crucial that enabling environments (policy, marketing and support service infrastructure) and institutional technical backstopping and extension advisory service are available to farming communities to practice sustainable land management. Research is needed at watershed scales to understand the drivers of land degradation, to identify appropriate ways to manage and stimulate the development of land-use systems that can absorb shocks due to climate change and sustain population growth rates. Poor farmers with degraded lands are often more vulnerable to climate shocks.

8. Blue-print approaches to formulating polices on combating land degradation would be counter-productive since every country has its own specificities that need to be appropriately evaluated. Therefore, in order to successfully develop the enabling policies it is essential, in the first place, to understand the concerns and needs of Governments in each Central Asian countries for maintaining status quo policies. Only full comprehension of divergent interests and perceptions of parties can help develop new policies with potential to address the concerns of policy makers. Enabling policy environment is conducive for sustainable land management.

9. In most of the Central Asian countries, policy making process remains largely state-centric, with little involvement of civil society. Therefore, targeted policy advocacy at the higher levels of authorities would be essential for creating enabling policy environment to fight land degradation. In this regard, it should be also understood that policy reforms are most successful only when there are internal dynamics and initiatives promoting these changes in each of the Central Asian countries. Finally, it should also be remembered that policies are designed and implemented in a given institutional context. Any policy initiative, no matter how enabling it is, can not be implemented unless there are institutions to promote implementation. The role of local communities, the private sector, civil society and international community would be essential in promoting such institutions in the countries of Central Asia.

SLMR Response options

10. Agro-ecosystems are often an oversimplification of natural ecosystems designed to increase crop yields. Some agricultural systems develop symptoms of land degradation very quickly, whereas others with complex structures have no detectable footprints on environmental quality for long periods. The sensible solution, therefore, is to advocate agricultural systems that have a minimal ecological footprint. Recent evidences show that

it is possible to intensify and diversify agriculture and increase productivity of wide range of farming systems through resource conserving agriculture. Thus, there is no need to trade off resource conservation to achieve increased production. The resource conserving technologies include a wide range of practices such as no till/ minimum till and permanent raised bed planting, water harvesting and supplemental irrigation, organic farming and mulching and residue management, integrated nutrient management, agro-forestry and agri-horticulture, rationale use of topo-sequences in rolling landscapes, live fences and vegetative barriers, integrated pest management, and integrated livestock systems. Resources conserving agricultural technologies improve production and simultaneously improve soil health, make ecosystem system more resilient and reduce its vulnerability to climate change. Resource-conserving technologies (RCTs) to have significant impact on land degradation and livelihoods require enabling policy and institutional environment. In this regard, it is highly important to critically assess the impact of current policies on land degradation, develop enabling policy options and scenarios, evaluate different trade-offs they involve to facilitate implementation.

11. Farmers generally need a basket of technological options that are generally scale-neutral, 'divisible' in applications and allow them to incorporate indigenous know-how and traditional wisdom. Initial results of the socio-economic and livelihood analysis surveys in Central Asia suggest that investments in sustainable land management, where crop-livestock mixed farming system is practiced by small farm holders are very much possible,; and there is security of land tenure. Income from non-farm, non-agricultural sources and livestock production provides flexible capital for timely completion of farming operations which are crucial for improved livelihoods. Resource-conserving technologies (RCTs) which in many ways represent conservation agricultural approaches offer 'basket approach' to farmers on the technological options. RCTs can increase the resilience of agro-ecosystems, vulnerable to otherwise unexpected natural events. Resource conserving technologies practiced in farmer participatory mode, 'co-evolve' with agents for change (farmers). Farmers very often fine-tune the resource conserving technologies to suite and match their farm specific requirements.

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12. **Project Inception Workshop:** In order to initiate the process of the SLMR project implementation an Inception Workshop has been organized in July 2-4, 2007. It was attended by senior research managers, scientists, heads of the national/ multi-country CACILM Council Secretariats, scientists from CG centers and the NARS including personnel of the line-departments, NGOs and farmer representatives. UNCCD focal representatives from all the five countries also participated. In the workshop participants reached an agreement on the thematic activities to be covered, number of research sites, lead institutions to be responsible to coordinating the program in each country. In the workshop NSEKs also identified the Coordinators at the research sites and also at the National Level. A background document was circulated along with the project document before the workshop. In the workshop, agreements on benchmark sites, site and national coordinators and research teams, thematic research activities and procurement of supplies, etc. were reached. The Country National Project Coordinators (NC) presented

the information on research sites, site characteristics, and activities that were considered relevant for resolution of the complex NRM problems at the selected sites. It was agreed that the project would have a GIS component that will be led by ICARDA for agroecological characterization of the benchmark sites and develop site similarity maps together with the NARS partners for upscaling the potential technologies. It was also agreed that ICARDA will develop common methodologies and lead research on socio-economic baseline data, ex-ante impact, and livelihood analysis, and policy research.

13. **Site Work Plans**: For development of appropriate plan of work, ICARDA and national scientists examined existing land management practices and test / fine-tune those options for adoption /improving them. The land management options selected in consultation with the participating communities were seen to be closely linked to the livelihood options of the primary beneficiaries of this program (farmers), located in both rainfed (rangeland /pastures, sloping lands and deserts) and the irrigated areas. The resource conserving technologies identified in farmer participatory mode for on-farm testing are likely to improve the sustainability and productivity of agriculture. A list of technological options that had potential for up-scaling was collated and presented there:

Information collected on Technological Options

14. **Technologies with Potential for Scaling-up and scaling-out: On** the basis of the results obtained in all previously funded projects implemented in Central Asia, some of the most successful technologies with potential for scaling-up and scaling-out were identified and listed under different themes:

I. Management of sodic environment

- **Phospho-gypsum technology for amelioration of Na^+ and/or Mg^+ dominated solonetz:** PG application rate of 3-4 t/ha in autumn before snowfall found to improve crop productivity by 33.1%, meets phosphorus requirements of the crops, improves infiltration rates of slowly impermeable soils and improve soil health and alleviates environmental pollution due to open-air dumping of PG.
- **Enriched phospho-composting**: *In situ* composting of crop residues with rock phosphate in furrows used for irrigation, reduces irrigation-induced soil erosion on sloping lands, improves nutrient availability and meets P requirement of the crops.

