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EXAMPLES OF FARMING SYSTEMS RESEARCH AT ICARDA

By

David F. Nygaard and Andrée Rassam *

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* David Nygaard is currently Vice President of the Agricultural Development Council in New York and was Program Leader for the Farming Systems Program at ICARDA, Aleppo, Syria. Andrée Rassam is a researcher at ICARDA and a graduate student at the University of Western Ontario, London, Ontario, Canada.

I. INTRODUCTION

The concept of Farming Systems Research is seen as a new and different approach to organizing agricultural research in developing countries. As such, it has received significant attention by researchers in agricultural development activities and substantial support by organizations financing agricultural development projects. That is surprising since there are still too few examples of successful Farming Systems Research (FSR) projects to merit that kind of attention and support; the time frame in which agricultural research is conducted is just too long and the concept of FSR too recent for it to be otherwise. Thus, one may argue that it only demonstrates a lack of viable alternatives for solving the problems we face in developing rural areas rather than attests to the viability of FSR itself.

FSR as it is used in the current literature covers a wide and extremely diverse set of activities. This was one problem that we confronted at the International Center For Agricultural Research in Dry Areas (ICARDA) in developing the Farming Systems Program (FSP) until we stopped searching for a universally applicable definition of FSR and focused instead on a research program that was important for the region ICARDA serves and appropriate and useful to the center. Realistic research objectives and a clear program statement of purpose increased the stature of FSR within the center and gave us the necessary support to carry out our research. Today, three years later, while it is premature to say that the approach has been successful, there are results from FSP research projects that indicate we are making progress in improving the farming systems we are studying. More importantly, they are results that would not have been achieved had we not adopted a Farming Systems Research framework.

The major objective of this paper is to illustrate the value of FSR based on the ICARDA experience with a cautionary note to keep FSR in perspective, a perspective that is more narrowly defined than it would be by many other FSR advocates. We hope to achieve this objective by attempting to:

1) describe FSR as it currently functions at ICARDA and stress its unusual features;
2) give examples of successful results to date of the research program, and
3) outline elements of concern about the future of FSR as a development strategy.

In the following pages, we argue that FSR deserves the serious attention it is receiving by development specialists, note that it requires creative researchers and sustained efforts to achieve its full potential, but suggest it is not a panacea to development problems. In the next section, the major elements of FSR at ICARDA are presented. This description is important in order to understand two examples of FSR which are given in sections three and four. The final section describes the limits of FSR and our concerns that these limits are seldom recognized by FSR practitioners.

II. THE FARMING SYSTEMS PROGRAM AT ICARDA

ICARDA's research was set up in 1977 to have a farming systems orientation. The major aim was to develop appropriate technologies that could be easily integrated into the existing farming systems in the region; thus increase the quality and quantity of food, and in turn, improve the well-being of the population, particularly the small-holder and resource-poor farmers. The Farming Systems Program was expected to help set research priorities for the Center and assure that research findings of the commodity programs were suitable for and acceptable to these farmers.

At first, the program was hesitant to accept this responsibility; we began with no theoretical basis on which to build and with few staff trained in Farming Systems Research. Initially, our research projects were organized along disciplinary lines, and, while there was some excellent research being conducted within the program, there was little interdisciplinary communication and consequently little focus on the important interrelationships of the many components of the farming systems we were studying.

In reorganizing the program, we benefited greatly from the experiences of other FSR practioners. In particular, Norman (1980) gave us a structure in which to visualize our research, and CIMMYT (197) and IRRI (1978,1981) provided some methods and tools with which to proceed. The following definition of FSR and statement of the goal and objectives of the FSP guided the selection of research topics and the allocation of research effort.

Definition

Farming Systems Research as it is perceived in the program is a process that identifies problems limiting agricultural productivity and then searches

for solutions to these problems. FSR is comprehensive in that an effort is made to evaluate new technologies in the light of all the components of the system including the complex interdependencies of these components. This process recognizes the resources and constraints of the farming families (who are both producers and consumers) and seeks solutions that are relevant, useful and acceptable to these families. Research is undertaken by multidisciplinary teams of scientists that interact continually with the farmers for whom the research is intended. This approach should ensure that the research produces appropriate technologies which, therefore, will be more easily and quickly adopted.

