

FARMING SYSTEMS RESEARCH PROGRAM

RESEARCH REPORT No. 8

ON-FARM TRIALS 1977/79

A Review of Field Experience and Proposals  
for Replanning ICARDA's Field Experimental  
Program

THE INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH  
IN THE DRY AREAS

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## INTRODUCTION

The major objectives in ICARDA's Charter are: to act as a Center for the improvement of the main food crops of the Region, to develop, promote and demonstrate improved systems of farming and to cooperate with other National and Regional Institutions in research, testing, demonstration and training.

In the early development of the research program it was envisaged that most of the work of the center would take place at the lowland station south of Aleppo and at a high altitude station (originally Tabriz, Iran). Additional sub-stations would be used, primarily for off-season nursery and disease screening, in Lebanon and Jordan. However, it was soon realised that if the Center was to achieve its objectives and carry out the activities outlined in its Charter (Article V, page 6) a considerable amount of activity would have to take place off the main research station.<sup>1/</sup>

Two main approaches have been adopted in this off-station activity: one exemplified by the Cereals Program Farmers' Field Verification Trials which represent a conventional approved variety and technology testing demonstration and the other, still in its very early development, that of the Farming Systems Program whose initial emphasis was entirely on off-station field studies of existing farming systems.

Both of these approaches may be seen to be essential parts of an overall research strategy that seeks to fulfil the Center's mandate. Both need constant modification and refinement as the Center's Program develops and as decisions on resource allocation become more critical.

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1/ In addition to the well established Regional and World network of nurseries of crop varieties distributed to National Programs.



In this report, the Cereal Program work in 1977/79 is reviewed (8.1) and a brief account of the Farming Systems Farmers field trials in 1978/79 is also made (8.2). A full account of the farming systems studies is given in Research Report No. 2, Sections 1-7 and in the accompanying discussion papers. This report concentrates throughout on off-station field trials or experimental activities and concludes with a discussion of objectives, problems and limitations and how they might fit into an overall plan of field experimental research (8.3).

In view of the growth of different types of field trials activity in many different locations, there is a need to distinguish each situation carefully and state the degree of control exercised by either research worker or farmer as this can be crucial in the interpretation and value of results and the validity of comparisons between locations and between types of technology. An attempt is made to define these situations in Appendix 14 and a full discussion of the implications is made in 8.3.

## 8.1 AN EVALUATION OF FARMERS' FIELD VERIFICATION TRIALS - 1977/79

### 8.1.1 Objectives of Farmers' Field Verification Trials

The Field Verification Trials undertaken by the Cereal Improvement Program were primarily intended to test the yield ability and disease resistance of new varieties of wheat and barley over a range of agroclimatic conditions. The detailed results of these trials - grain yields, ranking of individual varieties etc. are available in a separate report (ICARDA, 1979). The evaluation study undertaken by the Farming Systems Program was concerned with the wider implications of the trials, specifically, their relevance in the context of local farming practice, and from observations and discussions with farmers raised issues relevant to all future on-farm research.

The Farmers' Field Verification Trials have been described by the Cereals Program as the "last stage" in the delivery of new technology from the research station to a national program. They were intended as a cooperative undertaking between ICARDA scientists and the national scientists, to provide training opportunities for local staff. However, it emerged from the evaluation study interviews with farmers, and from visits to local agricultural offices, that the degree of participation of both farmers and local agricultural officials was highly variable, despite the greater emphasis placed on this aspect of the trials in 1978/79 season.

The trials have been variously described as being under "farmers conditions" or "field conditions" and it is useful to clarify at the outset of the discussion, the relationship between the trial conditions and local farming practice. The chosen farmers in each area were required to

provide land for the trial, generally part of, or adjacent to one of his own wheat plots. The farmer was responsible for the land preparation but all other operations were carried out by the ICARDA team. As all trials were planted with a standard treatment according to their zone (on the basis of average annual rainfall), the ambiguity of referring to "field conditions" becomes evident as in the majority of cases the trial package differed greatly from the practices currently followed by farmers. Therefore, although the varieties were tested under different agroclimatic conditions, they were not tested under farmers conditions as the trials followed a standard design, and decision making and the trial management were ICARDA's responsibility.

Demonstration of new varieties and practices was not a major objective of the trial, but had been considered as a secondary benefit. In the first year of the trials this led to some confusion of objectives resulting in over-simplistic comparisons of trial plots with farmers fields, and a tendency to use these comparisons as proof of the superiority of the new "package".

#### 8.1.2 Trial Location

The trials were planted in the main cereal producing areas of the country. Most provinces had trials in at least two rainfall zones. In the first year of the trials (77/78) there was a greater concentration of trials in Zone 1, receiving more than 350 mm annual rainfall. Only 5 participating farmers had holdings of less than 50 ha, though these represent 97 per cent of holdings and 68 per cent cultivated land. Criteria for size selection were suggested to the committee responsible for choosing the 78/79 sites, giving more emphasis to the lower rainfall zones whose barley production -- so crucial for the livestock industry, is predominant, and where large numbers of families depend on the land

for their livelihood. (See Appendix 1. Suggested criteria for selection of farmers and fields for verification trials). After the assessment of the first year's variety trial it was felt that the trials should be distributed according to the proportion of land falling within the different zones, rather than biasing their location toward the optimum conditions of Zone 1. The desire to run a series of "successful" trials should not override the principle of selecting sites and planning treatments in reference to existing farming conditions and trends. However, site selection is more difficult in the remoter, drier zones where crops are vulnerable to grazing before the trial can be visited for harvest.

Criteria for selection of farmers were followed by the site selection committee resulting in trials distributed over a range of farm size more closely representing the range of holding size in Syria as a whole, although tending nevertheless to be weighted on the side of larger holders (see Appendix 2). As verification of testing of the varieties performance over a range of representative conditions was the major objective of the trials, the issue of site selection is of crucial importance. Contact with farmers was generally made through the local agricultural engineers who naturally recommended farmers with whom they were familiar; often larger holders with irrigated land who frequently visit the agricultural offices for licences, inputs, advice etc.. In some cases the owners may not actually be present in their farms, rather relying on farm managers. Residence on the farm or in a nearby village and agriculture as main occupation were additional criteria for selecting farmers in 1978/79. (See Appendix 1, parag. 3). Assessing the degree of understanding and likely participation in the trial cannot be done in a brief interview, but can be developed through process of discussion and explanation throughout the growing season. In the case of these trials



this was not possible due to the wide distribution and number of trials planted. The criteria for selecting the plot of land for the trial (Appendix 1, parag. 4) were incorporated with a series of questions for the farmers at the first meeting and discussion of the trial (see Appendix 3). The two areas found to be of most importance relate to soil types and specific problems of the location, as these directly effect the results of the trial. Other questions relate to the previous treatment of the plot, and the farmers usual practices for cereals and an indication of his own interest in experimentation/trials. Although farmers had not been specifically questioned about soil types in 1977/78, most of the trials were located on soil types representing the majority of their area, though not always on the best soils. This has important implications for the results, as other sampling indicates the wide variation in yield between different soil types within a single zone. (See Farm Systems Crop Samples in Aleppo Province 1977/78 and 1978/79, Report No. 2, Section 5).

e.g. Zone 1 - 1979

Wheat and Barley Yields (kg/ha) by Soil Type

<u>Variety</u>	<u>Soil Type 1</u>	<u>Type 2</u>	<u>Type 3</u>
Mexipak	1503	1231	756
Bayadi	1243	1695	490
Arabic Abiad	2244	1681	1185

Source: Farm Systems Crop Sampling  
Aleppo Province 1979

In 1978/79 season, farmers were questioned about soil types before trials were planted, but no clear strategy of placement of trials according to soil type had evolved. Therefore the majority of trials were put on type 1 soil, although in some cases this represented only a small percentage of the village area, e.g., Maaret Dibsi, el-Bab, Souraan. Where the trial was on type 3 soil as in Zirdaneh, the low yield of the trial check in comparison to local yields on soil types one and two is to be expected. (Refer to Appendix 4. Cultural practices, yields, etc. in areas where Farmers' Field Verification Trials were located. Copies of the 1977/78 and 1978/79 Questionnaires are given in Appendices 9 and 10).

#### 8.1.3 Presentation of Data

The varieties in the trials were planted in small plots (5 m x 20 m 1978/79, 6.5 m x 30 m 1978/79) and the harvested yield converted into kg/ha. Each trial contained two local check varieties in order to compare the performance of the new varieties with the best locally available counterpart, e.g., Mexipak, Jori, Hourani, Florence Aurore, Arabic Abiad. In the 1977/78 season an area equivalent to that of the trial was harvested from the farmer's field and used as a basis for comparison, despite wide differences in cultural practices. In the following season, although some yield samples were taken from farmers lands, these were not used in direct comparison to the trial yields, as it was considered invalid to compare yields produced under very different conditions. A further difficulty lies in the inconsistencies found between the yields harvested by the ICARDA team from farmers lands, and those reported by the farmer for the whole field. (Refer to Table 1. Farmers' Practices 1978/79). In response to the request of farmers in the first year of the trials, at some locations the farmers' seed was planted in the trial alongside the other varieties. Again the results

TABLE 1

FARMERS' PRACTICES - 1978/1979

	A L E P P O								
	ZONE 1			ZONE 2			ZONE 3		ZONE 4
	Kawkabeh	Mereyghl	Atareb	Akhtarin	al-Bab	Nasriyeh	Qubtain	Kweiris	Khanaser
Variety	Mexipak/Ham.	Mexipak	Bayadi Hourani	Jori/Ham Arabic Abiad	Hamari Arabic Aswad	Hamari	A Aswad	A Aswad	A Aswad
Previous crop	COT	WMEL	WMEL	WMEL	FAL	WMEL	FAL	FAL	FAL
Cultivations	C9, C5, H Bcst., C5	C5, H Bcst., C5/T	C5, H Bcst., C5	C5, H Bcst., C5	-	C5, S/D, C5	Fed, H Bcst., Fed	-	C9, S/D
Seed rate	130 Ham. 120 Mexi	145	130	150	-	100	100	-	100
Fertilizer									
Autumn	46 P <sub>2</sub> O <sub>5</sub>	46 P <sub>2</sub> O <sub>5</sub>	-	69 P <sub>2</sub> O <sub>5</sub>	-	-	-	-	-
Spring	26 N 52 N	49.5 N 49.5 N	33 N	33 N	-	-	-	-	-
Herbicide	H. Sprayed	H. Sprayed	H. Sprayed	-	-	H. Sprayed	-	-	-
Harvest	CBH	CBH	HHV	CBH	-	HHV	HHV	-	CBH
F. Field Yield	2125 Mexi.	1450 Mexi.	1900 Bay. -	- 2000 A Abiad	1100 Ham. 1400 A Aswad	1000 Ham.	250	-	650
F. Field Harvtd.	1231 Mexi.	497	1728 Bay. 1400	641 Ham. -	- -	323 Ham.	138	897	477
F. Seed in Trial	1359 Ham.	-	2077 Bay. -	1282 Ham. -	1221 Ham. 1055 A Aswad	933 Ham.	-	-	492
ST. F.F.	2	1	1	1	1	1	2	-	1
ST. Trial	2	1	1	1	1	1	2	-	1

N.B.

