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# Poverty and Livelihood Analysis and Impact Assessment in Dry Areas (MegaProject 5)

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## Introduction

In the CWANA region an estimated 70% of the poverty is in rural areas. The rural population is largely dependent on agriculture, which is facing a number of converging environmental trends that reduce options, drive migration and threaten the future sustainability of livelihoods, particularly in the most marginalized areas (e.g., mountains and desert margins). Sustainable improvement of the welfare of the poor in dry areas can be achieved through a better understanding of the determinants of this poverty and the livelihood strategies adopted by rural communities. This requires analysis of the social, economic, and institutional dimensions of rural poverty and their linkages with the natural resource base and the environment. Such understanding allows proper design and adaptation of superior technological, institutional and policy options that could remove constraints which limit rural peoples' abilities to fully utilize those options and improve their livelihoods.

The purpose of this project has been to contribute to efficient and effective identification of the target populations' needs and related research problems, develop appropriate solutions or recommendation domains in the respective farming systems and agroecologies, improve targeting of research and technology transfer efforts towards the rural poor, measure adoption and impact of technologies, and enhance the capacity of national systems in socio-economic research. This project (MP5) supports the entire research agenda of ICARDA by providing the knowledge and feedback needed to identify technical, institutional and policy options that support the development of sustainable livelihoods in the dry areas.

## Achievements

Over the period under review MP5 produced extensive outputs with a variety of supporting documents and reports in different formats and languages in order to serve diverse audiences. There are also conference contributions and papers in proceedings and chapters in books (often in collaboration with researchers outside the socio-economic group, or in other CGIAR Centers); among these are some publications of significant value, which will be utilized widely in the international research and extension community (CCER- NRM and Socio-economics, 2005). Below are some examples of the accomplished research:

- A methodology for characterization of rural households in the dry areas using the Sustainable Livelihood Framework has been developed and applied in Khanasser valley in Syria as a benchmark case study. Following a workshop organized in December 2004 for ICARDA scientists and their peer collaborators from the NARS in Yale University on the methodology of rural livelihoods and poverty analysis, similar studies were conducted in Yemen and Pakistan. These studies generated useful information on the typology of rural households in the marginal and dry areas.
- A methodology for resource-related poverty mapping was developed and used to map agricultural income of Syria using GIS data base of natural resource endowment indices.
- Research linking human health, particularly child nutrition, to agricultural and rural livelihood systems has been initiated. Two studies on poverty, food systems and nutritional well-being of children have been completed. The first study focused on comparing the nutritional status of children across favorable and marginal environments. Stunting of children less than 10 years old ranged from 12% to 23% with the highest level recorded in the less favorable system followed by the barley/livestock and olive/fruit tree systems. The socio-economic factors influencing malnutrition were also analyzed. The second study focused on rural households within the marginal environment of Khanasser valley and found that on average 65% of the total protein consumed by households was derived from cereals. Yet, bread wheat, which is the major cereal consumed in the area, is deficient in essential amino acids such as lysine.
- Assessment of the impact of rural micro-credits on poverty alleviation in marginal areas in Syria has been initiated. A micro-credit program called *Sandug* in Jabal-Al-Hoss, a poor region in Aleppo Province, had positive impact on rural livelihoods. However, due to restrictive criteria that favored larger villages having good infrastructure, the program excluded smaller, poorer villages with poor infrastructure.
- A case study of dairy sheep systems in dry areas has been implemented in Khanasser, Syria. The study examined local institutional arrangements and embedded social capital, and analyzed the distributional effects of these arrangements and factors determining the poor's access to these arrangements. It also assessed opportunities and constraints related to dairy production, and developed recommendations to improve dairy sheep production using local institutions of cheese makers (*Jabbans*) as vehicle for change.
- A study on gender and agricultural labor has been completed. It found that the importance of female wage labor has progressively increased as a result of agricultural intensification and migration of males that left women as the dominant agricultural labor force. The implication is that research and extension services have to reach out to these women in order to be effective in having impact on their livelihoods.
- MP5 supported other projects in developing and applying a participatory technology development process and community approaches that respond to the needs and circumstances of poor farmers. The applications covered barley breeding and pest management using participatory technology evaluation (PTE) days, farmer interest groups (FIG) discussions, participatory barley breeding (PPB), farmer field schools