The FSP perceives its research as a process that passes through four stages (à la Norman). These stages are: (1) diagnostic, (2) design or experimental, (3) testing, and (4) extension. FSR is problem oriented; a clear diagnosis and definition of the problem are of paramount importance if the effort to find appropriate solutions is to succeed. This will determine the make-up of the team and the allocation of research effort to the various stages. Indeed, problem-oriented research acts to keep the team together, the effort focused and on-schedule.

This process is dynamic and iterative since we frequently return to previous stages to clarify points as we gain knowledge, confront problems and consider research alternatives. In addition, the distribution between stages is not sharply defined as there is much overlap, and we work at several stages simultaneously. Finally, it is flexible and adaptable to many circumstances and different problems. By visualizing the research process this way, we keep our work in perspective vis-a-vis other scientists and the farmer as well.

Program Goal and Long Range Objectives

The program seeks to find strategies that will add stability and improve the farming systems in the region by increasing the technical and economic efficiency of limited resources. Particular emphasis is placed on soil and water resources, combined with improvements in crop and livestock husbandry. To achieve this goal, the program has two overriding objectives which allows the design of strategies for increasing agricultural production.

The first objective is to develop and refine methods and tools that are required to conduct FSR. An agricultural system is determined by its natural resources, human resources, historical development and the current social and economic environment. Because the ICARDA region is large and diverse, these factors are found in many combinations, and consequently, the systems in our region are numerous. Therefore, we do not aim to develop a new system or technology that has wide applicability or adapability, but rather a process that can be used to improve a particular system and than be repeated elsewhere.

The second objective is to promote the use of FSR as an efficient approach to solving agricultural problems. FSR is a relatively new approach to agricultural research, and few people in the region are familiar with it. Thus, exposing scientists to this approach, and training them to use it, is a high program priority and will take a long time to achieve satisfactorily.

Within this FSR framework, the FSP developed five research projects for 1981/82 cropping year, all centered in Aleppo, Syria. In 1983 we added a sixth project which was our first major outreach activity--an FSR project in Tunisia. The current projects are:

Project I

The Productivity of Cereal Crops under Rainfed Mediterranean Environmental Conditions.

Project II

Nitrogen Fixation, Productivity and Water Use of Grain and Forage Legumes under Rainfed Mediterranean Environmental Conditions.

Project III

Crop Rotations and Cropping Systems.

Project IV

The Role of Animals in the Farming Systems of the ICARDA Region.

Project V

Environmental Zoning.

Project VI

Farming Systems Research in Tunisia: A test for FSR methodolcgy.

Few FSR practitioners would have difficulty with the preceding description of FSP, the program goals and objectives or the six research projects. Before discussing examples of some results of our program however, it may be useful to mention characteristics of the program that have made it more successful;then it would have otherwise been; they deal with disciplinary balance, research emphasis and project accountability, and these features are somewhat unusual in comparison with othe- FSR projects.

The first one is the strong contribution of biological scientists to our research. The ten senior positions in the program include two agronomists, two soil scientists, a crop physiologist, a microbiologist, a livestock scientist and three social scientists (currently two agricultural economists and one economist). Well over 80 percent of our research budget is allocated to support the biological scientists and their research. We suggest that this

is in stark contrast to many other FSR activities where social scientists control and often dominate. Indeed, the fact that a very high percentage of the people attending this workshop are social scientists illustrates this point well. At ICARDA, the biological research is as central to the research of the FSP as is the contribution of the social scientist.

Secondly, FSR projects at ICARDA include activities in all four of the stages described earlier. For example, diagnostic work is only conducted within a project where experimental research and on-farm trials are also current activities. This is important because it assures a distribution of research resources across stages. In the early years of the FSP, a major portion of research funds are being spent at the experimental stage. This can be contrasted with other FSR programs where very little emphasis is given to experimentation or contrasted with "so-called" FSR projects which only include diagnostic research. We do not include the latter independent type research in this discussion of FSR.