- 1) Seed and fertilizer rates, yields all in kg/ha.
- 2) For Trial check yield, see Appendix 4.
- 3) Key follows this table.

TABLE 1 (continued)

FARMERS' PRACTICES - 1978/1979

	I D L E B						AL GHAB	
	ZONE 1			ZONE 2	ZONE 3		ZONE 1	
	Zerdaneh	Maaret Dibsi	Khan Sheikhoun	Sinjar	Baraghiti	Howa	Sqelbieh	Kreim
Variety	Siete Cerros	Bayadi	Mexipak	Bayadi	A Aswad	A Aswad	Petik	Siete Cerros
Previous crop	WMEL	WMEL	WMEL	FAL	FAL	FAL	MELONS	COT
Cultivations	C5, H Bcst., C5	C5, H Bcst., C5/T	C9, S/D	-	D/H, H Bcst, D/H	D/H, C5, H Bcst, D/H	C5, H Bcst., D/H	M/B, C5, H Bcst., D/H
Seed rate	130	140	150	120	150	100	250	220
Fertilizer	120 P <sub>2</sub> O <sub>5</sub>	60 P <sub>2</sub> O <sub>5</sub>	-	55 P <sub>2</sub> O <sub>5</sub>	-	-	82 N	82 N
Autumn	33 N	-	-	26 N	-	-	130 N	130 N
Spring	99 N	15 N	16.7 N	-	-	-	-	-
Herbicide	H. Sprayed	-	-	-	-	-	-	Sprayed
Harvest	CBH	CBH	CBH	-	CBH	CBH	CBH	CBH
F. Field Yield	3000	2000	2150	-	Grazed	-	4350	5000
F. Field Harvtd.	-	-	2205	282	-	-	-	-
F. Seed in Trial	-	-	-	405	-	-	3800	4100
ST. F.F.	1/3	1	1	-	3	-	1	1
ST. Trial	3	1	1	-	3	1	1	1

TABLE 1 (continued)

## FARMERS' PRACTICES - 1978/1979

	H A M A		H A S S A K E H					R A Q Q A	
	ZONE 1	ZONE 2	ZONE 1			ZONE 2	ZONE 4	ZONE 2	
	Zalaqiat	Souraan	Tel 'Ayn	Um Rabia	Qeirawaan	Ras al-Ayn	Sabaa Askour	Bendrkhan	Bir'Atwaan
Variety	Fl. Aurore	Hourani A Abiad	Mexipak	Hourani	Hourani	Siete Cerros	Arabic Aswad	Mexipak	Mexipak
Previous crop	FAL	FAL	MELONS	FAL	FAL	FAL	FAL	FAL	FAL
Cultivations	D/P, C5, H Bcst., D/H	C9, S/D	D/H, S/D	D/H, D/H, S/D	D/H, D/H, H Bcst.	D/H, D/H, S/D	D/P, D/H, S/D	M/B, D/H, S/D	-
Seed rate	200	150	120	120	130	120	100	150	-
Fertilizer	55 P <sub>2</sub> O <sub>5</sub>	-	-	92 P <sub>2</sub> O <sub>5</sub>	23 P <sub>2</sub> O <sub>5</sub>	-	-	-	-
Autumn	54.4 N	18 N	-	17 N	23 N	-	-	-	-
Spring	-	26 N	-	-	23 N	-	-	-	-
Herbicide	Sprayed	Sprayed	-	A. Sprayed	A. Sprayed	-	-	-	-
Harvest	CBH	CBH	CBH	CBH	CBH	CBH	CBH	CBH	-
F. Field Yield	1250	1200	2150	654	1250	1140	300	1440	1000
F. Field Harvtd.	1641	1200	2405	-	1395	-	-	-	-
F. Seed in Trial	1974	-	2558	1128	1538	-	-	-	-
ST. F.F.	1	1	2	1	1	2	2	2	1
ST. Trial	1	1	2	1	1	2	2	2	1



TABLE 1 (continued)

## FARMERS' PRACTICES - 1978/1979

	H O M S			I R R I G A T E D				
	ZONE 1	ZONE 2	ZONE 3	HAMA	HASSAKEH	RAQQA	DEIR EZ ZOR	
	Dweir	Moubarakeh	Shinshar	Latamneh	Ras al Ayn	Jurn Aswad	Howey Diab	Khreita
Variety	Bayadi	Fl. Aurore	A Abiad	Siete Cerros	Jezireh 17	Siete Cerros /Jori	Jezireh 17	Mexipak
Previous crop	FAL	FAL	FAL	MELONS	COT	COT	COT	COT
Cultivations	D/H, H Bcst.,	C5, H Bcst., M/B	C5, H Bcst., C5	C5, H Bcst., C5	M/B, C5/T, S/D	D/P, S/D	D/P, H Bcst, D/H	D/P, H Bcst, D/H
Seed Rate	140	200	140	200	125	150	200	200
Fertilizer	-	46 P <sub>2</sub> O <sub>5</sub>	-	70 P <sub>2</sub> O <sub>5</sub>	92 P <sub>2</sub> O <sub>5</sub>	69 P <sub>2</sub> O <sub>5</sub>	35 P <sub>2</sub> O <sub>5</sub>	69 P <sub>2</sub> O <sub>5</sub>
Autumn	-	-	-	92 N	33 N	24 N	-	-
Spring	-	-	-	-	99 N	82 N	58 N	78 N
Herbicide	Sprayed	-	-	-	-	-	-	-
Harvest	CBH	CBH	HHV	CBH	CBH	CBH	HHV	HHV
No. of irrigation	-	-	-	-	6	4	5	6
F. Field Yield	1420	1665	360	4500	4560	4480 Mexi. 3840 Jori	2500	300
F. Field Harvtd.	-	-	-	-	-	-	-	-
F. Seed in Trial	-	-	-	5231	-	-	-	-
ST. F.F.	1	1	2	1	2	1	2	1
ST. Trial	1	1	2	2	2	1	2	1

KEY TO TABLE 1

Mexi.	-	Mexipak		
Ham.	-	Hamari	FAL	- Fallow
Bay.	-	Bayadi	S/C	- Summer Crops
B.	-	Barley		
L.	-	Lentils		
CHP	-	Chickpea	N	- Nitrogen
WMEL	-	Water Melon	P <sub>2</sub> O <sub>5</sub>	- Phosphate
COT	-	Cotton		

C9	-	Full Cultivation
C5	-	Cultivator (5 tynes for 'ayar and rdad)
C5/T	-	Cultivator followed by taban
D/H	-	Disc Harrow
D/P	-	Disc Plough
M/B	-	Mouldboard Plough
H/Bcst	-	Hand Broadcast
M/Bcst	-	Mechanical Broadcast (Spinner etc.)
S/D	-	Seed Drill
HHV	-	Hand Harvested
CBH	-	Combine Harvested
FED	-	Feddan

were very variable when compared with the same variety grown under farmers conditions, sometimes outyielding, and sometimes yielding less than the reported yield for the farmers field. These difficulties of sampling and the inconsistencies produced by minor variations in field conditions may be partly overcome by replicating the trial, but as yet no adequate means of comparing trial results with local practice has been incorporated in the trial.

Another problem concerning the presentation of data lies in the exclusion of "failed" trials from consideration. In some cases, the trials failed to germinate due to very low rainfall (sites in Dar'a and south of Damascus), in others the growth was very poor and grazing suspected. However, these occurrences and reasons for non-harvest of trials have not been referred to in discussion of results. Several of these abandoned trials were in the remoter areas, but had they been more closely supervised by local officials, damage might have been prevented. Human error as well as climatic conditions account for the apparent "failure" of some of the trials, but their exclusion from the discussion of results is serious in that the statistical results do not take any account of these losses, nor can such problems be remedied in future trials unless they are fully understood.

#### 8.1.4 Farmers' Responses

The interviews with participating farmers were conducted after harvest time, and had several objectives:

- To obtain a detailed record of the farmer's own practices for cereal crops and to understand the variation in practice in his neighbourhood.
- To assess how representative the trial location was of local conditions, e.g., soil type, rotation, cultivations. etc..

- To discuss any problems affecting the results of the trial.
- To discuss the farmers perceptions and the varieties performance and record their criticisms or suggestions for the future.

The questionnaire was expanded slightly in 1978/79 to include additional questions on sources of seed, information about new varieties, and history of use of fertilizer, herbicides and seed drills. Information relating to 31 of the 36 harvested trials was collected in 1978, and 30 of the 36 harvested in 1979, plus five which were not harvested.

#### Farmers Practices

A summary of general practices in areas where the trials were located is given for 1978/79 in Appendix 4, while Table 1 gives details of the individual cooperating farmers cereal cultivation. Appendix 5 summarises both individual and local practice for 1977/78.

#### Rotation

Two or more rotations are recorded for many areas. In general these depend on soil type, deeper soils in Zone 1 and 2 having a 2-year wheat/melons or wheat/lentils or 3-year wheat/lentils/melons and the shallower soils following a 2-year cereal/fallow rotation. In zones 3 and 4 the rotation is generally cereal/fallow with barley grown on the poorer soils. The farmers with irrigated land follow a 2-year summer crops cotton/wheat rotation. In many areas, but particularly in Hassakeh Province, the area under lentils had decreased in 1978/79 season.

### Variety

In general, farmers with irrigated land, and those in Zone 1 are growing the newer varieties which they obtain through their local agricultural offices. In many cases Mexipak and Siete Cerros had been grown since 1970 and Jezireh 17 was being widely grown in the first year it was made generally available to farmers. Farmers had not necessarily seen the new varieties growing before trying to obtain them. Reports from neighbours and suggestions from agricultural engineers were said to be the main source of information about new varieties. In several of the Zone 1 sites - Maaret Dibsi, Dweir, Qairawaan and Um Rabia farmers grow local varieties in addition to the newer wheats. Two of the reasons given were that the local varieties fetch a better price and give a better yield in years of poor rainfall.

In Zone 2, the main wheat variety grown is Hourani, bought at local markets or stored from a previous season's harvest. Some farmers had tried higher yielding varieties or were growing them on irrigated land, but most felt they were unsuitable for dryland cultivation. Three exceptions were Akhtarin (Jori), Ras al-Ayn (Siete Cerros) and Bendrkhan (Mexipak). Local varieties were favoured for their higher prices, drought resistance and lack of shattering at maturity. In general the Zone 2 farmers had good information about varieties currently available but expressed caution about their suitability for dry conditions. The main barley variety grown in Zone 2 is Arabic Abiad, whereas in Zones 3 and 4 Arabic Aswad is more common. Hourani and Florence Aurore were the main wheat varieties grown in the drier zones. Farmers felt that the Mexican varieties would fail in dry years although a few had experimented with growing them.



### Fertilizer

Several of the farmers visited commented that the fertilizer rates used in the trials were comparatively low -- particularly on the irrigated trials. Three farmers with irrigated trials used fertilizer levels above those on the trial, especially phosphate. Only one farmer visited in Zone 1 did not use fertilizer on his wheat crop, though fertilizers are commonly used in his area. Rates of nitrogen were lower than those used on the trial, though the phosphate applications were similar. The two farmers in Deir ez-Zor and Ras al-Ayn reported having seen fertilizer experiments run in their areas. Most farmers said they reached their present levels through experience, having seen yields increase with increased application and one farmer has designed his own experiments (see Appendix 6). Advice is taken from the Ministry Officials, through cooperatives, and from neighbours.