- (FFS), and in some cases a resident field staff was assigned to provide continuous flow of information that bridges the gap between research and farming communities.
- The project helped to organize a workshop on institutionalizing participatory approaches and capacity building for research and development, which was held at ICARDA on 25–27 March 2003. It supported 11 training courses on participatory research, conducted an assessment of the capacity of the center and its partners in participatory research and gender analysis in collaboration with the System-Wide Program on Participatory Research and Gender Analysis (PRGA) of the CGIAR. The project also played a vital role in the development of the center's INRM approach and NARS capacity building.
  - Two global impact studies have been published on barley and lentil germplasm technologies. The study on the spillover impacts of ICARDA germplasm technologies on Australia was published. Another study on the impact of IPM on Sunn Pest in wheat for Iran, Turkey and Syria has been initiated. MP5 is contributing to a regional effort involving FAO, ICARDA as well as Iraq and Afghanistan in developing IPM options to the heavy chemical application of the control of Sunn Pest in wheat. The study compiles the experience of national initiatives to shift from government control of the pest to farmer managed approaches. A study on the impact of technology adoption on wheat production in Syria has been completed and published. This study has become an important document used by ICARDA and Syrian authorities to highlight research impacts in Syria. A study on the impact of participatory plant breeding was completed in collaboration with PRGA of the CGIAR System. This is one of the unique studies that have ever examined the impact of participatory research. A poster paper on the impact of farmer participatory research in barley improvement was presented in 25th International Conference of Agricultural Economists, 16–22 August, 2003, Durban, South Africa.
  - Adoption and impact studies conducted in Marsa Matrouh Resource Management Project, Egypt, using three complementary methods (Rapid Rural Appraisal, farm surveys, and case studies) revealed substantial uptake of technologies promoted for sustainable development and poverty alleviation in one of the poorest and most deprived regions in Egypt. It was found that the majority (58%) of the total project beneficiaries (17,500 households) has variably increased their income due to project interventions. The impact realized was due to relatively high adoption rates achieved in a few years which were supported by the project.
  - Studies conducted under the Mashreq and Maghreb project in Algeria, Iraq, Jordan, Lebanon, Libya, Morocco, Syria, and Tunisia assessed the uptake and impact of improved crop and livestock technologies on productivity enhancement and natural resources management. The technologies studied include improved barley varieties, forage legumes, feed blocks, cactus, improved rams, early weaning, and *Atriplex* plantation. These studies were published in a book by ICARDA in 2005.
  - A groundwater study in five villages, covering four agricultural suitability zones in Syria, has been completed. The study compared the relative profitability of different crops that are grown using groundwater drawn from shallow aquifers. It also identified the main forces driving groundwater exploitation and analyzed groundwater

demand and irrigation costs, modeled farmers' groundwater investments, and determined the probability of successful drilling. The study revealed that water-management policies implemented over the last few decades had increased productivity and agricultural income in general but ground water pumping in the drier areas was not sustainable and many wells dried up and forced households to migrate.

- A study analyzing policy and institutional factors affecting terrace maintenance in mountain slopes in Yemen has been completed. Farmers and officials working both in government and other institutions (such as banks and development programs) were interviewed (1) to assess how socioeconomic changes over the last four decades have influenced terrace maintenance and (2) to determine how aware rural mountain communities are of the resources available, which could be used to maintain their terraces and build livelihood assets. The study found that although conditions prior to the 1960s promoted investment in terraces and land conservation, the socioeconomic climate following that decade has favored less investment in land improvement, leading to terraces being abandoned and to their degradation. The study also identified policy gaps that affect both the adoption of sustainable terrace farming and the livelihoods of rural communities in the mountains of Yemen.
- A study conducted in Khanasser, an Integrated Research Site in a dry marginal area in northwest Syria, aimed to determine farmers' responses to new policies, and how their actions affected land use and their own livelihoods. Results of surveys conducted at household, village and community levels as well as expert opinions and a review of the literature identified several policy changes that have affected land use and rural livelihoods. These include the irregularity of sheep exports, which created uncertainty in lamb-fattening enterprises and the banning of barley cultivation in the rangelands that aimed to restore natural pastures; this ban has reduced the supply of feed and thus the profitability of sheep production; the banning of cotton cultivation as well as digging of wells to avoid excessive groundwater extraction. Farmers have formulated their own coping strategies, which include seasonal and permanent out-migration and off-farm employment. The study identified several development policy gaps which are currently causing hardship for rural communities. These include: (1) a lack of credit facilities to help resource-poor farmers build their assets, and (2) weak extension services and a lack of support for technology diffusion and resource-management options.
- A new methodology for assessing on-farm water use efficiency was jointly developed with ESCWA. Six case studies covering alternative cropping and irrigated systems in Egypt, Iraq, Jordan and Syria were implemented. Three different models, namely the fixed-allocation input model, variable input model and a behavioral model, were used. The study found that the actual volume of water used for all crops was high and above the crop requirement. These studies identified factors affecting farmers' decisions in allocating limited amounts of irrigation water among competing crops. Results identified potential areas for interventions and important policy implications.
- A survey on water use was completed for 284 farms in Iraq. The study showed the increased land and water productivity gained from supplemental irrigation in wheat systems, reaching up to 100% yield increase in bread wheat, and 58%-81% in durum

wheat. But farmers over-irrigated their wheat crop leading to low (77%) water use efficiency within the sample.