An emphasis on all stages of farming systems research in our projects is important for two other reasons. It keeps the research pointed toward the ultimate objective (of increased productivity and improved welfare for the target farmers). Otherwise researchers too often get lost in the intermediate stages and lose sight of the longer range goals.

The organization of the FSP at ICARDA has shown the interrelationship between the stages and the iterative nature of research efforts. An example of this is given in the next section, and we only mention here that there is a need to be working on several stages simultaneously in order to have the flexibility to "get it right."

Finally, FSR tends to be so inclusive that it is difficult to know what to expect from such projects and it is even more difficult to measure research productivity. The current project orientation of the FSP at ICARDA has substantially alleviated these problems. A clear statement of the objectives of each project and a stepwise progression toward reaching those objectives by which short term results can be evaluated were essential in achieving this.

Two examples from the ICARDA experience should help to clarify these ideas. The first describes a barley research project and stresses the importance of trials on farmers' fields and differences among farms. The second looks at the impact of a new technology on labor use within a family as well as within a village.

III. TRIALS ON FARMERS' FIELDS

For several years the Farming Systems Program has been engaged in a major research effort on barley production in climatic environments typically found in the Mediterranean basin. The research has focused on improved agronomic management with particular emphasis given to moisture-use by the crop. This experimental small-plot work has been conducted at five sites selected along a steep rainfall gradient in Aleppo Province where average rainfall varies from more than 500 mm/year to less than 250 mm/year.

The choice of agronomic practices to include in the research were partially based on surveys of the area where important differences were found in agricultural practices as well as socio-economic conditions from one village to another. For example, as one moves from wet to dry villages, barley production increases in economic importance and farm size also increases. However, families in these drier areas are poorer and many require off-farm income to maintain their livelihoods. Mechanization is common in the dry areas for barley production but few chemical inputs are used and no new cultivars are available. Finally, barley production has a very important dual purpose role -- as a fodder for grazing animals or harvested for grain and straw. The weather conditions for the particular year in question determine the value and use of the crop. Finally, as we traverse the transect toward the drier villages, animal numbers per family increase and the percentage of family income derived from sheep production increases. It is thought that barley and sheep compliment each other in a way so as to add inter-seasonal stability to the family income stream. This information was useful in helping the agronomist develop priorities for experimental work.

The experimentation focused on nitrogen and phosphorus fertilizer use and seeding rate of two cultivars (one old and one new) of barley. The experimental methods and results of these agronomic trials discussed in greater detail elsewhere (Nygaard, 1982; Farming Systems Program, various annual reports). Important contributions were made by the soil physicist (moisture use), the soil chemist (soil chemical analysis for available phosphorus and nitrogen status and uptake) and crop physiologist (plant growth analysis) as well as the agronomist. One of the findings that became clear at the initial stages of this research was the dramatic differences between yields on the experimental plots (even under middle levels of input use) and yields on nearby farmers' fields. Table I indicates these dramatic differences in the 1980/81 crop year. Note that the gap in percentage terms is more important in the drier areas. This yield gap was maintained in subsequent seasons, and economic analyses showed that it would be economically profitable to close much of the gap.

After three years of experimental work, we attempted to replicate some of these results on farmers' fields. For the reasons given above and due to ICARDA's special interest in the poorer farmers in the region, the research concentrated on barley production in the drier areas. To keep the trials relatively simple and easy for farmers to follow and understand, we decided to have four treatments:

Plot 1. Local barley (Arabi Aswad) with other inputs controlled by the farmer according to his normal practices.

Plot 2. Local barley plus 50 kg. of P_2O_5 with farmers' practices.

Plot 3. A newer cultivar (Beecher) with farmers' practices.

Plot 4. A newer cultivar plus 50 kg/ns of P_2O_5 with farmers' practices.