Use of fertilizers in Zone 2 depends on several factors such as proximity to main sources, soil type etc.. Fertilizer use in Zone 2 in Jezireh areas is not common (except for irrigated plots), but around Aleppo and Hama low rates are used, particularly for wheat grown on soil type 1. Fertilizer is rarely used by barley or crops grown on poorer soils in Zone 2. None of the farmers interviewed in Zones 3 and 4 were using fertilizer, considering their areas too dry to justify its use.

### Herbicide

Herbicide use is found in areas of high rainfall where farmers have access to spraying machinery or alternatively as in the north of Hassakeh Province, have aerial spraying done for them by the government. Only one of the five farmers interviewed having irrigated trials use herbicide (Ras al-Ayn) though Treflan is used on preceding cotton crops.

The farmer in Jurun Aswad stressed the importance of the rotation in effecting weed control and felt in his case spraying was not necessary. Most farmers using herbicides had seen their effect on neighbours lands before buying it for use on their own wheat fields. Herbicides are not commonly used in the drier zones although in slightly better rainfall conditions they may be used where available but not necessarily every year -- al Bab, Nasriyeh, Moubarekeh, Souraan etc..

#### Seed drill

Use of seed drills depends greatly on availability in different areas -- which in turn tends to relate to farm size. Seed drills are widespread in the Jezireh where they have been in use for over 15 years. Farmers mentioned they gave better seed distribution, enabled regulation of planting depth and were much quicker than broadcasting. Seed drills were said to be unavailable in the Deir ez-Zor area, and of limited availability around Idleb, al-Ghab and Hama. Farmers in Idleb, al-Ghab and Hama considered the seed drill unsuitable for planting on wet soils as the seed tubes would become blocked, and felt their small holdings did not justify expensive purchase of drilling equipment.

#### Seed rate

In the 1978/79 trials breadwheats and barleys were planted at a rate of 100 kg seed/ha and durum wheat at 125 kg/ha. In nearly all cases these rates were below those used by farmers, except in the driest zones. In the irrigated areas farmers use 150-200 kg/ha, and in the very wet areas of Zone 1 such as al-Ghab, farmers may use 200 kg/ha or more. In Zones 2, 3, 4 the contrast between trial and farmers rates is less marked (100-150 kg/ha).

### 8.1.5 Farmers' Comments on the Trial

#### Their size and design

In both years of the trials farmers said they felt the trial plots were too small to be conclusive about the performance of the different varieties. One farmer (Ras al-Ayn) who had trials in both years with markedly different results, felt that differences in yield were more attributable to the trial design than to real differences between the varieties. Several farmers were not happy with the functioning of the combine harvester and therefore felt the yield figures might be *mislea-*ding. In 1977/78, two farmers had commented on the differences between the trial conduct and local farming practice, pointing out that it was impossible for farmers to distinguish the effect of variety from the effect of package of practices which went with the trial. These contrasts in practices are more marked in the drier zones and on smaller holdings. Several farmers expressed a wish to see simpler trials, possibly with fewer varieties, which would allow them to separate the effect of the different variables -- variety, fertilizer, herbicide, drilling, and this led to the design of a series of agronomic experiments for 1979/1980. Because of the difficulty of "disaggregating" the package, many farmers felt that the trial had not clearly demonstrated that the new varieties give better yields. Related to this was the comment that the trial did not give any indication of the performance of the varieties over the range of annual conditions experienced by farmers, i.e., in very good or very poor years as well as average years.

In 1977/78 several farmers had expressed a wish to see their own seed in the trial, and this was done in 1978/79 though not at all locations. These results gave some idea of the "package" effect, but these were considered "unofficial" results and had not formed part of the



design of the trial, rather being viewed as of interest to the farmer only. A larger number of farmers in 1978/79 were inclined to consider their varieties just as good as those in the trial -- Howa, Zalaqiyat, Zerdaneh, Bendrkhan, Khreita, Akhtarin, Qdiraan.

Farmers in Mereyghl, Kreim, Sqelbieh, Qeirawaan and Akhtarin felt that the seed rate on the trial was too low, and Kreim and Sqelbieh commented on the low rate of fertilizer on the trial. Specific problems relating to individual sites are listed in Appendices 7 and 8.

Explanation, identification of varieties, involvement of farmers

Eight of the participating farmers in 1977/78 appeared to have little comprehension of the objectives of the trial and the majority were not able to discuss their impressions of individual varieties as they could not recall the names. The introduction of a clear naming or numbering system was recommended for 1978/79 but this was not done, other than in a few locations. Thus a similar difficulty occurred in 1978/79 in discussing the varieties, with the additional comment from farmers that they would have liked more explanation, information and discussion about the methods and objectives of the trial. (Shinshar, Khanaser, Zerdaneh, Akhtarin). Partly resulting from the lack of involvement of farmers and insufficient explanation, was the fate of the harvested seed. In several cases all the varieties were mixed, although some farmers kept the highest yielding variety for planting in the following year. This is perhaps the strongest evidence indicating the farmers perceived little benefit or use in the trial. Farmers who did keep a variety (Kawkabeh, Kreim, Sqelbieh, Tel 'Ayn, Souraan, Qdiraan, Qubtain) expressed interest in being able to grow them under their own conditions.

Farmers were asked at which operations on the trial they were present. Involvement of farmers having irrigated trials was high -- none missing harvest and only one missing planting. Ministry personnel were also present for the major operations. In Zone 1 the farmers at Kreim and Maaret Dibsi were present for all operations, 5 other farmers missed only weed control operations. Three others were present only for planting and harvest, the farmer at Ataareb was present for harvest and at Khan Sheikhoun for planting.

For Zone 2 sites, most farmers were present for harvest, except Nasriyeh, but it was not possible to ascertain the extent of the Ministry personnel-involvement. In Zones 3 and 4 only one farmer was absent for harvest, but the involvement of Ministry representatives tended to be less, possibly for reasons of transport and remoteness.

#### Comments on varieties

Of the irrigated trials, farmers in Ras al Ayn and Jurun Aswad favoured Stork, mentioning its high yield and drought resistance, whilst at Howey Diab and Latamneh, Norteno was listed for its yield, good height and resistance to shattering. In Zone 1, farmers in Maaret Dibsi, Qeirawaan and Kawkabeh liked some of the varieties but could not specify which. Khan Sheikhoun, Kreim mentioned Norteno and GRS, and Stork and GRS by Mereyghl and Zalaqiyat. Stork was also liked at Tel 'Ayn and Dweir. Features mentioned were yield, grain size, good colour, shattering resistance. In Zone 2, Bendrkhan's farmer declared no interest in "White" barley, and in Nasriyeh and Akhtarin local barley was considered better than the other trial barleys. The farmer at Souraan preferred local varieties because they were taller. Recognition or distinction of varieties was less in Zone 2 than Zone 1, and farmers tended to explain any yield differences between their own crops and the trial results by reference to the trial inputs. Beecher barley was liked by farmers in Howa, Shinshar and Khanaser for its yield, height and large spikes. Taller varieties are preferred for easy harvesting.



### 8.1.6 Discussion and Conclusions

The contrast between farmers practices and the trial is most marked in the drier zones partly reflecting allocation of inputs at an official level. Fertilizers are more difficult to obtain in the drier zones. Where farmers have had access to higher yielding varieties and the necessary inputs, adoption has been relatively rapid, but local varieties are still grown because of the price advantage and local demand for a hard wheat suitable for "burghul" making. The major criticism of the trials from the farmers point of view was the lack of direct comparison between variety under conditions similar to his own. The difficulty with the approach adopted in these trials is the assumption that the "package" will be adopted as it has been presented, but there is ample evidence to illustrate that farmers are selective adopters, and that different components of a package may be adopted in different sequences in different regions. In the absence of participation of researchers in considering a range of realistic modifications to the package, in consultation with the farmers, it is left to the farmer alone to work out which components he can afford and what would be the likely return. The trial design was geared towards the physical optimum yield but gave no indication to farmers as to economic levels of the various inputs and thus did not help in their decision making. This was illustrated in the drier zones where farmers felt that fertilizer use could not be economically justified, but the trial gave little information on this issue. Another problem with the "package" approach is the tendency to make exaggerated claims for new varieties based on unjustifiable comparisons between trials plots and farmers fields. Most farmers expressed interest in trying new varieties under their own conditions, undertaking their own experiments and applying inputs at levels determined by availability, cost and expected return. However, at this level the involvement of the researcher has been minimal.

Several reasons might be mentioned: Firstly, a research worker trained in the tried and tested methods of field experimentation on research stations may find the transfer of these methods and designs to farmers fields unrealistic and result in the application of treatments which do not accurately represent farming practice. (e.g., comparison of hand sowing and drilling techniques in a small randomized block experiments). The methodology of field research on farmers lands at ICARDA is as yet in its infancy, and even among scientists recognizing these difficulties, there is little conviction that farmers themselves have something to contribute to the design and planning of experiments.

Underlying this problem is the common assumption that farmers should be recipients of technology, rather than creative participants. The assumed higher status of researchers tends to lead to a devaluation of farmers experience and a rejection of modes of explanation which do not conform to the scientific and professional norm.

It appears from the evaluation of the Farmers' Field Verification Trials, that farmers involvement through-out the conduct of the trial is crucial to their success -- even considering the limited objective of verification. However, as yet little professional reward or recognition is gained from spending time talking to and learning from farmers and hence most research workers have concentrated on research giving demonstrable yield increases (on the research station), considering that their task had ended at that point.

The Farmers' Field Verification Trials have in most cases only peripherally involved the farmers and local community, and in their eyes appeared as unrealistic exercises carried out by a group of out-

siders. Therefore, the main requirement at this stage is a rethink of the methodology relating to on-farm trials, a clearer definition of objectives and new flexibility in our concept of what constitutes "research".

## 8.2 FARMING SYSTEMS FIELD TRIALS 1978/1979

The Farming Systems Program study of existing farming systems in Aleppo Province started in September 1977. At the beginning of the work it had been decided that for a minimum of two seasons we would concentrate on the development of an understanding of farming systems and not plan any field trials until the third season of study at the earliest. It was soon evident from our individual interviews, group discussions and from observations that there was a considerable degree of experimentation in farming practices and that this constant innovation by farmers led to a valuable fund of knowledge about soil type, soil water relations, soil water management, variety/environment interactions, fertilizer needs and timing, harvest timing and post harvest technology. This kind of knowledge is extremely difficult to record systematically but much of it can be found throughout the discussion in Research Report No. 2 and its companion discussion papers. It should also form a vital background to the identification of research priorities and even how field research should be conducted, but it rarely does. One of the objectives of the approach adopted by the Farming Systems Research Program (see Farming Systems Research Program: An Introduction, ICARDA 1979, and Discussion Paper No. 6) is to encourage much greater participation of farmers in the research process and make better use of their fund of knowledge.

Despite the wealth of qualitative information from some individuals there were some who requested support and our participation in field trials for the 1978/79 season. All were related, in some way, to the use of fertilizer and followed very variable experience in responses both to amounts applied and timing. In many villages, fertilizer is only just becoming available for widespread use and there are still many problems, such as uncertain supply and sometimes the sale of inappropriate fertilizers.

The trial in village 1B/05 was planned in advance of the growing season and followed lengthy discussions with the farmer; the trials in village 1A/13 were both planned rather hurriedly and later suffered as a result.