- The impact of natural resources management research was evaluated using *Atriplex* and cactus alley cropping systems introduced by the Mashreq and Maghreb project in Morocco and Tunisia, respectively. This study is part of the CGIAR initiative on impact assessment, Standing Panel for Impact Assessment of the Science Council (SPIA). Results indicated adoption rates of 30-33%, with nearly 24% of the land devoted to the alley cropping systems in the targeted areas. Farm and flock sizes, subsidy policies, and socio-economic characteristics of farmers were found as key factors affecting the adoption of the alley cropping system. The adoption of this system has greatly increased feed resources through increased barley productivity and *Atriplex* and cactus biomass. As a result, the feeding cost of small ruminants was reduced by up to 33% among adopters through the substitution of costly feed, wheat bran, barley grain, and sugar beet pulp by shrubs biomass. Quantification of environmental benefits in the form of soil erosion reduction and increased organic matter content showed good prospects for this natural resource management technology.
- Capitalizing on the experiences of the WANA countries in the management of range resources, MP5 contributed to assessing the outcomes of these reforms in Jordan, Morocco, Syria and Tunisia. The result is an important public good that contributes to the global discussion over the management of the ‘commons’ and shows how these different reforms have contributed to increasing efficiency of livestock production systems within cooperative systems in Morocco and Jordan, and internalizing costs following the privatization of rangelands in central Tunisia. Community models for evaluating the effects of technical, institutional and policy options were developed.

## Current Activities and Future Plans

The socioeconomic research portfolio has focused on fewer but more relevant issues such as fostering collaboration and promotion of participatory research methods, paying specific attention to the gender dimension of rural poverty, access to productive resources and income earning opportunities. In addition it conducts analysis of production systems and markets, and opportunities to improve livelihoods of rural communities. Specifically, focus has been on the following key areas:

- Assessing the impact of agricultural research and identifying pathways out-of-poverty. This includes the adoption and impact of ICARDA’s research outputs on increasing productivity, income generation, and natural resource management.
- Analysis of the determinants of poverty, vulnerability and rural livelihood strategies, with specific attention to the gender dimension, nutrition, constraints and opportunities for poverty reduction.
- Market and non-market valuation of the natural resources used by rural communities and analysis of the impact of NRM research on rural livelihoods.

- Analysis of policy and institutional options concerning natural resources management, particularly water and rangelands, to extend livelihood options for rural poor, and the returns to investments in the dry areas.

Research activities have evolved from farming systems diagnosis and adoption studies to the application of sustainable livelihoods analysis to a wide range of agricultural and non-agricultural issues that influence rural livelihoods. As a result, technology assessment has moved away from a purely economic feasibility study for a “typical” or “average” farmer, towards the analysis of farm typologies, their assets and strategies as well as institutional innovations and policy options that could improve their livelihoods. The rationale for such an orientation is that many resource-poor households may not directly benefit from agricultural technologies. This recent shift is more likely to contribute to the Center’s goal of enhanced research ‘targeting’ to the rural poor.

For natural resources management, MP5 is placing a greater emphasis on the policy and institutional factors that influence the adoption of resource conserving technologies and the benefits that can be gained from their adoption in terms of efficiency, equity and environmental sustainability. This requires the development of appropriate social, economic, and environmental indicators and related methodologies for assessing the impact of natural resources management research. Policy and institutional issues are acknowledged as the primary constraints to the adoption of resource-preserving farming practices and creating policy awareness is an important activity of this project. Equally important is the valuation of natural resources and environmental benefits associated with investing in natural resources conservation.

The project has made an important headway in understanding the effects of the different institutional options on the performance of production systems and household types but there is still a major gap on understanding the determinants of collective action. The project will devote more efforts to study the determinants of collective action over the management of range resources. Already, joint research efforts have been initiated in Morocco and Syria between ICARDA, CIRAD and the National systems to tackle some of these issues. Methodologies developed for rangelands will also be applicable to the management of water resources, and used later in other areas of ICARDA’s mandate region. Given increased emphasis of the Center on high-value crops for promoting diversification, marketing of agricultural commodities and linking farmers to markets are potential areas for expansion of MP5.

## **Integration with Other MPs**

MP5 is highly integrated with all other MPs and eco-regional programs by contributing directly to the implementation of socio-economic and policy research in all projects as depicted in the table below. MP5 is involved in and contributed to the implementation of 13 restricted projects jointly implemented with other MPs. The strategy adopted by

the senior scientists involved includes a clear division of labor, the attraction of graduate students, post doctoral fellows, joint appointments with other research centers, and building partnerships with advance research institutions, system-wide programs and initiatives, and NARS collaborators. The socio-economic research agenda of MP5 contributes to the Millennium Development Goals (MDGs), namely, poverty and hunger, gender equality, environmental sustainability, and development partnership; and to all Science Council priorities for 2005-2015.

**MP5 integration with other MPs.**

<i>MP5 Research Themes and Involvement in the Implementation of Restricted Projects</i>	MP1	MP2	MP3	MP4	MP6
Livelihoods and poverty analysis	XX	X	XX	XX	X
Adoption and impact assessment		XX		X	XX
NR valuation and impact assessment of NRM research	XX		XX	X	X
Policy and institutional research	XX	X	XX	XX	X
Human capacity building	XX	X	X	XX	X
Direct involvement in the implementation of restricted projects (number)	4	3	1	3	1

Note: xx indicates a direct effect; x indicates a secondary effect.