Each plot was one-tenth of a hectare in size.

TABLE 1.

Barley Yields 1980/81

Rainfall[1] Zone	Yields on Farmers' Fields	Yields on FSP Trials	Potential Increase (in percent)
1	3,150	4,100	30
2	1,211	3,610	198
3	1,106	2,400	117
4	674	1,710	254

1. Agricultural areas in Syria can be divided into four agricultural stability zones which are most strongly influenced by average rainfall. They are:

   Zone 1 — Over 350 mm of rain per year.

   Zone 2 — 250-350 mm and not less than 250 in two or three related years.

   Zone 3 — Over 250 and not less than this in half the years.

   Zone 4 — 200-250 mm and not less than 200 in half the years.

These trials were the first joint (scientist-farmer) managed on-farm trials the program conducted as part of its FSR strategy. The first year of this research, 1981/82 was technically disappointing. However, the experience was still educational and beneficial for the multidisciplinary team. It is useful to describe that experience.

In Table II the results of the first year's trials are presented. It is clear from these data that there is such variability across sites that differences in pair-wise comparisons are not statistically significant. While the phosphorus effect is at least positive, it is small in comparison to the response we found in yields on the experimental plots. In addition, the newer cultivar appears to be actually less productive than the traditional variety.

The team visited the farmers that were cooperating in these trials and their families several times during the growing season. Discussions during these visits touched on several subjects, e.g., traditional technology for barley production, the value and use of the grain and by products, complimentary animal activities and other agricultural and nonagricultural tasks in which household members are involved.

A number of problems or potential problems that would effect the adoption of new agronomic practices were revealed during these visits. An essential one was the importance of the cropping history of the plot in determining barley yields. All of the small-plot experimental work was conducted on fields which were fallowed in the preceding year. However, six of the eight[1] fields in the on-farm trials were planted to barley in the previous year; we did not pay enough attention to cropping history.

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1 Note that two trials were grazed by animals and not harvested; thus, results of only six fields are reported in Table II.

TABLE II.

Grain and Straw Yields (kg/ha) of Barley On-Farm Trials, 1981/82

Zone	Trial No.	Arabi Aswad-P		Arabi Aswad+P		Beecher-P		Beecher+P	
		Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
3	1	774	1191	647	715	508	671	971	975
	3	516	594	431	476	584	605	536	532
	4	796	1082	910	1236	595	967	799	1133
	Mean	696	956	663	809	562	748	769	880
4	5	46	222	217	298	159	443	163	309
	6	170	295	144	215	70	215	120	335
	7	831	970	973	1148	668	1269	771	1170
	Mean	349	484	445	554	299	642	352	605

It would be difficult to argue that we would have missed the importance of cropping history had this research not been done with a FSR perspective, and we do not do so. However, a FSR approach increased our understanding of cropping rotations and farmers' attitudes about them, and increased the likelihood of catching the cropping history issue. In the second year, 1982/83, we chose plots that were fallow in 1981/82. The result was a dramatic improvement in yields in the second year and greater differences among treatments. Table III allows us to compare the results of the two years. The two villages are the same in each year but some of the farmers changed. Averages are given for grain yield only since the straw yields show a similar trend.

These results in the second year clarified several points. First, there was a significant response to phosphorus for both the traditional as well as the newer cultivar; this was true in both agricultural zones. Second, Beecher barley is not the improved variety we thought it was, and subsequently the barley breeder has developed other new lines that are superior to Beecher. In addition, partially as a result of these on-farm trials, the selection process for new barley cultivars is increasingly being done in harsher drier environments in addition to continued selection at ICARDA's research station which is located in a relatively higher rainfall area.

The importance of the barley/fallow rotation lead us to search for more information about this and other rotational issues. Somel (1984) conducted a larger survey of barley producers and found that only 50 percent of the farmers in Zone 3 practiced this rotation while 63 percent of farmers in Zone 4 did so (Table IV). As a result, now much more emphasis is being given to other rotations in the FSP and some attention is being paid to a

TABLE III.