#### 8.2.1. TRIAL 1 Wheat Variety and Fertilizer Experiment, Village 1B/05<sup>1/</sup>

This experiment arose from the farmer's interest in variety x fertilizer interactions in cereal crops and his concern to find an optimal rate of application of fertilizer for his land.

The experiments had two objectives: (1) to examine the physical response to combinations of nitrogen and phosphate fertilizer and (2) to determine the optimum economic rate of fertilizer application for two varieties of wheat. Secondly, the team wished to gain experience in running trials and regarded this trial as one of several introductory field experiments with farmers in Syria.

At the outset it was realised that there was a need to keep the trial as simple as possible and down to a manageable size for the plot

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<sup>1/</sup> This village had a history of field trials carried out by the Ministry of Agriculture on irrigated land. Seldom had the results been discussed with farmers. The ICARDA Cereals Program also ran a verification trial nearby in 1978/1979.

available, and therefore, it was thought unlikely that it would be possible to determine optimum fertilizer levels with any degree of reliability. Details of the experimental design, layout and treatments are in Appendix 11.

The land was prepared by the farmer in October using a feddan with two horses following the previous crop of watermelons. The land was marked out, prepared (Ayar) and fertilizer and seed applied by the farmer and ICARDA research assistants on November 8th and the seed and fertilizer were covered (Rdad) by the feddan. The surrounding area was planted and covered shortly afterwards by the farmer.

Regular visits were made to the experimental area and some discussions were held with the farmer and the local extension office on the progress of the trial. It was generally agreed that insufficient time was spent during the growth of the crops in discussion and explanation with the farmer at the trial site.

During the early growth of the crops, a number of effects were observed:

- 1) the local Bayadi wheat grew vigorously at all fertilizer levels and reasonably well without any;
- 2) Mexipak had a greater range of growth effects due to fertilizer, the zero fertilizer treatment resulting in very poor growth;
- 3) phosphate appeared to have a major effect on early development and nitrogen a less pronounced effect. Colour and vigour scores support some of these observations (Tables 2 and 3).



There was a lower than average rainfall during the season (258 mm) and this followed an average rainfall year in 1977/78 (370 mm).

The trial was harvested by hand on 3rd and 4th June 1979 with the help of the farmer's family. The main weighings of each plot yield were carried out in the field and whole plant sub-samples were removed for weighing, threshing and analysis at Tel Hadya. The residue of the crop was left for the farmer.

TABLE 2

VIGOUR SCORES: VARIETY AND FERTILIZER TRIAL, VILLAGE 1B/05

	<u>P<sub>2</sub>O<sub>5</sub> applied (kg ha<sup>-1</sup>)</u>			<u>N applied (kg ha<sup>-1</sup>)</u>			Mean
	0	30	60	0	20	40	
Bayadi	4.0	6.2	7.7	4.0	6.5	7.2	6.5
Mexipak	1.7	5.8	8.1	1.7	6.3	7.3	6.2

(1 = very poor growth; 10 = healthy, vigourous growth)

TABLE 3

COLOUR SCORES: VARIETY AND FERTILIZER TRIAL, VILLAGE 1B/05

	<u>P<sub>2</sub>O<sub>5</sub> applied (kg ha<sup>-1</sup>)</u>			<u>N applied (kg ha<sup>-1</sup>)</u>			Mean
	0	30	60	0	20	40	
Bayadi	4.0	6.4	7.5	4.0	6.5	7.7	6.5
Mexipak	1.7	6.7	8.7	1.7	7.0	8.0	6.9

(1 = very pale green; 10 = dark green)

An analysis of total dry matter and grain yields per plot showed that there were few significant results even though coefficients of variation were low (total weight: error I coef. of V. = 15.3 per cent; error II = 6.7 per cent; grain weights: error I = 18.4 per cent; error II = 10.4 per cent). With total weight, the main effect of phosphate was significant, and also the mean difference between the control yields and those with fertilizer. With grain weight, only the combined effect of fertilizer compared with the no fertilizer plots was significant. The mean grain yields from the local variety and Mexipak were not significantly different from each other. The results are summarised in Table 4.

TABLE 4

THE EFFECT OF PHOSPHATE AND NITROGEN FERTILIZER  
ON TOTAL AND GRAIN WEIGHT OF TWO VARIETIES OF WHEAT

	N (kg ha <sup>-1</sup> )								Mean
	0	20		40		60			
	P <sub>2</sub> O <sub>5</sub> (kg ha <sup>-1</sup> )								
	0	30	60	30	60	30	60		
(1) <u>Total weight</u> ('00 kg ha <sup>-1</sup> )									
Bayadi	81.3	89.4	100.3	98.0	97.7	90.7	96.0	93.3	
Mexipak	62.0	87.0	89.3	84.0	96.0	85.0	95.7	85.6	
(1.s.d. (P=0.05) Treatments: 10.1, P effect sig. <sup>t</sup> (P=0.1) 0 fert v rest sig. <sup>t</sup> (P=0.01)).									
(2) <u>Grain weight</u> ('00 kg ha <sup>-1</sup> )									
Bayadi	27.6	30.2	30.7	32.0	33.7	30.5	30.6	30.8	
Mexipak	22.0	32.0	30.1	28.3	31.0	30.6	30.5	29.2	
(1.s.d. (P=0.05) Treatments=1.6; 0 fert v rest sig. <sup>t</sup> P=0.01)									

There are a number of conclusions from the trial. The first was that the physical responses confirmed much of the experience of the area on the rather inconsistent responses to nitrogen, the significant response to phosphate (even up to  $60 \text{ kg ha}^{-1}$ ) and the lack of a significant yield difference between local and Mexipak varieties in a drier than average year (258 mm). The results of one trial are clearly inadequate evidence on which to base a general recommendation on fertilizer optima and a discussion of these results brought about a question of the value of the fertilizer response as a technique in field experimentation. As the level and nature of the response tends to vary with season, planting method, timing of fertilizer application, previous cropping and fertilizer residues and with the inherent fertility of the soil, it may be difficult, if not impossible, to conduct trials, with all the control necessary and with adequate replication, from which useful general recommendations can be made. This matter should be discussed further following the on-farm 1979/80 fertilizer trials and using the experience of other institutions in the region of farmers' field fertilizer trials. The simple factorial design was useful, as the trial could be used to demonstrate the effects of inputs applied singly and in combination. In general discussions on alternative technologies many farmers had stated that they were not interested in a complete alternative package of technology, but wished to know what contribution the various components could make either singly or in combination. This request led to this type of trial being started in 1978/79 on the Tel Hadya site and tested further on farmland in 1979/80.

The trial was also useful in that it provided an area of common interest and involvement with the farmer and neighbouring farmers. In many ways the process of running the trial at this stage of our research program was more important than the yield results. It should be noted that our involvement was not as great as it could have been and some information was lost as a result.

### 8.2.2 TRIAL 2 Timing and Rate of Nitrogen Fertilizer Application to Local Wheat in a High Rainfall Village 1A/13

This trial developed from a discussion with several farmers about appropriate rates and timing of nitrogen application to wheat growing in a deep, high clay content soil. The discussion centred about the possible value, if any, of spring applied nitrogen, particularly in a drier than normal year, and whether it was possible to develop a strategy to take account of possible variations in rainfall amount and distribution. A design was evolved, from discussions with the cooperating farmer and the local extension agent, that involved Spring or Autumn, Spring and Autumn, low and high rates of application of nitrogen and with a base dressing of phosphate. Details of the trial are in Appendix 12.

The previous crop on the land was spring-planted chickpea in 1978 and before that wheat (1977/78). Unfortunately, the trial was planned very late and there was a limited area suitable by the time we were ready to begin. The area allocated was very uneven and although the plot was marked out and the seed and fertilizer applied carefully, the covering of the seed with a tractor-drawn mouldboard plough (normal practice for this village on deep, heavy soils) across the line of the plots resulted subsequently in uneven establishment and mixing of fertilizer treatments on neighbouring plots. The treatments were applied as planned, partly at planting and partly in the Spring, but apart from the obvious differences between zero fertilizer plots and those with fertilizer, there were no significant effects of note.

When the plot was ready for harvest, at the same time as the rest of the field, the whole area was combine-harvested before any final sample records could be taken. As is normal practice in this village, a combine owner was contacted to harvest a number of plots during that week and this plot was one of them. Sufficient advance warning was not given by the farmer, but even she was unaware of the exact date on which the harvest was to take place. A clearer labelling of this plot by the Program team would have prevented this mishap.

### 8.2.3 TRIAL 3 Chickpea: Seed Dressing and Fertilizer Effects

This trial was also conducted in village 1A/13 and suffered a similar fate to Trial 2. It was planned following a request from a farmer for us to investigate the potential benefits of seed dressing on spring planted chickpea and also whether the crop would benefit from a starter dose of nitrogen. Details of the trial are in Appendix 13.

Again the trial was planned and agreed to only just before planting on 10th March. The usual method of planting chickpea in this village was to broadcast sow the crop onto previously mouldboard-ploughed, winter-fallowed land and then cover it with the mouldboard. This was thought to result in a minimum loss of moisture on planting. In order to maintain a greater degree of control over seed rate and fertilizer application, we prepared the land with a cultivator, applied the treatments and covered with a cultivator. As there was very little rain after this date germination was poorer than the surrounding crop but establishment appeared to be better on the plots sown with dressed seed.

No visible effects on subsequent growth were apparent and though we arranged in advance for the harvest date, when we arrived to carry out this job the farmer had harvested the whole area and the plants from all the plots were bulked.

Both these trials suffered from a lack of adequate supervision, explanation and discussion from both research and extension staff, though they cannot be regarded as total failures. Obviously, there is a genuine interest in carrying out trials of various kinds in this village but clearly a much greater care was needed in setting up and running such experiments. Many of the problems experienced in this experiment could have been avoided through a more regular contact but that was difficult in this village due to its distance from Aleppo and the difficulty of contacting the cooperating farmers on every monthly visit. A residential research or extension worker may have greatly increased the value of the exercise.

Many scientists may feel that the lack of any conclusive results from any of these trials reflects badly on the Center and on the scientists involved. We do not accept this view and in fact feel that the shared experience has been mutually beneficial and a form of communication has been established that could be valuable in the future. The view commonly held is that we should develop our technologies first on our research station and later transfer them to farmers' lands. This was the basic approach of much of the early work of the Farming Systems Program at ICRISAT and was the view of a number of ICARDA scientists in 1977. This view, and the belief that any trial on farmers' lands should be entirely controlled by the research or extension workers, are considered to be mistaken, as elementary errors and failures arising from these approaches are quickly perceived by farmers and can set back any development of alternatives many years. Other problems of this type of approach have been discussed in 8.1.

### 8.3 ON AND OFF-STATION FIELD TRIALS -- A SUMMARY OF PROGRESS AND PROPOSALS

Since the work recorded here was completed, another year of on-farm field trials experience has been gained in Syria and Jordan, the Legume Program have started off-station trials and a new project has commenced in Egypt and Sudan on broad beans. Also, an important new area of off-station work has been started, by the Soil Water and Nitrogen group within the Farming Systems Program, with the setting up of 4, ten-hectare sites in Aleppo Province. A number of useful internal discussions have taken place, some documents have been circulated (Harvey and Nygaard), 1980) and a meeting of agronomists has taken place.