II. Water-wise, cost effective technologies for rice-wheat cropping systems

- **Drip Irrigation / Micro-Sprinkler Irrigation:** Combined with raised-bed planting and application of fertilizer nutrients nearly doubled the productivity of soybean and winter wheat.
- **Cutback and Alternate Furrow Irrigation:** increased soil moisture uniformity and reduced surface runoff and irrigation induced-irrigation. Cutback alternate furrow irrigation increased yields of most crops. Water use efficiency was higher by 50% over the alternate-furrows irrigation and by 75% on furrows irrigation.
- **Micro-Furrow Irrigation:** Found very useful on sierozem soils with varying slopes in increasing soil moisture uniformity, reduced surface runoff and soil erosion.

- **Irrigation by Portable Plastic Chutes**: Portable plastic chutes increased yields of winter wheat, maize and vegetables crop (in sloping area) as well as cotton and wheat (in lowland area). Under lowland conditions, portable chutes helped in reducing the amount of water applied, as well as water losses.
- **Kahriz system**: improved water discharge considerably to increase irrigated acreage.

III. Bio-drainage for management of rising groundwater levels

Reduces the load for disposal of drainage (saline) waters, produces biomass, sequesters carbon, and provides fuels and timber, reduces negative environmental impacts and has a significant potential in improving farmers' income located in fragile and degraded environments.

IV. Tillage and crop establishment

- **Direct dry seeded rice** reduces water consumption/irrigation requirement by 70-90 cm, improves system productivity by more than 1.2 t/ha (30 %), doubles the cropping intensity/reduces fallowing, efficient leaching during the rice season alleviates the need for additional leaching in the fall season.
- **Zero tillage:** proved to be very profitable, water and energy saving in rainfed wheat based systems. No-tillage combined with direct seeding of spring wheat has now been adopted on almost 100,000 ha area.
- **Raised Bed Planting:** Raised bed planting system reduced seed rates by almost half and resulted in higher winter wheat yields. Saved irrigation water and improved use efficiency of fertilizer nutrients.
- **Precision land leveling:** Laser – assisted precision land leveling, saves 20 percent water and improves the efficiency of all the resource conserving technologies. It helps eliminate weed problems in the initial years.
- **Relay cropping of direct dry seeded Wheat into standing Cotton:** In irrigated cotton-wheat systems the practice has been adopted on a very large area in Uzbekistan and Tajikistan. Facilitates planting into cotton stubble, timely planting, saves seed, fuel and energy and improves yields.
- **Crop Diversification** with crops like durum wheat, barley, oats, buckwheat, food legumes, rapeseed and forages is on an increase. Safflower is an important alternative crop. Common bean is a better preceding crop to wheat than barley and sunflower.
- **Biological Inoculants***: Rhizobium* inoculation of chickpea seed resulted in about 40% increase in the yield over no inoculation.
- **Modern improved cultivars:** Improved cultivars and crop diversification.

V. Agricultural Management of Saline Water Resources

- **Technologies for conjunctive use of saline/drainage waters:** Saves fresh irrigation water (25-50%), meets crop water demands during periods of short fresh water supplies with out any significant yield penalties, facilitates double cropping and also improves leaching efficiency; potential for up-scaling and out-scaling.
- **Residue management and Mulching:** Use of mulch cuts back unproductive evaporation losses of water (saves 20-30 cm water in cotton-wheat system), reduces salinization rates; increases crop yields of cotton-wheat system by

- **Use of saline water** in rehabilitation of degraded forests/ agro-forestry/ agri-horti systems and pasture / range lands.

The detailed technical work plans were developed and were shared with the MSK, Bishkek, and are available at the MSK website**.** This report presents the activities conducted, with summary and monitorable indicators (**Annex 1**) and list of trials planned at benchmark sites (workplans) in each of the countries (**Annex 2**), participating Institutions (**Annex 3**) and an expenditure statement during the reported period (**Annex 4**).

14. **Project Agreements:** An Agreement between ADB and ICARDA was signed in September, 07. Similarly ICARDA and lead institutions signed an agreement for implementing the project work in each country. These agreements were submitted to the Bank and some comments were received on the agreements with national partners. ICARDA is attending to them to issue a corrigendum / redo the agreements. List of experts and participating institutions under the identified lead institution headed by the National Coordinator is given in **Annex 3**.

15. **Site visits for location of specific work plans**: Research teams collected information on the identified agreed sites and the geographical domains these sites will typically represent for soils, climate, crops and cropping systems and livestock related issues. The teams visited the identified sites / provinces / districts, interacted with a range of stakeholders. These visits helped teams to assess local situations on nature and type of land degradation, cause-effect relationships and bring convergence in opinions of line-departments, farmer groups, land users and researcher. Information on potential technological options to different NRM issues generated earlier in ADB and other project was collated and discussed with farmers for their inputs. During the Field visits to identified locations discussions were organized to (i) on site specific NRM problems, (ii) reach a consensus on potential technical options for resolution of the problems with the farmers, farmer groups and the line-departments, and (iii) select farmers to work with the Research teams.

16. **Sustainable Land Management Research at sites**: National teams developed a vision of Research on Sustainable Land Management Research for their respective countries and shared those documents with ICARDA and Multi-country Secretariat, Bishkek. On the basis of the inputs received from national partners, a draft **Research Prospectus** was developed by ICARDA and shared with CACILM/ADB in August, 2007 along with the **Project selection criteria** for funding. The revised research prospectus was later submitted on Jan 16, 2008 for additional inputs. The workshop for discussions on the Research Prospectus is planned for Feb 8, 2008.

17. **Baseline data/ common methodologies:** For socio-economic analysis, benchmark survey instruments were developed by ICARDA/ Agribusiness and shared with national partners for their technical inputs and fine-tuning. The survey instruments have been pre-tested for a full-scale analysis of livelihood and policy options in the project areas.