Grain Yields (kg/ha) of Barl y Plots

at Breda and Khanasser for Two Years

	1981/82[1]	1982/83[2]
Zone 3		
Arabi Aswad no P	696	786
Arabi Aswad + P	663	1026
Beecher no P	562	708
Beecher + P	769	1287
Zone 4		
Arabi Aswad no P	349	933
Arabi Aswad + P	445	1474
Beecher no P	299	785
Beecher + P	352	1007

1. Averages based on 3 farmers in each village.

2. Averages based on 4 farmers in each village.

TABLE IV.

Usual Crop Rotations on the Largest Barley Plot

(Percentage of Farms)

	Zone 2		Zone 3		Zone 4	
	West	NE	West	NE	West	NE
Barley-Fallow	67	33	50	19	63	8
Barley-Barley	13	29	29	41	20	83
Barley-Barley-Fallow	--	19	--	33	--	8
Barley-Legume-Fallow	10	--	--	--	--	--
Other	10	19	21	7	17	--

Source: Somel, Kutlu, "Barley Production in Syria," Discussion Paper, ICARDA (forthcoming). Results of survey of 150 barley producers in Northern Syria.

continuous barley rotation which poorer, small holder farmers claim they are economically obliged to follow.

Other points were raised by the farmers and, as a result, the team developed several follow-up studies:

1) Farmers thought that Beecher barley, grain and straw, was a poorer quality of feed than their traditional variety. Therefore digestibility studies were begun at the experiment station by the livestock unit and, in fact, the animal component became a much more important research element of the project. (Thomson, 1983.)

2) There is a problem of phosphorous availability in the dry zones of Syria. More information is needed and currently being sought to determine total national supplies of phosphorous, alternative uses and pricing and distribution policies of the government.

3) Agricultural credit would need to be reviewed as well if an increase in phosphorous application is going to be recommended in these areas.

4) The use of barley for grazing forage, etc., was highlighted in this research and several new studies were begun to better understand the farmers' decision making process. (Nordblom, 1983a, 1983b).

More on-farm trials need to be conducted before any recommendations are made to Syrian farmers; in an area with such high climate variability, two years of experimentation is not enough. Nevertheless, recommendations to farmers are one aim of this research and the process will not be complete until this is done. Hopefully, this example illustrates the value of a farming systems approach for developing appropriate technologies for target farmers.

IV. THE IMPACT ON AND DISTRIBUTION OF LABOR USE

Perhaps the most exciting research result to date at ICARDA is the development of new chickpea cultivars that are resistent to Ascochyta blight. Chickpeas are grown in most of the Mediterranean basin as an important legume due to the beneficial role it plays (a) in the cropping rotation (it is a host for nitrogen fixing rhizobia) and (b) in human diets (it is both high in protein content and has an amino acid balance that compliments cereals).

In much of the ICARDA region, it is planted in March after the major portion of winter precipitation has fallen. By planting late farmers avoid Ascochyta blight which is highly likely to attack chickpeas in the cooler winter months of January and February. However, research has shown that if the disease can be avoided, increased moisture use by the plants can increase yields two to three fold. Thus a major breakthrough occurred when resistant lines to this disease were found after intensive research efforts of the Food Legume Improvement Program at ICARDA.

These new lines are now being tested on farmers' fields and are about to be released by some national programs in the ICARDA region, Syria being one of them. Biological scientists at ICARDA are aware of indirect as well as direct effects of technological changes, and they requested social scientists to look at the impact of a change in chickpea production which basically entailed using a new cultivar and advancing the date of planting by 2 or 3 months. Thus they hoped to minimize any negative effects of the new technology and identify in advance any socio-economic constraints to adapting the proposed change.

The first obvious benefit of biological scientists initiating social science research was that we avoided "so what?" questions being asked. An earlier research study of several villages in Aleppo Province drew such a response by our colleagues from the biological sciences when the report became available. Whether or not such questions are valid is irrelevant to this discussion. What is relevant is that social scientists were reacting and responding to questions posed by biological scientists and at the same time were gaining the interest and cooperation, of the biological scientists.