It is clear from only a cursory view of all these activities and from a review of experience elsewhere (see reference list) that ICARDA will not be able to fulfil Articles IV (Objects) and V (Activities) of its Charter unless the Center can develop a clear, rational and integrated field research program that brings together the interests, skills and experience of its scientists, with those of national program scientists and those of farmers.

#### 8.3.1 Early Lessons

The lessons from our early experience are clear:

- 1) Involvement of research scientists with farmers and extension workers in field trials can be a mutually beneficial activity.
- 2) Trials partly or wholly run by farmers are an essential part of any field research program.

- 3) There needs to be a clear understanding of the aims and objectives of any trial on farmers' land by farmers, research workers and extension workers before a trial begins.
- 4) At least some of a group of trials conducted on farmers' lands should investigate perceived needs of the farmers.
- 5) A clear distinction must be made between trials that are investigating basic responses and interactions possibly without any immediate relevance, and those that examine or demonstrate alternative resource-management options. It is suggested that the former types of trial should only be run on sub-sites (see below).
- 6) The selection of representative locations and farming groups must be made without bias towards any favoured locations or type of farmer.
- 7) Comparisons of performance between existing and alternative technology have to be made with great care to avoid misrepresentation.
- 8) A much greater degree of care, supervision and interaction is needed between all participating parties if the maximum benefit is to be obtained from an on-farm trials program.



### 8.3.2 Proposed Trials Structure

It would therefore seem to be an appropriate time to draw up a structure for future off-station research activities and seriously to consider the setting up of a field research unit through which all such activities could be considered. This form of organization has been developed successfully at other centers, notably IRRI.

In this section, activities at each of the principal locations identified in Appendix 14 will be outlined in turn with the greatest emphasis on on-farm trials as they represent the areas in need of greater support at the present stage of development of ICARDA's research program. They also involve a great deal of cooperation with national research and extension activities.

### 8.3.3 Types of Trials Appropriate for Each Location

#### 1) On-farm

- (i) New crop/variety introduction. Small plot testing under farmer's technology.
- (ii) Variety testing and demonstration. Hectare size plot with technology agreed by farmer, researcher and extension agents.
- (iii) Components of production. Only appropriate components tested at each location agreed by farmer, research and extension worker.
- (iv) Rotational sequences to compare existing and alternative systems, e.g. introduction of forage legumes and intensive livestock. Farmer control.

- (v) Land management systems. Ten hectares or more in size. Possibility of group action in area prone to soil erosion or where improved productivity is only possible through intervention or cooperative action.
- (vi) Monitoring of crop and livestock production, meteorological investigations, input/output relationships. These constitute the on-going studies undertaken by the Farming Systems Research Program. They act as a valuable evaluation system for all on-farm trials activities. A greater degree of farmer involvement in recording should be possible and indeed is essential after three seasons' studies.

## 2) Sub-site

These consist of experimental sites, covering a range of agro-ecological zones, that are under the control of research scientists and/or extension officers. Sub-sites may be on private or state land and the main function would be to act as research, testing and demonstration centers linked to the main research station through common trials and treatments.

- (i) Variety testing with and without major inputs.
- (ii) Basic agronomic trials -- planting date, seed rate, fertilizer use, drilling vs. sowing.
- (iii) Soil moisture -- infiltration, storage and use.
- (iv) Nutrient sources, cycling and use.

- (v) Tillage systems within rotations.
- (vi) Seed bulking.
- (vii) Crop model testing.
- (viii) Meteorological recording.

At each of these sites there should be rotational sequences that are similar to existing sequences in the area. At least some trials should be comparable to some of the on-farm trials.

3) Main research station (e.g. Tel Hadya)

This location has been chosen originally because it is representative of an important area of rainfed agriculture and it also contains a wide selection of typical soil types of the region. The location specificity limitations of the single site, and the many problems that arise from the rather special treatment it inevitably receives should be realised, and only certain types of trial and investigation should be carried out solely at this location. For many other trials, the main station should simply be used as one of a chain of sub-sites.

- (i) Plant selection and breeding. Selection for cold tolerance, adaptability, pest and disease resistance, yield stability and productivity.
- (ii) Physiological basis for yield variation. Analysis of crop growth and partition of assimilates.
- (iii) Drought tolerance and avoidance, crop water and nutrient use.

- (iv) Rotational sequences and alternatives.
- (v) Crop performance within existing and alternative cropping and crop/livestock systems.
- (vi) Crop, forage and livestock interactions within production systems.
- (vii) Livestock performance under alternative systems.
- (viii) Physical and economic input/output relation of enterprises and whole system.
- (ix) Seed bulking.

In addition to these three main areas of research activity, a number of sub-stations may be appropriate for the bulking of seed materials in off-season nurseries, certain types of disease work and crop testing in different environmental conditions (e.g. Shaubak, Terbol).

Having suggested the range of activities that could take place at each of these locations it is vital that the various groups of activities are not seen as experimentation at different levels, but are all given equal priority in the overall research program.

Of fundamental importance to the success of an experimental program is the definition and understanding of research objectives. It is clear from the experience of the first few years of ICARDA on-farm research that many scientists, extension workers and farmers were not aware of the underlying objectives and principles of much of the off-station work and consequently many misunderstandings and misinterpretations of motives have arisen.

#### 8.3.4 Objectives

A number of objectives for each of these types of trials are listed below. They have been compiled bearing in mind the objectives and activities of the ICARDA charter. Others may be thought to be more appropriate and may be added.

##### 1) On-farm trials

- to involve the farmer, extension and research workers in the research, demonstration and education process;
- to test and demonstrate realistic alternatives within existing systems using readily available resources;
- to examine the feasibility of developing new systems of crop, livestock and land management;
- to develop an understanding of rationale and change within farming systems.

##### 2) Sub-site trials

- to carry out applied soils, crop physiology and agronomy work in a wide range of environments;
- to test a broad range of soil, crop and livestock management systems;
- to collect data for the verification of productivity models;
- to bulk seeds.

### 3) Main-station trials

- to develop new crop varieties, or modify existing ones, that are more stable, productive and resistant to disease and pest than varieties presently grown;
- to carry out basic research on crop physiology, agronomy and ecology;
- to test promising new plant materials under existing and alternative rotations and systems of soil, crop and live-stock management;
- to examine the feasibility of intensifying whole farming systems through alternative methods of resource management.

#### 8.3.5 Organization

It is important that this classification of research activities by location is not regarded as divisive in any way, either through program activities or between on-station and off-station work. The success of the whole research program depends on the integration of research activities through the constant interaction between research scientists, extension workers and farmers in working towards common goals. It is therefore proposed that a Center experimental trials planning group is set up to oversee and coordinate all field trials work, and particularly to guide policy and strategy. This group would guide the work of three units: on-station trials, sub-site trials and on-farm trials, each of which should have representatives from all Programs and with responsibilities for each area of activity clearly defined.

#### 8.4 CONCLUSION

This report has reviewed some of the lessons from ICARDA's early experience in off-station trials work and has then attempted to outline a possible strategy for the whole field experimental program. Such a structure can provide a guide to the planning of future work if there is a commitment on the part of the Center scientists to work with national program scientists and farmers, and an understanding by all parties of the aims and objectives of all field trials work. More knowledge is needed on the part of the ICARDA scientists of the farmers who should benefit from the products of research, and the scope and nature of their farming systems. Much of the initial and continuing work of the Farm Systems Program is designed to provide this knowledge, but this can never substitute for first-hand, regular experience of field situations outside the main research station. It is suggested that membership of the trial units should be regularly changed so that during a period of years scientists and assistants should have experience of all types of trial activity.

It is suggested that ICARDA has an opportunity to play a leading role in the improvement of research organization and in making research a more valuable part of rural development if the Center could develop a research system that could serve as a model for National Programs throughout the Region. However, the Center cannot transfer knowledge or methodologies from its base in Syria to other countries without a reliable and tested research organization and expertise that is making a useful contribution to agricultural development in Northern Syria. This can serve as an excellent training and demonstration base for planners, research workers and extension workers.

## REFERENCES

- Biggs, S. D. (1980). On-Farm Research in an Integrated Agricultural Technology Development System. Agric. Adminis., April 1980.
- Byerlee, D. et al. (1979). Towards a Methodology for Developing Technologies Appropriate to Farmers. Int. Ass. Agric. Econ. Conf. Banff, Canada, September 1979.
- ICARDA. (1979). Results of Farmer's Field Verification Trials 1977/78 and 1978/79 in the Syrian Arab Republic. mimeo.
- Izumo, T. (1977). Developing of On-Farm Testing Program for Maize in India. Incremental and Sequential Adoption Trials. Agric. Report No. 2. Regional Maize Agronomist Asian Reg. Maize Prog. CIMMYT.
- Mann, C. K. (1977). Package of Practices. A Step at a Time with Clusters. Rockefeller Foundation Program. Ankara, Turkey, 1977.
- Ryan, J. and Subrahmanyam, K. V. (1975). An Appraisal of the Package of Practices Approach in Adoption of Modern Varieties. Occ. Paper 11 Economics Prog. ICRISAT.



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The report was written by Adrienne Martin and David Gibbon with valuable criticism and comment from Jim Harvey and Rog Fredenburgh.

## APPENDIX 1

### SUGGESTED CRITERIA FOR SELECTION OF FARMERS AND FIELDS FOR VERIFICATION TRIALS

#### 1) Distribution of Trials in Different Zones

The trials should be distributed across the different rainfall zones according to the Ministry of Agriculture classification. Although the *boundaries* between zones are not distinctly drawn, the areas in each province falling into the four zones are known by the local agricultural officials.

Zone 1: 350 mm +                      Zone 3: 250 (250mm 2 yrs out of 3)  
Zone 2: 250-350 mm                      Zone 4: 200-250 (250mm 1 yr out of 3)

Area of land in each rainfall zone (steppe not included in total)\*

<u>Zone</u>	<u>Fertile Area</u>	<u>Less Fertile</u>	<u>Zone as % of total</u>
1	1,196,019	560,596	35
2	771,185	502,158	25
3	536,056	789,882	26
4	178,241	452,805	13

If the number of trials in each zone is based on the *percentage* distribution of total land area the numbers are as follows:

Zone 1: 14 trials                      Zone 2: 10                      Zone 3: 10                      Zone 4: 5

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\* Source: Central Bureau of Statistics. Statistical Abstract, 1976.

If the number of trials in each zone is based on the percentage distribution of fertile land:

Zone 1: 18                      Zone 2: 11              Zone 3: 8              Zone 4: 3

Our suggested allocation of trials (1) 9, (2) 10, (3) 7, (4) 3, is weighted towards zone 1 by either of these criteria, but the another important consideration is the degree of emphasis which should be given to barley -- for which ICARDA as a research center has particular responsibility.

## 2) Distribution of Trials According to Farm Size

Trials should be distributed over a range of farm size:

### Distribution of land ownership in Syria (owners with agric. main occupation) \*

<u>Size of holding (ha)</u>	<u>% of holdings</u>	<u>% of cultivable area</u>
10	72	21.8
10-20	14.8	18.8
20-30	6.1	13.3
30-50	4.3	14.4
50-100	1.9	10.8
100	.9	20.9

It is suggested that at least 2/3 of the trials should be on farms less than 30 ha (accounting for 92.9 per cent of owners). Exceptions could be made in areas where larger holdings are common. In parts of Aleppo Province where holding size is very small, trials should be located through the cooperative.