18. **Benchmark site characterization:** For the GIS component preliminary data sets were collected on site locations, soils, climate and cropping systems. NARS collaborators helped ICARDA to compile the site characteristics information and some thematic maps pertaining to sites/ provinces were developed and shared with National leaders during their visit to ICARDA Aleppo in November 2007. A National Professional Officer, based in SLMR coordinating unit, ICARDA-CAC-PFU in Tashkent was trained for assisting the GIS work module. Also the GIS projects with large-scale data layers were compiled in the GIS laboratory in ICARDA and some relevant information was extracted from the GIS project reports.

19. **Field Activities**: A program of field experimentation as agreed with national research teams and ICARDA team was initiated at the sites to validate the potential SLMR options at the identified benchmark sites. These trials / demonstrations were initiated in autumn / winter season, 2007. The list of such trials is given in **Annex 2.** Results will be available after the wheat crop season.

20. **Participation in CACILM Meetings:** National coordinators and ICARDA participated in meetings of the National CACILM Councils (Central Asia Initiative for Land Management (CACILM) whenever possible and presented information on the current status of SLMR Project activities. Project coordinator attended such meetings in Uzbekistan and Turkmenistan during his visits to those countries.

21. **Procurement of Implements**: Equipment agreed during the process of development of the technical program was repaired or bought through ICARDA to avail duty-free facilities only available to the ICARDA Mission. List of equipments procured or got repaired for smooth functioning of the project is enclosed as under:

- Multi-crop raised bed zero till planter, imported on its way
- Optical Sensor for assessment of green biomass, crop N demands, yield and soil health
- Conductivity meters for salinity measurement (repair)
- Portable chutes and polyethylene pipes to improve efficiency of irrigation water supplies
- Precision laser –assisted land leveling equipment

Some of these equipments have already reached destinations and some of them are on their way to research sites.

22. **Procurement / Collection of Seed- halophytes:** Seed materials were collected, as well as requisitioned from other CG centers. Winter wheat germplasm was provided by ICARDA/ CIMMYT; pearl millet and pigeon pea germplasm was supplied by ICRISAT; Indian-mustard, rapeseed and Egyptian clover provided by ICAR, New Delhi, and AVRDC agreed to provide mungbean. ICARDA mission in Tashkent helped in germplasm collections. National Teams in Uzbekistan and Kazakhstan collected local land races of trees/ shrubs and fodder grasses germplasm (halophytes) that can be used for improving the availability of the fodders for the livestock in desert areas. Exploratory missions were organized in Kzyl-Orda and Kyzylkum deserts for the purpose. ICBA provided some information on the halophytes that could prove useful in Central Asia.

23. **Laser Assisted Precision land leveling:** The design of drag type scrapper-bucket for the use with Land leveling equipment was finalized after performance evaluation and field visit to ZEF-UNESCO Project, Urgench. This project is using an imported prototype (drag type scraper-bucket) that is feather weight and economically cheap. After the field visit, subsequent discussions with experts from SANIIRI and Uzbek Institute for Mechanization and Electrification of Agriculture were organized to reach a consensus. It was agreed that the existing system operating with ZEF-UNESCO Project, Urgench, Uzbekistan should be assembled locally and supplied to national programs as it will obviate the need to import a heavy duty, costly scrappers from abroad. This decision is likely to build local capacity and will also promote agribusiness / custom service for land leveling. Currently, Institute for Mechanization and Electrification of Agriculture charges USD 450-500/ ha for land leveling.

Initial Impact Observed during Reported Period

24. Two **SMEs** (small manufacturing entrepreneurs) based in Urgench have developed expertise and have started manufacturing the hydraulic scrapper bucket for the laser assisted land leveler system indigenously. This is also being promoted through the ZEF-UNESCO Project. This is the first time that any small private sector entrepreneur has taken an initiative for an indigenization of the laser assisted land leveling technology. Experts from Institute of Mechanization and Electrification also visited Urgench and Dr. K.B. Yormammat. Director agreed to develop the scrapper buckets for the SLMR project and also agreed to cooperate in generating information on precision land leveling and promote rental service of the laser systems.

25. **Seminar to educate on Laser land leveling:** Our purchase enquiries promoted M/s Leica Geosystems, a Swiss company to open Sales and Servicing out-let in Tashkent Uzbekistan. They organized a seminar to educate the experts on the benefits of the system. Basteev G.N., Khegay B.B. and Dadajanov R., having many years of experience with levelers and laser units in Soviet Era participated and interacted with the Company's Service engineers.

26. **Irrigation Equipment:** M/s "SOVPLASTITAL" JV and Suvsanoatmash LLC Factory based on the State Design Office on Irrigation (GSKB of Irrigation) restarted making polyethylene pipes and portable chutes for arm use.

27. **Cost reduction / access:** Institute of Mechanization and Electrification of Agriculture in Tashkent agreed to develop a drag scrapper bucket using a simple Indian prototype provided to them from ZEF-UNESCO project in Urgench. With this development the cost of the bucket will come down. Existing buckets costs about USD 6000/ piece. The newly designed bucket will cost between USD 1200- 1600/ piece only.

28. **New proposals:** A research proposal on agro-forestry (tree, grass and nutritional cereals) was developed by the UZ scientific Crop production center and submitted to NSEK, CACILM to rehabilitate Kyzylkum deserts (reducing salt deflation, improve

environmental quality, increase biomass production and livestock productivity and livelihoods of the people residing there. The National CACILM council of Uzbekistan decided to combine all the related proposals so that a unified proposal could be commissioned.

29. Uzhydromet and University of Samarkand have expressed willingness to cooperate to enhance the utility of the Optical Sensors by combining remote sensing, GIS and Optical sensors to estimate the acreages of cotton and wheat crops in Uzbekistan and provide the In-season estimated crop yields (INSEY – before harvest of the crop). The Organization has agreed to find resources internally and cooperate on this issue and link to climate changes.

30. Multi-institutional and multidisciplinary teams of scientists work together at the research sites in each country to resolve the problems of the natural resource management. Gradually, such interactions will facilitate development of multi-institutional, multi-disciplinary research networks.