Studying the impact on agricultural labor use was one aspect of this research. Previous research at ICARDA had shown that new mechanical technologies were rather quickly adopted in Syria. Land preparation, for example, is almost completely done by tractor today and an increasing percentage of harvesting, particularly cereal crops, is being mechanized. We also know that machines are almost entirely operated by men.

We developed working hypotheses which suggested that the recommended changes in chickpea production are likely to run into the following problems:

1) labor bottlenecks at the earlier planting date,
2) an increase in weed populations,
3) different labor demands at harvest,
4) increased chickpea cultivation in drier areas, e.g. Zone 2 in Aleppo Province, and
5) altered forces operating on chickpea markets.

With these issues in mind, Rassam developed a study of labor use in chickpea production with a particular focus on the impact of

the new technology on female labor. Her study aims to describe the existing family agricultural labor patterns as well as hired female labor, to anticipate probable effects of the new recommendations for chickpea production and to proscribe alternatives that will minimize the changes on families if the new technology is adopted.

Rassam visited 48 farmers in four villages in Aleppo Province during the 1982/83 cropping year. Two of the villages were in Zone 1 where chickpea production is widely practiced, while two were located in a slightly drier area in Zone 2 where chickpeas are not currently grown. We anticipate that the new cultivar can be used to introduce chickpea production to these villages. The analysis of this data set is not complete and will be reported by Rassam in the near future (Rassam, in process). However, some indications from the research are available and presented below.

In Table V, specialization of agricultural tasks by family members is shown. Land preparation and chemical weed control is completely done by men. Fertilizer application and seeding are generally masculine tasks. On the other hand, hand weeding and feeding and caring for the animals is mostly done by women. Seed preparation and the various steps in the harvest process seem to be shared jointly by men and women although there is also specialization by sex within the harvest process itself. Aside from weed control (in the wetter zone more chemical control was used), there is little difference between zones.

Table VI breaks down hourly labor input into two cropping groups. Female labor is more important in legume production (62 percent) than cereal production (42 percent), and hired female labor both locally and from other villages is very important for legumes. A sizeable

TABLE V.

Sex of Labor for Various Agricultural Tasks
(Numbers of Households)

	Zone 1			Zone 2		
	Female	Male	Mixed	Female	Male	Mixed
Land Preparation Mechanized	0	23	0	0	20	3
Seed Preparation	2	0	19	2	0	19
Planting	0	17	5	3	12	8
Fertilizer Application	0	16	6	0	15	4
Hand Weeding	11	0	3	8	0	11
Chemical Weed Control	0	14	0	0	5	0
Harvesting	0	7	15	0	3	19
Threshing	0	8	14	1	6	13
Winnowing	0	5	14	1	2	15
Animal Husbandry	12	1	5	12	2	6

TABLE VI.

Labor Use Differences in Cereal and Legume Production, Aleppo Province, 1982/83

(Percentages of total hours of labor input)

	Cereals	Legumes
Female		
Family	37	16
Hired from Village	4	18
Hired Elsewhere	1	14
Sub-total	42	62
Male		
Family	22	16
Hired from Village	17	6
Hired Elsewhere	15	5
Sub-total	54	27
Children (12 years old or less)		
Family	3	4
Hired from Village	1	2
Hired Elsewhere	0	5
Sub-total	4	11
Totals	100	100

amount of the male hired labor would be associated with rented equipment which usually comes with an operator. In general the female labor contribution was higher than we expected, and women will certainly be influenced by any technological change, specifically by a change in legume production.

The greatest labor requirement is at harvest time, and harvesting legumes, particularly lentils, is extremely labor intensive (Table VII). In addition, Rassam found that 72 percent of the legume labor requirement for harvest was done by females. Since cereal crops occupy about 50 percent of the cultivated area compared to 25 percent for legumes the above data should be weighted accordingly.