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\* Source: Agricultural Census Data, 1970-1971.

3) Selection Criteria for Farmers

- The village and farmer's land should be easily accessible in all weather.
- As far as can be established, the farmers and their families chosen should be those who are likely to understand and participate in the running of the trial.
- They should be resident on or in a village near their land, with agriculture as their main occupation. If possible farmers with other employment, sharecroppers, or farmers employing managers should not be included as their involvement is likely to be less.
- Farm size should be under 30 ha if possible.

4) Selection of Trial Plot

- The trial should be easily accessible from the main road, but not necessarily be located on it as this increases risk of damage or *theft*. The trial itself should be at least 20 meters from the road (including access road).
- As far as possible the area of the trial should be representative of the major soil type of the area, should also be representative in the rotation followed and method of cultivation. The farmers should be asked to assess possible locations for soil fertility, representativeness etc.
- The history of the location should be checked for any particular problems, e.g. weeds, diseases, flooding, and susceptibility to illegal grazing to assess the likelihood of damage.

- The trial should be located in a field where the farmer intends to plant his own cereal crop. A rainfed trial should not be situated next to the farmer's irrigated crop.
- The trial should preferably be on level ground but otherwise should run up and down the slope.
- If the trial area is increased in comparison to last year the length of the trial should be increased, not the width.



APPENDIX 2

SELECTED FARMERS 1978/79

Location		Holding Size		Status	Labour		Machinery	Animals	Other Inc.
	Trial	Total	IRR		Employed				
					Persons	Family			
Ras al Ayn	(IRR)	217	167	Rented	4	17	-	-	-
Howeij	(IRR)	50	50	Private	-	4	-	***	-
Khreita	(IRR)	5	5	Coop.	-	-	-	***	-
Jurn Aswad	(IRR)	40	20	Private	-	2	-	**	-
		1100	-	Shared 60% }					
Latamneh	(IRR)	14	14	Private	-	2	-	-	-
<hr/>									
	Zone								
Zalaqiyat	1	6	-	Shared 20%	-	-	-	-	@
Sqelbieh	1	15	5.7	Private	-	-	-	-	-
Kreim	1	7	3.4	Private	-	2	-	-	@@
Atareb	1	6	-	Coop.	-	-	-	*	-
Mereyghl	1	35	12	Private	1	2	-	**	-
Kawkabeh	1	27	-	Coop.	-	5	-	**	-
Qeirawan	1	46	-	Coop.	-	-	-	*	@@
Tel 'Ayn	1	80	30	Private	2	5	-	*	-
Um Rabia	-	20	-	Coop.	-	-	-	-	@@
Maaret Dibsi	1	14	-	Coop.	-	-	-	-	-
Zerdaneh	1	120	80	50 Private }	1	6	-	-	-
				70 Rent }					
Dweir	1	7.5	4	Private	-	-	-	*	-
<hr/>									
Ras el Ayn	2	180	80	Rent	-	-	-	-	-
Bendrkhan	2	20	10	Coop.	-	1	-	**	-
Souraan	2	170	-	Private	-	-	-	***	@
Khan Sheikhoun	2	13.5	-	Coop.	-	-	-	**	@
Moubarakeh	2	13.5	2	Private	-	-	-	*	-
Nasriyeh	2	55	8	Private	-	-	-	**	-
Qadiraan	2	70	0	Private	-	-	-	-	@@@
Akhtarin	2	15	2	Private	-	-	-	*	-
<hr/>									
Howa	3	100.5	5	Private	-	-	-	***	?
Baraghiti	3	24	2	Private	-	-	-	*	-
Shinshar	3	24	2	Coop. + Rent	-	-	-	**	-
Qubtain	3	15	-	Coop.	-	-	-	*	-
<hr/>									
Sabaa Askour	4	400	20	Shared	-	-	-	***	-
Khanaser	4	200	-	Private	-	-	-	-	?

\* under 10 head

@ under 10 %

\*\* over 10 under 50

@@ over 10% under 50 %

\*\*\* over 50 head

@@@ over 50 %

### APPENDIX 3

#### QUESTIONS FOR POSSIBLE PARTICIPATING FARMERS

##### Question 1

- 1) Main soil types and rotations on his land.
- 2) Are they typical of the village?
- 3) Are they typical of the main soil types of the area?

##### Question 2

- 1) Has he a suitable field for a trial in a cereal field (last year fallow or summer crops).
- 2) Is the ground level?
- 3) Soil type and depth.
- 4) Area available.
- 5) Typicality.
- 6) Variation within yield.
- 7) Farmers' assessment of fertility of the field.

##### Question 3

Any specific problems of the field -- weeds, diseases, run off, flooding, unprotected, distant, damage or disturbance in part.

##### Question 4

- 1) Last season's crop.
- 2) Was it irrigated?
- 3) Details of cultivation.
- 4) Fertilizer and manure.
- 5) Herbicides and insecticides applied.

Question 5

- 1) Cereal varieties grown.
- 2) Yields last season on soil types 1, 2, 3 and 4.
- 3) Treatment of cereal crops.
  - Seed dressing, seed rate, herbicide, fertilizer, manure, harvest, drilling/broadcast, planting date (in relation to arrival of rain) post harvest treatment.
- 4) Quantities for household and livestock.

Question 6

- 1) Has he ever seen or done an experiment on his own in past?
- 2) Is he interested in
  - (a) having a trial, and
  - (b) helping to run one?
- 3) Would a trial be of benefit to himself and others in area?

Question 7

Other comments.

CULTURAL PRACTICES ETC. IN AREAS WHERE  
FARMERS FIELD VERIFICATION TRIAL WERE LOCATED  
1978 - 1979

	Z O N E (1)						
	A L E P P O				I D L E B		
	Kawkabeh	Mereyghl	Atareb	Al Qarieh	Zerdaneh	Maaret Dibsi	Khan Sheikhoun
Rotation	2 Year Wheat/S.Crops	2 Year/3 Year Cereals/S.C. Lentil/ Wheat/Lentil/S.C.	3 Year Wheat/Lentil/ (Melons) S.C.	-	2 Year Wheat, S.C./ Cotton, Melons	2 Year Wheat/Lentils S.C. (Melons)	2 Year Cereals/Lentils, S. Crops
Soil Type (1)	20% KLB	75% RD	95% RD	-	95% RD	10% RDDP	70% RD
(2)	30% RD	25% RD/W	5% RD/K	-	5% W	50% RD	30% W
(3)	35% K	-	-	-	1% RD	40% K	-
Variety	Mex. Hamari	Mexipak	Bayadi, Hourani Mexipak	-	Siete Cerros	Bayadi	Mexipak
Seed rate	130 Mex. 125 Ham.	145 Mex.	130 Ham.	-	125	130	150
Cultivation	AY/RD 1 CULT. + MLDB after HVST	1 CULT BDCAST. RDAD + TABBAN	AYAR BDCAST RDAD	-	AYAR BDCAST. RDAD	CULT., BDCAST. TABBAN	1 CULT + DRILL
Fertilizer	46 P <sub>2</sub> O <sub>5</sub> 65 N	46 P <sub>2</sub> O <sub>5</sub> 52 N	46 P <sub>2</sub> O <sub>5</sub> 26-39 N	-	96 P <sub>2</sub> O <sub>5</sub> 6 N	46 P <sub>2</sub> O <sub>5</sub> 16.5 N	0 P <sub>2</sub> O <sub>5</sub> 16.5 N
Herbicide use	70%	Some Weeding 0	Some Weeding 10%	-	100%	Some Weeding 0	10%
Drill %	0	50%	10%	-	10%	25%	100%
Harvest	Combine 8%	Combine 6%	Hand/Combine	-	Combine 6%	Combine 60L/Ha	Combine 50L/Ha
Trial check	2103 Mex.	903 Mex.	2226 Mex.	-	1964 Mex.	3455 Mex.	2215 Mex.
Soil type	2	1	1	-	3 UNREP	1	1
Local Yields (1)	2812 Mex.	1600 Mex.	1875 Bay. 2500 Mex.	-	3000 S. Cerros	1600 Bay.	1900 Mex.
(2)	875 Ham.	1300	1125 Bay. 875 Mex.	-	2500 S. Cerros	1600 Bay.	1000 Mex.
(3)	975 Ham.	-	-	-	-	-	-

N.B. Seed and fertilizer rates and yields in kg/ha.

BLK = Black;

RD = Red;

K = Karaj;

W = White;

YL = Yellow;

S. C. = Summer Crops.

APPENDIX 4 (continued)

CULTURAL PRACTICES ETC. IN AREAS WHERE  
FARMERS FIELDS VERIFICATION TRIALS WERE LOCATED  
1978 - 1979

	Z O N E (1)						
	G H A B		HAMA	H A S S A K E H			HOMS
	Sqelbieh	Kreim	Zalaqiat	Tel 'Ayn	Um Rabia	Qeirawan	Dweir
Rotation	2 Year/3 Year Wheat/Melons/ Wheat/Wheat/S.C.	2 Year/3 Year Wheat/Melons/ Wheat/Wheat/S.C.	2 Year Wheat/S.C. Legumes	2 Year Wheat/Fallow S. Crops	2 Year Wheat/Wheat Lentils, Fallow	2 Year Wheat/Fallow Wheat	2 Year Wheat/Fallow
Soil type (1)	65% RD	35% BL	75% RD	25% BLK	97% RD	75% RD	50% RD
(2)	35% BL	65%	15% YL	50% RD	3% BLK	15% W	20% BL
(3)	-	-	10 RK	25% GY	-	15% K	10% BK
Variety	Jezireh 17 Petik	Siete Cerros	Fl. Aurore	Mexipak	Hourani	Hourani	Bayadi
Seed rate	250	220	200	120	120-140	130	150
Cultivation	CULT + BDCAST. + DISC HARROW	CULT + BDCAST. + DISC HARROW	DISC PLOUGH CULT + BDCAST + D HARROW	DISC HARROW + DISC DRILL	DISC HARROW + DISC DRILL	DISC HARROW BROADCAST DISC HARROW	DISC PLOUGH BROADCAST + DISC
Fertilizer	81.6 P <sub>2</sub> O <sub>5</sub> 16.5 N	159 P <sub>2</sub> O <sub>5</sub> 260 N	55.2 P <sub>2</sub> O <sub>5</sub> 54.5 N	46 P <sub>2</sub> O <sub>5</sub> 40 N	46 P <sub>2</sub> O <sub>5</sub> 40 N	23 P <sub>2</sub> O <sub>5</sub> 16.5 N	96 P <sub>2</sub> O <sub>5</sub> 78 N
Herbicide use	60%	90%	100%	20% Aerial	20% Aerial	100% Aerial	100%
Drill %	0	20%	0	100%	100%	100%	0%
Harvest	Combine 5%	Combine 5%	Combine 5%	Combine 5%	Combine 8%	Combine 7%	Hand/Combine
Trial check	3374 Mex.	3621 Mex. 4708 Jez. 17	1544 Jori 1918 Mex.	2389 Mex.	1518 Mex. 1831 Jez. 17	1369 Mex.	Not recorded
Soil type	1	1	1	2	1	1	1
Local Yields (1)	3750 Mex.	4500 Mex.	1250	1980 Mex.	1680 Mex.	1560 Mex. 1170 Hou.	1200
(2)	3750 Mex.	3000 Mex.	500	1560 Mex.	1680 Mex.	-	1200 Bay.
(3)	-	-	-	-	-	-	-