Annexes

Annex 1
Summary of the Progress Report
(July-December- 2007)

Activities	2007		Status	Performance Targets
	Qtr3	Qtr4		
Output 1. CA countries through the application of integrated systems analysis will have greater understanding of the policy, institutional, environmental drivers of land degradation, and will develop a comprehensive research				1) Orientation workshop with national partners to review information in the NPF's; 2) Common methodologies and approaches in data collection, factor analysis and system modeling developed; 3) Logical flowcharts, system models and other tools.
1.1 Coordination and monitoring of regional and national research activities in all the five countries through the establishment of multi-disciplinary teams of national and international scientists.			All the countries have constituted the research teams, and initiated the farmer participatory research work. ICARDA has initiated the socio-economic surveys for livelihood and policy analysis, characterization of the benchmark sites, digitization and GIS mapping of the sites.	
1.2 Common methodology and research approaches for data collection, factor analysis and system modeling developed for the diagnostic activities.			Minimum data sets and their common methodologies for monitoring salinity, soil moisture, estimating biomass/surface cover etc. were discussed in the Orientation/Inception workshop. Methodologies for socio-economic survey and livelihood analysis are being pre-tested and will soon be finalized.	
1.3 Orientation workshop for national scientists and enumerators organized			Orientation workshop organized in July, 02-04, 2007 in Tashkent, Uzbekistan. More than 50 participants including from NSEKS from all the Central Asian countries took part.	
1.4 Analyses of driving forces, causes, impacts of land degradation in CA countries through participatory diagnosis and integrated system analysis.			Project Manager studied all the background materials including the NPFs and interacted with research teams and various stakeholders in all the countries to identify major causes of land degradation in the region. He also visited the selected sites with the national research teams for field validation of SLMR options there.	
1.5 Ex-ante bio-economic modeling combined with extensive stakeholder consultation			Survey instrument for evaluation of the impact of land degradation on rural livelihoods was developed and being pre-tested before the launch of full scale socioeconomic surveys. Socioeconomic and policy analysis of systemic interactions of causes and consequences of land degradation is in progress.	
1.6 Mechanisms for local participation in SLM activities researched and established			Linkages with SMEs, NGOs and private sector have been established for promoting resource conserving technologies, such as laser land leveling, zero tillage, and raised bed planting and residue management.	

Output 2. Research prospectus for SLM research and donor-support for the duration of the CMPF Support Project developed including development pathways, research hypotheses and links with NPFs				1) Development pathways identified in all five; Central Asian countries 2) Research hypotheses identified; 3) Potential options (livelihoods, policy/ institutional) for SLM for applied research; 4) Multi-stakeholder workshop on research prospectus.
2.1 Integrative research hypotheses formulized by CA countries and research findings for identification of major factors determining comparative advantages of development pathways synthesized.			Technical program containing SLM research options and hypothesis have been developed by the national research teams in each country. It is already available on the CACILM website.	
2.2. Existing development pathways identified using cross-country analysis and incorporated into NPFs.			An analysis of the NPFs in each country revealed that the major problems affecting the livelihoods of the people include: 1) salinity and waterlogging, 2) reduced biodiversity vis-à-vis crop diversification including seed production and lack of crop-livestock integration, 3) excessive tillage and inefficient planting technologies/agronomic practices leading to high production costs, 4) sand deflation in desert areas and low productivity of the soils in dry region and more particularly the sloping lands. In order to improve the livelihoods and combat land degradation the existing development pathways are as under: 1) intensification and extensive agriculture 2) improved crop productivity through use of available scarce water supplies, 3) Use of improved crop cultivars and external inputs, and 4) supplement income and subsistence farming through the household plots.	
2.3 Development pathways that are strongly associated with land management options (mainly resource conservation practices) identified.			Following development pathways having very high potential for ensuring sustainable land management and improving livelihoods were identified: 1) paradigm shifts from excessive tillage to no-till and reduced tillage; 2) replacement of residue removal, soil incorporation and burning practices with mulching and residue retention to reduce erosion losses, cut back unproductive water losses through evaporation, moderate soil temperature, and reduce GHG emissions; 3) Move away from mono-cropping to diversified cropping systems, including inter- and relay cropping systems in intensive irrigated and rainfed agri-horti-systems generally practiced on sloping lands; 4) do away from excessive irrigation by precision land leveling to save precious water resources and improve use efficiency of external inputs and reduce drainage volumes through need based salt leaching in fall/ spring seasons; and 5) integrate crop production with livestock. These development options are being tested in different agro-ecologies for their subsequent up and out-scaling. New improved germplasms having higher yield potential and tolerance to abiotic and biotic stresses (rusts, salinity and drought) introduced to the farmers.	

2.4 Major development domains using GIS tools and potential benchmark sites identified in each CA country			GIS coordinates of benchmark sites under different RETAs and projects were collected and being mapped in Central Asian republics	
2.5 Ex-ante analysis of potential trade-offs between competing interests and the implications for different options				
2.6 A draft research prospectus developed based on the results of activities 2.1 – 2.6. through multi-stakeholder workshops			Draft research prospectus was developed and circulated to National and Multi-country CACILM councils. On August 17, 2007 and presented to in the 1st Steering Meeting of CACILM in Bishkek. It is now under revision.	
2.7 National scientists trained through on-the-job and specialized courses			A training program was organized on operation and maintenance of the zero till and raised-bed planters for benefit of the technicians and farmers. The opportunity was used to demonstrate zero- till/ raised bed planting of the wheat crop in farmers' fields.	
2.8 Simple tools for local assessment and monitoring of land degradation developed.			Not yet started	