The households in the sample had a large amount of variability in size and structure. The analysis has not yet been done to examine how the family demographic structure effects cropping choice, hired labor practices, and choice of technology. Nevertheless, there is enough information to anticipate problems and effects of the new chickpea technology. The important ones are:

1) A labor bottleneck at planting is apparently less important than we hypothesized; planting is not a labor intensive activity.

2) Weed control, however, will be very important. Earlier planting will increase the weed problems on the chickpea plots. Hand weeding these plots will be most important for women in the family. The fact that most weeding is currently done without hiring labor indicates that there is no labor bottleneck at this time of the cropping calendar, but a greater weeding effort may overtax a family's female labor pool.

3) If chemical weed control of chickpeas is introduced, this task will be undertaken by the men and this will radically effect the labor allocation to chickpea production. Whether such a change would be good or bad for women depends on the alternate use they make of their time.

TABLE VII.

Percent of Labor Hours Allocated to Various Tasks in the Production of Cereals and Legumes

	Cereals	Legumes
Land Preparation	10.1	3.7
Planting	5.1	1.5
Fertilizer Application	11.0	0.9
Hand Weeding	20.0	16.1
Chemical Weed Control	0.8	0.1
Pest Control	8.5	2.4
Harvesting	26.2	58.4
Transport from Field	12.0	5.3
Threshing	4.6	6.6
Winnowing	0.4	1.6
Other	1.3	3.4
	100	100

4) The change in labor use at harvest could be profound. First, there is already a sizeable requirement for hired female labor. If the harvest process is not mechanized, this requirement will most likely increase due to greater yields. Secondly, the demand for mechanized chickpea harvesting will increase and appropriate equipment could be developed rather quickly. ICARDA is already developing legume harvesters and threshers. Thirdly, land currently allocated to lentil production, particularly in Zone 2, will shift to chickpea production if the new cultivars are successful. Hand harvesting chickpeas is simpler than lentils and a decrease in the labor requirement, mostly hired female labor, could be important.

5) The price effects of a substantial increase in the supply of chickpeas in local markets are unknown and require urgent attention. The demand for chickpeas is certainly price inelastic and price changes could be severe. Information on marketing activities by family members also deserves attention.

6) Finally, the household processing of chickpeas and the impact of the new chickpea cultivars on family nutrition needs attention. This is being done in a complimentary study by a nutritionist on the FSP team.

Answers to many of these points can be found in the on-farm trials by carefully observing and monitoring the responses of the farming family to farmer-managed chickpea trials on his land. Thus, we return to the process discussed in the first example. Joint-managed trials are currently under way in a collaborative effort between the Food Legume Improvement Program, the Syrian Ministry of Agriculture and Agrarian Reform and the FSP; Farmer-managed trials are the next step. Note that FSR is conducted by other programs at ICARDA in addition to the FSP. It is possible that the FSP will cease to exist at ICARDA when the Center organizes all of its research along the lines described above.

CONCLUSION

There are more and more examples of results emerging from FSR projects that indicate the advantages of this approach. Due to the large number of FSR projects that have begun recently, an increasing number of case studies will become available. The experience of FSR at ICARDA, although short in duration, can also contribute to this literature.

We have argued in this paper that the contribution of the Farming System Program at ICARDA is unusual due to the way we have organized our research. Examples of on-farm barley trials and labor use in chickpea production were given to support this contention and illustrate our approach. Key elements in our program are multidisciplinary teams with strong biological as well as social science components and which study not only the whole farming system but the complete process of developing new agricultural technologies. The benefits of FSR, we believe, are more in organizing agricultural research projects and less a total approach to rural development. Its practioners must be well trained in specific disciplines rather than generalists; FSR is certainly not a discipline itself.

Therefore, we are concerned at the large number of projects that are included under the rubric of FSR. Many of these, for example, are no more than a way for social scientists to get financial support to do their surveys. The results of some efforts are bound to be disappointing. And if the answer to the question "So what's new?" is "Nothing!", FSR will fall into disfavor and we will have missed an opportunity to build new, and we think more effective, agricultural research units.

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