CULTURAL PRACTICES ETC. IN AREAS WHERE  
FARMERS FIELD VERIFICATION TRIALS WERE LOCATED  
1978 - 1979

	Z O N E (2)					
	A L E P P O			IDLEB Sinjar	HAMA Souraan	HASSAKEH Ras al Ayn
	Akhtarin	al Bab	Nasriyeh			
Rotation	3 Year Wheat/Lentils	2 Year Cereal/Fallow	2 Year / 3 Year Wheat/Lentils/S.C. Cereal / Fallow	-	T.1. 3 Year Wheat/Lentils Fallow, S. Crops T.2. 2 Year Wheat/Fallow	2 Year Wheat/Fallow
Soil type (1) (2) (3)	70% RD 20% KD/YL 10% K	30% RD 70% YLK -	65% YL 35% WK -	-	85% RD 65% W -	-
Variety	Hourani Jori A Abiad	Hourani A Aswad	Hourani A Abiad	-	Hourani Fl. Aurore A Abiad	Siete Cerros
Seed rate	150 BLY 125 WT	100	100	-	110	120
Cultivation	AYAR/BDCST/ RDAD	N.R.	AYAR/BDCST/ RDAD	-	CULT + DRILL	AFTER FALLOW 3 DISC HARROW + DRILL
Fertilizer	BLY 72 P <sub>2</sub> O <sub>5</sub> 33 WT N WT 96 P <sub>2</sub> O <sub>5</sub> 49.5 N	46 P <sub>2</sub> O <sub>5</sub> 16.5 N	46 P <sub>2</sub> O <sub>5</sub> 16.5 N	-	13 N	-
Herbicide use	0%	100%	60%	-	5%	0
Drill %	0%	0%	0%	-	25%	100%
Harvest	Combine 7%	-	Hand/Combine	-	Combine	Combine 8%
Trial check	1400 Hourani 2251 A Abiad	944 Hourani 2279 A Abiad	974 Hourani 110/ A Abiad	-	2441 A Abiad 1862 Mexipak 1641 Fl. Ar.	1146 Mexipak 1800 A Abiad
Soil type	1	1	1	-	1	2
Local Yields (1) (2) (3)	750 2000 500 2000 500	1100 1400 1000 -	1000 1500 400 600 -	- - - -	1000 Ham. 1500 BLY 720 -	1020 S.C. B.N.G. 1020 -

## APPENDIX 4 (continued)

CULTURAL PRACTICES ETC. IN AREAS WHERE  
FARMERS FIELD VERIFICATION TRIALS WERE LOCATED  
1978 - 1979

	Z O N E (2)			Z O N E (3)				
	R A Q Q A		H O M S	A L E P P O		I D L E B		H O M S
	Bendrkhani	Bir'Atwaan	Moubarakeh	Qubtain	Kweiris	Baraghiti	Howa	Shinshar
Rotation	3 Year Cereal/Fallow	2 Year Cereal/Fallow	2 Year Wheat/Legumes	T.1. 2 Year Cereal/Fallow T.2. 2 Year Barley/Fallow	-	2 Year Cereal/Fallow	2 Year Wheat/Fallow Type 2 & 3 Barley/Fallow	3 Year Wheat/Legume/ Fallow 2 Year Cereal/Fallow
Soil type (1)	15% BL	20% RD/YL	65% RD	30% YL	-	33% BL	33% BL	25% RD
(2)	85% RD/YL	20%	30% RDK	35% YL/W	-	33% RD	33% RD	35% YL
(3)	-	20%	5% K	35% W	-	33% YL	33% W	40% YLK
Variety	Mexipak	Mexipak A Abiad	Fl. Aurore Mexipak A Abiad	Hourani A Aswad	-	A Aswad	A Aswad Hamari Fl. Aur.	A Abiad
Seed rate	150	125	200	120 WHT 100 BLY	-	125 BLY	100-110	140
Cultivation	MLDBOARD	AFTER FALLOW DISC HARROW + DRILL	CULT BDCST OVER MLDBOARD	CULT. BDCST RDAD	-	DISC H. BDCST DISC H.	DISC H. AYAR BDCST RDAD (DISC H.)	DISC PLOUGH BDCST RDAD CULT
Fertilizer	-	Occ. P <sub>2</sub> O <sub>5</sub>	69 P <sub>2</sub> O <sub>5</sub> 39 N	-	-	-	-	-
Herbicide use	0	0	80%	0	-	60%	0	0
Drill %	100%	100%	0%	0	-	0	0	0
Harvest	Combine 10%	Combine	Combine 50L/Ha	Hand Harvest	-	Combine H.	Combine 15%	Hand Harvest
Trial check	600 Mexipak 1590 A Abiad	728 Mexipak 1108 A Abiad	1328 Fl. Ar. 1282 Mexipak 1564 A Abiad	677 A Abiad	-	308 A Abiad	462 A Abiad	262 A Abiad
Soil type	2	1	1	2	-	3	1	2
Local Yields (1)	1440 Mexipak B.N.G.	1220 Mexipak 2000 B.	1000 Fl. Ar. 1100 A Abiad	300 Ham.	-	-	400 Aswad	840 A Abiad
(2)	1440 Mexipak	840 Mexipak	600 600	150 Ham. 200 BLY A Aswad	-	-	300	560 A Abiad
(3)	-	-	-	-	-	-	-	-

CULTURAL PRACTICES ETC. IN AREAS WHERE  
FARMERS FIELD VERIFICATION TRIALS WERE LOCATED  
1978 - 1979

	Z O N E (4)		I R R I G A T E D					
	ALEPPO Khanaser	HASSAKEH Saba Askour	RAOQA Jurn Aswad	HASSAKEH Ras al Ayn	DEIR EZ-ZOR		HAMA Latamneh	DAMAS. Mar as-Sultan
Rotation	2 Year Cereal/Fallow Barley/Barley	Cont Barley	IRR. 2 Year Wheat/Cotton DRY 2 Year Cereal/Fallow	IRR. 2 Year Wheat/Cotton (Sesame Veg)	IRR. 2 Year Cereals, S.C./Cotton	IRR. 2 Year Wheat/S.C. Cotton	IRR. 2 Year Wheat/Cotton S.C. Veg.	-
Soil type (1)	95% YL/GL	15% BL	80% RD	10% BL	60% GY	75% GY	85% RD	-
(2)	5% Y/M	65% W	10% RDK	90% YL	20% W	20% W	15% YL	-
(3)	-	20% K	10% W	-	20% S	-	-	-
Variety	A Aswad Hamari	A Aswad	Siete Cerros	Jezireh 17	Jezireh 17	Mexipak	Siete Cerros Fl. Aurore Mexipak	-
Seed rate	100	100	150	130-140	200	200	200	-
Cultivation	AYAR BDCST. RDAD	DISC HARROW + DRILL	DISC HARROW + DRILL	MLDT. PLOUGH CULT + DRILL	DISC PLOUGH BDCST + DISC HARROW	DISC PLOUGH BDCST + DISC HARROW	CULT + BDCST + CULT	-
Fertilizer	-	-	46 P <sub>2</sub> O <sub>5</sub> 33 N	69 P <sub>2</sub> O <sub>5</sub> 99 N	34.5 P <sub>2</sub> O <sub>5</sub> 57 N	69 P <sub>2</sub> O <sub>5</sub> 99 N	52 P <sub>2</sub> O <sub>5</sub> 92.4 N	-
Herbicide use	0	0	0	30%	0	0%	90%	-
Drill %	10%	100%	100%	100%	0	0%	20%	-
Harvest	Hand/Combine	Combine 14%	Combine	Combine	Hand Harvest	Hand Harvest	Combine 6%	-
Trial check	810 A Abiad	N.R.	3518 Mex. 4067 Jori	4851 Jez. 17	3938 Jez 17	3421 Mex.	4872 Mex.	-
Soil type	1	2	1	2	2	1	1	-
Local Yields (1)	400 Hamari 500 A Aswad	-	4200 S. Cer. 4600 Jori	3500 Jez. 17	2500 Jez 17	3000 Mex.	4000 Mex.	-
(2)	-	200	-	2500 Jez. 17	2000	1500	-	-
(3)	-	-	-	-	-	-	-	-

## APPENDIX 5

FARMERS PRACTICES  
FARMERS FIELD VERIFICATION TRIALS  
1977 - 1978

	Z O N E (1)						
	A L E P P O				I D L E B		
	Afrin	Maranaz	ar - Rai	Jerablus	Ruj Hereta	al - Fowa	Khan Sheikhou
Farmers Rotation	3 Year Wheat/Lentil/ S. Crops	2 Year Cereal/Lentil/ S. Crops	2 Year Yell Soil Wint/S.C. 2 Year RD Soil Wht/Legume/S.C.	2 Year Cereal/S.C. Cereal/Fallow	2 Year Winter/S.C. Wheat/Lentil	3 Year Wheat/Lentil/ S. Crops	2 Year Winter/S.C. Cereal/Fallow
Rotation in Area	2 Year Cereal/Legume	2 Year Winter/S. C.	2 Year Yell Soil 3 Year RD Soil	Same rotation	Same rotation	2 Year Yell Soil 3 Year RD Soil	2 Year Yell Soil 3 Year RD Soil
Soil type (1) (2) (3)	70% RD 10% RK -	RD YL YLK	75% YL 25% RD K	70% RD 15% RD 10% RDK	66% RD 33% YL -	60% RD 40% RD -	RD RD -
Variety	Mexipak	Jori	Syrimex	Mexipak	Senator Cappelli	Syrimex	Siete Cerros
Seed rate	125	135	140	145	270	150	120
F. Cult., Previous crop	AFTER COTTON MLDB. + DRILL	AYAR, BDCST, RDAD	AFTER MELONS CULT+TOB+S. DRILL	AFTER MELONS 1 CULT + DRILL	AYAR / RDAD RDAD BDCST.	AYAR/BDCST./ RDAD CULT.	AYAR DISC H DRILL
Cultivation in area	Bdcst Lessfet	S.R.	S.R.	S. R. No Spraying	S. R. Win. Fertilizer	Herbicide	SR 20% Fert
Fertilizer	W 69 P <sub>2</sub> O <sub>5</sub> - S 52 N	W 69 P <sub>2</sub> O <sub>5</sub> - S 26 N	W 83 P <sub>2</sub> O <sub>5</sub> 32 N S 66 N	W 69 P <sub>2</sub> O <sub>5</sub> 27 N S 33 N	W - - S 49 N	W P <sub>2</sub> O <sub>5</sub> N S N	W 46 P <sub>2</sub> O <sub>5</sub> 65 N S 26 N
Herbicide	Sprayed	Sprayed	Sprayed	-	Sprayed	Sprayed	-
Harvest	Combine	Combine	Combine	Combine	Combine	Combine	Combine
Yield	2875	1620	1600	1450	2400	2250 2300 BLY	2400 220 BLY

N.B. Seed and Fertilizer rate and yields in kg/ha.