Output 3. Research projects initiated in benchmark sites in all five countries of Central Asia and options tested with the land users				1) Benchmark sites established; 2) Similarity maps of benchmark sites; 3) Alternative SLMR options tested; 4) Feasible research proposals developed by NARS; 5) Staff trained.
3.1 Benchmark sites (both new and those already operational under on-going research projects (RETAs 6136 & 6208, IFAD-TAG, FAO-TCP etc.) identified for each of the development pathways having strong association with land management aspects and using cross-country approach			Research information on Benchmark sites used in different projects was collected. These benchmark sites were mapped in GIS framework. Relevant data as was available in the project reports for those sites (physico-chemical characteristics of soils, bio-climate, socio-economics and technologies tested /developed) were screened to identify potential SLMR options and to fill technology gaps for further validation.	
3.2 Digital database of benchmark sites using GIS tools for monitoring and further out-scaling developed and available to CA countries.			Site similarity maps are yet to be generated by the GIS Lab in ICARDA, Aleppo.	
3.3.Alternative livelihood and land management options selected and tested that provide quick and effective evidence of their benefits in a community-based participatory approach involving young scientists			SLMR options leading to improved livelihoods and development as were identified under output 2.3 and 3.2 were discussed with farmers before initiating farmer participatory research on their fields to fill information gaps and to improve or validate the identified ones.	
3.4 Community arrangements for managing common pool and land resources and potential institutional options identified.			Multi-stakeholder dialogue has been initiated by the research teams with local authorities in Zambul and Kyzylkum deserts where common property resources are widely available.	
3.5 The impact of different alternative land management options on livelihood and environment monitored.			Farmer participatory trials are in progress and being monitored to study saving in irrigation water, runoff losses and salt build up and accumulation of soil carbon and agronomic efficiency of fertilizer N.	
3.6 Alternative SLM options demonstrated to broad audience of stakeholders			Farmer participatory trials are in progress. Traveling seminars will be organized at some appropriate crop growth stages.	
3.7 Ex-post analysis of trade-offs between competing interests and the implications for each development pathway				
3.8 Alternative policy and institutional options to support adoption of SLM practices developed through combining policy analysis				

with field results.				
3.9 Young national scientists trained through on-site and specialized training.			Pl. see output 2.7	

Output 4. National development programs establish strategies for facilitating refinement and adoption of SLM practices				1) Well-trained personnel for SLM; 2) More users adopting SLMR; 3) Farmers' Fairs and Field days; 4) Training and demonstration of users; 5) Recommendations on best practices.
4.1 Linkages are established between Extension/advisory services and SLMR project and national coordination council			Adoption of the resource conserving technologies is being linked to SMEs, service providers, individual farmers and farmers' organizations in all the countries by the research teams.	
4.2 Mechanisms for up-scaling and out-scaling of SLM strategies and practices identified and analyzed across the CA countries			The methodology and mechanism for on out- and –up-scaling of SLM technologies is being developed and fine-tuned for Central Asia. This methodology implies benchmark site characterization and subsequent linking it to agro ecological similarity maps at the cross-country regional level. This will help to identify the similarity domains of the SLMR technologies for further dissemination. ICARDA GIS Lab is engaged now in benchmark site characterization, which includes different layers such as on climate, soil, water, crop patterns, etc. The second phase would be to develop similarity maps for the region in 2008.	
4.3 Out-scaling mechanisms assessed and tested through participatory action research and ex ante assessments.				
4.4 Mechanisms of wider community involvement, public awareness and advocacy campaign such as Farmer's Fairs, Field Days, Farmers' Schools etc tested in the CA countries.			Farmer field school organized in Dilara farms (Bishkek) on operations, serving and maintenance of machinery prototypes used for zero tillage and raised bed planting. English language training course organized in Dushanbe for the national project staff to enhance their competence to access available information on similar problems. EM probe training on salinity measurements was organized.	

Annex 2

Research Activities Planned and Initiated in 2007

Responsible, Institution, Performer	Proposed activities	Research Teams
ICARDA	**Component I. Developing a program of SLM Options**	
	1.1 Revised cooperation agreements	
	1.2 CA countries will have better understanding of policy, institutional, environmental drivers of LD and have developed a Comprehensive Research Prospectus	
	a) Socioeconomic and Policy Studies	K. Shideed and A.Mirzabaev (ICARDA) R. Khusanov (NGO Agribusiness and Entrepreneurship)
	i) Review of current biophysical, socioeconomic, policy, institutional, environmental and other drivers of land degradation in an integrated way to identify their systemic interactions.	
	ii) Socioeconomic surveys to evaluate the impact of land degradation on livelihoods of land users.	
	iii) Socioeconomic assessment of Sustainable Land Management options.	
	iv) Development of alternative enabling policies for SLM and evaluation of trade-offs between different competing policy and institutional scenarios, including through multi-stakeholder consultations, leading to identification of pathways for rural development through sustainable land management.	
	v) Policy advocacy and sensitization for adoption of SLM options and enabling policies.	
	b) Geographic Information Systems	E. de Pauw, O. Tsay (ICARDA)
	i) Collection of datasets for benchmark sites.	
	ii) Digitization of the datasets in GIS framework.	
	iii) Development of combined agro-ecological maps for Central Asia.	
	iv) Development of site similarity maps for up-, and out-scaling of SLM technologies.	
	v) Publication of the GIS maps through a agro-ecological bulletin for Central Asia.	
	1.3 Research Prospectus for SLM Research including Development Pathways Research Hypotheses and link with National Program frameworks	T. Oweis and R. Gupta (ICARDA), and National coordinators and their teams
	Component II. National Research Activities	
Uzbek Scientific Production Center of Agriculture and Research Institutions under it.	**a) Uzbekistan**	R. Ikramov, S. Yusupov, H. Maksadov and team
	i) Assessment of soil leaching requirements in irrigated plains to enhance water productivity and reduce drainage volumes (Lysimeter and Field Experiment).	
	ii) Maintaining favourable soil salinity balance in permanent raised-bed planting cotton-wheat irrigated systems.	
	iii) Assessment of both native and non-native tree and grass species for their biomass productivity, salt tolerance and bio-drainage ability to rehabilitate the degraded rangelands in arid agro-ecologies.	
	iv) Evaluation of diversified, salinity-resistant crops for enhancing biomass production for livestock in degraded rangelands.	
	v) Calibration and use of optical sensor for biomass prediction, nitrogen management, and yield forecasting.	
	vi) Evaluation of the impact of precision laser-assisted land leveling on water	

	savings, salinity and crop yields in irrigated agro-ecologies.	
	b) Turkmenistan	
	i) Evaluation of optimal planting time and its effect on crop yields, farmer livelihoods and land quality in saline and non-saline environments of cotton-wheat systems.	M. Nepesov (NC) A.Sparmuradov
	ii) Assessment of yield potential of different cotton and wheat cultivars under varying salinity levels for improved farm incomes.	
	iii) Validation, fine tuning and generation of new Resource Conserving Technologies (RCTs) in cotton-wheat systems for reducing soil compaction, crusting problems and water losses.	
	iv) Permanent raised bed planting system under zero till for cotton-wheat system.	
	v) Maintaining favourable salt balance in raised-bed furrow system in cotton-wheat.	
	vi) Study the impact of pigeon-pea and tree species on surface cover in controlling erosion and increased biomass.	
	vii) Calibration and use of optical sensor for biomass prediction, nitrogen management, and yield forecasting.	
	viii) Evaluation of the impact of precision laser-assisted land leveling on water savings, salinity and crop yields in irrigated agro-ecologies.	
	c) Tajikistan	
	i) Effect of Stripe cropping on runoff and soil erosion in sloping lands used under in agri-horti production system.	
	ii) Study the impact of different mulches on soil moisture conservation, soil erosion and yield of grain crops and grapes in sloping landscapes.	
	iii) Study the effect of reseeding and nitrogen fertilization on biomass production and soil quality in degraded pastures lands.	
	iv) Evaluate the efficacy of the mechanical and vegetative measures in control of gully erosion for rehabilitation of degraded sloping lands.	
	v) Develop nursery raising techniques for community plantation in sloping lands.	
	vi) Calibration and use of optical sensor for biomass prediction, nitrogen management, and yield forecasting.	
	vii) Evaluate the effect of Ferulia (medicinal / aromatic plant) as cover crop on soil moisture conservation and erosion. Rationale land use of sloping top sequence to improve productivity and reduce land degradation.	
	d) Kyrgyzstan	
Research Institute of Soil Science & Agrochemistry an associated centers	i) Evaluation of prime crop cultivars (chickpea/ safflower/ dry peas/ soybean/ maize/ wheat / and Barley) suited to different tillage systems for improved water productivity in shallow water table conditions.	**A. Saparov (NC)**
	ii) Study the effect of different tillage, residue management and herbicide molecules (pre and post emergence) on weeds population, crop water requirements and water productivity to increase farm incomes.	
	iii) Studies on the effect of controlled irrigation methods in improving crop productivity, water use efficiency and reduce irrigation-induced soil erosion.	
	iv) Effect of the Conjunctive use of multi-quality irrigation water (fresh and drainage water) on crop yields and soil quality (salinity buildup).	
	v) Evaluate the impact of laser-assisted precision land leveling on water savings, salinity and crop yields in irrigated and rainfed agro-ecologies.	
	vi) Calibration and use of optical sensor for biomass prediction, nitrogen management, and yield forecasting.	
	e) Kazakhstan	
	i) Evaluate the current status of land degradation in irrigated lands of “Kaptagay” LLC in Shielli massif of Kazakhstan.	
	ii) Assessment of the existing soil organic carbon status and potential for carbon sequestration in irrigated lands of “Kaptagay” LLC in Shielli massif of Kazakhstan.	
	iii) Studies on the effect of irrigation schedules on rice yield, saving in irrigation	

	water and salinity of the ponded waters and soil profile.	
	iv) Study the effect of different border dimensions on salt- water-salt balances in rice culture for saving in irrigation water and salt buildup.	
	v) Evaluate the performance of perspective rice cultivars introduced from the Kazakhstan and Russian rice breeding nurseries.	
	vi) Calibration and use of optical sensor for biomass prediction, nitrogen management, and yield forecasting.	
	vii) Evaluate the performance of different trees, shrubs, grasses and fodder crops in submontane plains, sand massifs, and sands in Abylai area.	

Annex 3

Research teams

1. Project Implementation Team of ICARDA

Theib Oweis, Ph.D
Research Program Director and Water Management Specialist
Mega-Project, Water Resources and Mitigation of Drought
ICARDA, Aleppo

Christopher Martius, Ph.D
Regional Coordinator / Head
ICARDA-CAC / CGIAR-PFU, Tashkent

Raj Gupta, Ph.D
Project Manager, SLMR
ICARDA-CAC, Tashkent

Kamel Shideed, Ph.D
Research Program Director and Agricultural Economist
ICARDA, Aleppo

Eddy de Pauw, Ph.D
Head GIS Lab.
ICARDA, Aleppo

Alisher Mirzabaev, MS
Socio-economist and Project officer
ICARDA Tashkent

Oksana Tsay, MS
NPO, GIS database digitization
ICARDA Tashkent

Sherzod Qosimov
Web Master,
ICARDA-CAC, Tashkent

Acadmecian Dr. Rasulmat Khusanov
Agro-business and Entrepreneurship Ltd. (CAEL),
An NGO, Registered with the Government of Uzbekistan

2. **National Research Teams**

Kazakhstan: Benchmark site Shieli

National Coordinator, Research Institute of Soil Sciences and Agricultural Chemistry	A. Saparov
Site coordinator, Chief Research officer, candidate of biological science	A. Otarov
Responsible performer, Head of reclamation division of RISSaAC, Chief Research officer, candidate of agricultural science	M. Ibraeva
Responsible performer, Head of department Kazak National Agrarian University, doctor of engineering science, professor	A. Rau
Responsible performer, Director of Priaral Research Institute of Agroecology and Agriculture, doctor of engineering science, Professor	T. Karlikhanov
Doctor of agricultural science, professor, Priaral Research Institute of Agroecology and Agriculture	K. Bakiruli
Priaral Research Institute of Agroecology and Agriculture	M. Vilgelm
Research officer, assistant professor	E. Kalibekova
Hydraulic engineer, Kazakhstan National Agrarian University	R. Kablanov
Junior research assistant, RISSaAC	A. Virakhmanova

Kazakhstan: Benchmark site Abylai

Site coordinator, Doctor of agricultural science	A. Seitkarimov
Kazakhstan National Agrarian University	Dr. A. Karinbaev Dr.A.Virakhmanova A. Bazarbaev
Scientist agricultural economist	S. Tokaev
Farmer	E. Tokaev

Kyrgyzstan: Bechmark site Daniyar

National Coordinator	Dr. M. Bekenov
Site coordinator	Dr. L. Martynova
Soil scientist, agronomist	G. Elemanova
Hydraulic engineer – irrigator	P. Jooshev
Farmer-agronomist	O. Mamaev
Plant protection specialist	N. Mokshina
Biologist	B. Asanakunov

Kyrgyzstan: Benchmark site Kenenbay

Site coordinator, irrigation specialist	A. Atakanov
Irrigation specialist	A. Naloychenko
Agronomist	S. Pismenniy

Hydraulic engineer	N. Sharshekeev
Hydraulic engineer	Mr. R. Madumarov
GIS laboratory specialist	Ms. N. Zemlyanskaya

Tajikistan: Benchmark sites Faizabad and Vaksh

National Coordinator, Research Institute of Soil Science	S. Sanginov
Site Coordinator, Doctor of agricultural science, Vaksh branch NPO (scientific-production association) «Zemledelie»	T. Gulov
Responsible performer candidate of agricultural science, Vakhsh branch NPO «Zemledelie»	M. Abdulloev
Performer, candidate of agricultural science, Vakhsh branch NPO «Zemledelie»	O. Rakhmonov
Performer candidate of agricultural science, Vakhsh branch NPO «Zemledelie	A. Yorov
Head of laboratory, Institute «Tochikzaminsoz»	A. Khakimova T. Sladkova
Research officer, Research Institute of Soil Science	Kabilova
Post-graduate student, Research Institute of Soil Science	Jumaev

Uzbekistan: Benchmark sites Sherzod Samandar Birligi, Esanboi-ota and Kyzylkum

Central Asian Research Institute of Irrigation (SANIIRI)	R. Ikramov NC
Uzbek Research Institute of Cotton Growing	Dr. F. Khasanova
Irrigation specialist, SANIIRI	Mr. Sh. Yusupov, G. Basteev
Institute of Irrigation and Melioration	Ms. O. Ashirova
Irrigation specialist, SANIIRI	Mr. Mr. D. Narziev
SANIIRI	Mr. R. Rakhimov
State Research Institute of Soil Science and Agrochemistry	Mr. D. Latypov
Djizzak Branch Research Institute of Cotton Growing	Dr. Kh. Maksadov (SC),
State Research Institute of Soil Science and Agrochemistry	Mr. A. Tursunov
Research Institute of Karakul breeding and Ecology Desert	Dr. S. Yusupov (SC)
Research Institute of Karakul breeding and Ecology Desert	Dr. A. Rabimov
Irrigation specialist, SANIIRI	R. Rakhimov
Soil science and agrochemical Institute	D.S. Sattarov ,Tursunov A
Uzbek Research Institute of Cotton Growing	L.Kh.Shezdjukova, Dr. F.M.Khasanova,
Tashkent Institute of Irrigation and Reclamation	Sh. Jusupov, G.N. Basteev,O.Ashirova
UzCRI	Dr. Maksadov; H Khalikov

Annex 4
Table 1. Approved Budget for the SLMR Project

Financial plans of the SLM-R Project
June 15, 2007 to May 31, 2009

Item	**SLM Program**	**National Research**	**Total**
A. Asian Development Bank Financing			
1 Consultants			
a. Remuneration			
i. International Consultants	120 000		120 000
ii.Domestic Consultants			
2 International Travel and Per Diem	60 000		60 000
3 Training Seminars and Conferences	90 000	30 000	120 000
4 National Research Program Agreement[1]		300 000	300 000
5 Local Transportation[3]		20 000	20 000
6 Data collection studies and surveys[2]	80 000		80 000
7 Equipment[2]		70 000	70 000
8 Publication, reports, communication	20 000		20 000
9 Contingencies	10 000		10 000
Subtotal A	380 000	420 000	800 000
B. ICARDA Financing			
1 ICARDA Personnel	250 000		250 000
2 ICARDA Administration and Support	90 000		90 000
3 Research Operations Ongoing	160 000		160 000
Subtotal B	500 000		500 000
TOTAL	880 000	420 000	1 300 000

Annex 4

Table 2. Budget provisions by Component (US$) from 2007- 2009

Country		Comp. I Developing a program of SLM options	Comp. II National Research Activities	Procurement of equipment	Training & workshop [2]Dissemination	Coord.Monitoring, & Travel	Total, USD
Kazakhstan							
	2007		15,000	9,000	1,000	1,000	27,000
	2008		30,000		3,000	2,000	34,000
	2009		15,000		2,000	1,000	18,000
Sub-total		*0*	*60,000*	*9,000*	*6,000*	*4,000*	*79,000*
Kyrgyzstan							
	2007		15,000	17,667	1,000	1,000	34,667
	2008		30,000		3,000	2,000	35,000
	2009		15,000		2,000	1,000	18,000
Sub-total		*0*	*60,000*	*17,667*	*6,000*	*4,000*	87,667
Tajikistan							
	2007		15,000	9,000	1,000	1,000	27,000
	2008		30,000		3,000	2,000	34,000
	2009		15,000		2,000	1,000	18,000
Sub-total		*0*	*60,000*	*9,000*	*6,000*	*4,000*	79,000
Turkmenistan							
	2007		15,000	16,667	1,000	1,000	34,667
	2008		30,000		3,000	2,000	34,000
	2009		15,000		2,000	1,000	18,000
Sub-total		*0*	*60,000*	*16,667*	*6,000*	*4,000*	86,667
Uzbekistan							
	2007		15,000	17,667	1,000	1,000	35,667
	2008		30,000		3,000	2,000	34,000
	2009		15,000		2,000	1,000	18,000
Sub-total		*0*	*60,000*	*17,667*	*6,000*	*4,000*	87,667
Total National Research			**300,000**	**70,000**	**30,000**	**20,000**	**420,000**
ICARDA- GIS							
	2007	3,800			2,000	2,500	8,300
	2008	14,500			2,500	1,700	18,700
	2009	3,000					3,000
ICARDA/NGO- SEPR							
	2007	3,000				2,000	5,000
	2008	23,000			2,000	5,000	30,000
	2009	8,000			2,000	5,000	15,000
Sub-total Data Collections and Studies							**80,000**
ICARDA CPU							
	2007	49,743			35,000	19,254	103,997
	2008	35,129			50,000	24,767	109,895
	2009	35,129			25,000	25,980	86,108
Sub Total		**120,000***			**110,000****	**70,000*****	**300,000**
Total SLM program							**380,000**
GRAND TOTAL		**120,000**	**300,000**	**70,000**	**140,000**	**90,000**	**800,000**

*** i) International consultant**

**** i) Training seminars and conferences (USD 90 K), and ii) publications, reports and communications (USD 20K)**

***** i) international travel (USD 60 K), and ii) contingencies (USD 10 K)**

Annex 4

Table 3. Budget (USD) for Training/ Workshop activities in 2007- 2009

Themes and Activities	Total Numbers	2007	Budget 2008	Budget 2009
1. Regional Training workshop on Optical Sensors (Green seekers) monitoring NDVI/ biomass. N Management and treatment responses (4- 8 February , 2008)	1		**13,000**	**-**
2. Workshop for discussion of the Research Prospectus (February 9-10, 2008)	1		**6,000**	**-**
3.Training for National partners on multi-crop zero-till and raised bed planter and Laser land leveling	1		**10,000*)**	**-**
4. English courses (3 month course two participants /country)	1		**10,000**	**-**
5. Regional Workshops (Presentation of the Winter 2007 and spring 2008 results and planning in (Sept.21-24, 2008) and end of the project workshop in 2009 , together with SLM Project Steering committee meetings	2		**15,000**	**15,100**
6. Farmer traveling seminars, field days, policy advocacy etc. in each country for dissemination of results (one each in spring and July /summer 2008)#	4		**10,000*)**	**10,000*)**
7. Inception workshop of the SLMR project	1	**29,961**		
8. Training for bed planter repair and operation (Kyrgyzstan) Nov2007	1	**939**		
Total		**30,900**	**64,000**	**25,100**

***) These costs will be covered under the line-item (Training, seminars and conferences) provided for each of the NARS**

Annex 4.
Table 4. Procurement plans in SLMR Project

Country	**Year 2007**					**2008**
	Bed planter Units (5)	Por-table chutes Units (2)	Greenseeker Sensor units (5)	Laser land leveler units*) (3)	Hydrant & flexible Plastic pipe (2)	(3) Drag bucket as accessory for laser
Kazakhstan	1		1			
Kyrgyzstan	1	1	1	1	1	1
Tajikistan	1		1			
Turkmenistan	1		1	1		1
Uzbekistan	1	1	1	1	1	1
Total costs**)	**20,000**	**1,000**	**25,000**	**18,000**	**1,000**	**5,000**
Grand total	**USD 70,000**					

***) 3 hydraulic drag buckets and control valves will be locally manufactured/ procured through ZEF/UNESCO or Uzbekistan Mechanization Institute, Tashkent to install the laser systems in the CAC.**

****) these costs excludes the freight and duty charges, if any. Savings – if any, will be used in Kazakhstan and Tajikistan for repair / purchase of accessories of the existing equipments during project durations.**

Annex - 4

TA No. 6357 (ADB Format)

Table 5. Statement of Expenditure(US Dollars)

Project Name: ***Central Asian Countries Initiative for Land Management Multicountry Partnership Framework Support Project***

Project Financial Status for the Period: ***April-December, 2007***

Item of Category	Approved Cost Estimates (a)	Actual Expenditures		Balance of Cost Estimate (a-b)
		Current Period	Cumulative from Start to Current (b)	
Funds Received ©				120 000,00
1. Consultants				
a. Remuneration				
i. International Consultants	120 000	49 743	49 743	70 257
ii. Domestic Consultants				
2. International Travel and Per Diem	60 000	11 898	11 898	48 102
3. Training Seminars and Conference	120 000	26 421	26 421	93 579
4. National Research Program Agreement	300 000	29 586	29 586	270 414
5. Local Transportation	20 000	517	517	19 483
6. Data collection studies and surveys	80 000	4 784	4 784	75 216
7. Equipment	70 000	53 958	53 958	16 042
8. Publication, reports, communication	20 000	5 540	5 540	14 460
9. Contingencies	10 000	4 467	4 467	5 533
Total Expenditure	800 000	186 915	186 915 (d)	613 085

Fund Balance (c-d)	**-66 915**

Name and Signature
Team Leader

Name and Signature
Project Director or Manager

Annex 4
Table 6. Expenditure Statement by Components and categories (US$)
From July-Dec. 2007

NARS / ICARDA (GIS & SEP Research)	SLMR Component-I	SLMR Component				Total Expenditure (USD)
	[1]Developing a program of SLM Options / including project planning workshop	National Research Activities	[2]Procurement of equipments	[2]Training and workshop [3]Dissemi-nation	[4]Coord. Monitoring & Travel	
Kazakhstan	4,129	4,400	4,525	450	1,863	15,367
Kyrgyzstan	4,571	4,858	11,075	640	3,552	24,696
Tajikistan	2,732	4,404	4,525	967	1,095	13,723
Turkmenistan	6,271	8,624	17,529		2,009	34,433
Uzbekistan	4,539	4,817	11,530		1,600	22,486
ICARDA-SLMR Coord. Unit					64,530	64,530
ICARDA- GIS	4,784		4,774	2,122		11,680
ICARDA/ SEPR /NGO						
Total	**27,026**	**27,103**	**53,958**	**4,179**	**74,649**	**186,915**

[1] Refers to costs incurred in Inception planning meeting on NARS participants.
[2]Training & workshop and procurement costs handled by ICARDA on behalf of the national partners
[3] Dissemination costs are directly spent by the NARS on stakeholder involvement and up scaling technologies
[4] Coordination and monitoring costs include connectivity, and office expenses etc.