FARMERS PRACTICES  
FARMERS FIELD VERIFICATION TRIALS  
1977 - 1978

	Z O N E (1)					
	H A S A K E H			D U R B A S S I E H		
	'Amuda	Mir 'Aziz	Ayn Ward	Malak	Qurmaniyeh	Tal Kadesh
Farmers Rotation	2 Year Cereal/Lentil	2 Year Cereal/Melons	-	2 Year Cereal/Fallow/Cont. Cereal	2 Year Cont. Cereal	2 Year Cereal/Cotton/Lentils
Rotation in Area	2 Year Cereal/Lentil	2 Year Cereal/Melons Fallow	-	Cereal/Fallow Cereal	Cereal/Fallow Cont. Cereal Lentils	Cereal/Fallow Cont. Cereal Lentils
Soil type (1)	90% RD	RD	-	RD	RD	RD
(2)	10% BL	-	-	BL	YL	YL
(3)	-	-	-	-	-	-
Variety	Siete Cerros	Mexipak	-	Shehari	Mexipak	Mexipak
Seed rate	120	120	-	130	135	100
F. Cult., Previous crop	DISC HARROW + DRILL	DISC HARROW, DISC HARROW SEED DISTR.	-	DISC H + DRILL MLB. af. HVST.	DISC H + DRILL MLB. af. HVST.	DISC H + DRILL DS. PL. af. HVS.
Cultivation in area	Fertilizer	-	-	S.R.	S.R. Less Fer.	S.R. Less Cult.
Fertilizer	W 51 P <sub>2</sub> O <sub>5</sub> - S 37 N	W 69 P <sub>2</sub> O <sub>5</sub> 24 N S 57 N	-	W 46 P <sub>2</sub> O <sub>5</sub> 16 N S -	W 23 P <sub>2</sub> O <sub>5</sub> 25 N S -	W 46 P <sub>2</sub> O <sub>5</sub> 16 N S 33 N
Herbicide	-	-	-	-	-	-
Harvest	Combine	Combine	-	Combine	Combine	Combine
Yield	1560	2760 2280	-	1300	1300	1200

FARMERS PRACTICES  
FARMERS FIELD VERIFICATION TRIALS  
1977 - 1978

	Z O N E (2)								
	H A M A			A L E P P O			H A S S A K E H		
	Mohardeh Shear	Taabeh	Souraan	Deir Qaaq	Arbaa Kabeer	Nasriyeh	Ras el Ayn	Tel Beidar	Tel Burak
Farmers Rotation	2 Year Winter / S.C. Cereal / S.C.	T.1. 3 Year Wheat/Lentil S. Crops T.2. 2 Year Cereal/Fallow	3 Year Cereal /Legumes S. Crops	T.1. 2 Year Cotton/wheat T.2. 3 Year Cereal/Fallow	2 Year Cereal/Fallow	2 Year Cereal/Legumes S.C. 2 Year Cereal/Fallow	2 Year Cereal/Fallow	2 Year Cereal/Fallow	2 Year Cereal/Fallow
Rotation in Area	Cereal/Fallow Cont. Cereal Lentils	Cereal/Fallow Cont. Cereal Lentils	S.R.	2 Year Cereal/Fallow	2 Year Cereal/Fallow	S.R.	S.R.	S. R.	S. R.
Soil type (1)	RD	50% RD	RD	5% BLK	50% RD	YL	75% BL	80% RD	BL
(2)	-	50% RK	-	20% RD	25% YL	YLK	10% YL	10% BL	YL
(3)	-	-	-	75% K	25% W	-	15% W	10% K	K
Variety	Mexipak A Abiad	Bayadi	Fl. Aurore	Bayadi A Aswad	Bayadi	Hamari	Mexipak	Shehani Mexipak	Shehani
Seed rate	180	130	150	120 100	60	100	100	130	150
F. Cult., Previous crop	AYAR / RDAD CULT. BDCST. 2 MLB.	AYAR / RDAD CULT. BDCST. MLB af. HVST	CULT+DRILL DISC PLOUGH	AYAR / RDAD CULT. BDCST. af HVST MARCH	CULT MARCH BDCST+RDAD	AYAR / RDAD BDCST D. PL.	DISC H + DRILL 2 DISC H	DISC H. + DRILL 2 DISC H	DISC H. + DRILL
Cultivation in area	Few Herb.	Few Fertil. Most Herb.	5% Fert + Herb	Bdcst + Rdad	Share Cropped	Spring Fert.	Fewer Cult.	S. R.	S. R.
Fertilizer	W -	W 46 P <sub>2</sub> O <sub>5</sub>	W 37 P <sub>2</sub> O <sub>5</sub>	W -	W -	W 46 P <sub>2</sub> O <sub>5</sub>	W -	W -	W -
	-	26 N	5 N	-	-	-	-	-	-
	S 65 N	S 26 N	S 10 N	S -	S -	S -	S -	S -	S -
Herbicide	Sprayed	-	-	-	-	Sprayed	-	-	-
Harvest	Combine	Combine	Combine	Hand Combine	Hand Harvest	Hand Harvest	Combine	Combine	Combine
Yield	1000 Mex. 2000 Bar.	1560	2200	1200	360	1010	1250	1040 Sh. 1820 Mex.	1500

APPENDIX 5 (continued)

FARMERS PRACTICES  
FARMERS FIELD VERIFICATION TRIALS  
1977 - 1978

	ZONE (3)	I R R I G A T E D				
	HASSAKEH Karaj Tel Ahmar	RAQQA Tel Abiad	IDLEB Saraqeb	H A M A Zalaqiat	al Maboja	HASSAKEH Ras el Ayn
Farmers Rotation	2 Year Cereal/Fallow	2 Year Cereal/S.C. Dry Cereal/Fallow	3 Year Wheat/Lentils Cotton-Melons	2 Year Wheat/Cotton	2 Year Wheat/Vegt. Dry Barley/Fallow	2 Year Wheat / Cotton
Rotation in Area	S. R.	S. R. Cont Cereal	S. R.	S.R.	S.R. Also Cotton	S. R.
Soil type (1)	66% YL	33% RD	75% RD	RD	25% YL	YL
(2)	33% K	33% BL	25% RD	-	75% K	-
(3)	-	33% W	-	-	-	-
Variety	A Aswad	Mexipak	Siete Cerros	Mexipak	Mexipak	Mexipak
Seed rate	100	108	120	170	130	120
F. Cult., Previous crop	AYAR/RDAD BDCST + DISC PLOUGH	3 IRR. DRILLED	4 IRR. BDCST + AYAR/ RDAD DISC PL.	1 IRR. BDCST + AYAR/ RDAD 2 MLB AFTER HARVST	7 IRR. EDCST + AYAR/ RDAD DISC PL.	6 IRR. DRILL CULT. + TOB. DISC PL. AFTER HARVST.
Cultivation in area	Some do not do Summer Plough	Herbicide	S. R.	Few P <sub>2</sub> O <sub>5</sub>	S. R.	Disc H. Less Fertl.
Fertilizer	W - - S -	W - - S 43 N	W 50 P <sub>2</sub> O <sub>5</sub> - S 66 N	W - - S 130 N	W 115 P <sub>2</sub> O <sub>5</sub> 50 N S 44 N	W 90 P <sub>2</sub> O <sub>5</sub> 33 N S 99 N
Herbicide	-	-	-	Sprayed	-	Sprayed
Harvest	Combine	Combine	Combine	Combine	Hand Harvest	Combine
Yield	800	1620 Dry 770	3164 Dry 1800	3600	4550	5160



## APPENDIX 6

### TWO EXPERIMENTS DESIGNED BY FARMERS (ZONE 1)

#### 1) Fertilizer Rates

4 plots were planted with local Hourani Wheat at a seed rate of 120 kg/ha.

Plot 1)	57.5 kg P <sub>2</sub> O <sub>5</sub>	33 kg N/ha	(8 ha)
2)	40.25 kg P <sub>2</sub> O <sub>5</sub>	-	(8 ha)
3)	-	41.25 kg N/ha	(4 ha)
4)	-	-	(3 ha)

The farmer reported similar yields on all plots, and concluded his local variety showed very little response to fertilizer application.

#### 2) Variety Trial and Drought Resistance

This trial was designed by one of the farmers participating in both 1977/78 and 1978/79 who had kept seed from the first year.

5 varieties were planted, each in five plots, hand preparation and fertilizer rates were the same as for his wheat fields (see Appendix 4).

Four of the five plots on each variety were given six irrigations, and one was given five.

<u>Vriety</u>	<u>Seed sown</u>	<u>Area sq.m.</u>	<u>Yield</u>	<u>kg/ha</u>
G R S	40 kg	4480	1920	4285.7
Dougga	50 kg	5600	3000	5357.1
Stork	50 kg	5600	3240	5785.7
Jezireh 17	50 kg	5600	3000	5357.1
Mexipak	50 kg	5600	2700	4821.4

The farmer felt this confirmed his preference for Stork, which out-yielded the other varieties. In comparing the plots with only five irrigations, GRS, Dougga and Stork appeared about equal in ability to withstand drought. Stork showed less susceptibility than the other varieties. Mexipak and particularly Jezireh 17 were the worst affected.

## APPENDIX 7

### SPECIFIC PROBLEMS ON TRIAL SITES - 1977/78

#### Zone 1

- 1) Two sites in Hassakeh Province -- Um Hoja and Ras al Ayn (dry) had problems with water-logging on the trial. The irrigated trial at Ras al Ayn was considered by the farmer to be on a poorly chosen site and complicated layout which made harvest difficult.
- 2) The trial at Mir Aziz was planted near to a road and edge effects were clearly observed. There was also some damage from a vehicle on the trial.
- 3) The trial at Amuda received extra fertilizer on the side adjacent to the farmer's own crop.
- 4) The trial at Shebanieh (State farm) received double fertilizer.
- 5) The trial at Malak was in poor location, lower than the remainder of the field, and on soil which had been disturbed during road construction.

## APPENDIX 8

### SPECIFIC PROBLEMS ON TRIAL SITES

(Reported by farmers) - 1978/79

#### Zone 1

- 1) Farmers in Afrin, Atareb, Maaret Dibsi and Zerdaneh said they thought the trial had been planted too early -- Kawkabeh (Afrin) had to be resown in November as seedlings died after an early germination and insufficient moisture.
- 2) Bird damage of some varieties was reported at Maaret Dibsi, and the Hegy combine was faulty causing some of the yield to be lost at harvest.
- 3) The results of the trial at Dweir were not included in the yield tabulations as the farmer harvested the trial before the arrival of the ICARDA team, and some mixing and possible loss of varieties in the field was suspected.
- 4) The trial at Sqelbieh was said to have suffered from poor land preparation.
- 5) The trial at Qeirawan received double herbicide. It was sprayed by the ICARDA team, then sprayed later on from the air.
- 6) The farmer at Tel Ayn thought that the spring fertilizer was applied too late in his trial.

Zone 2

- 1) Losses from the combine harvester were reported at Akhtarin.
- 2) Better land preparation was advised at Moubarakeh and Qadiraan (al-Bab) and deeper seeding favoured.
- 3) Some insect damage (unidentified) was reported at Souraan.

Zones 3 & 4

The varieties in the trial at Sabaa Askour matured later than the farmer's own surrounding crop which was harvested, leaving the trial exposed to grazing. The farmer had contacted the local agricultural office to warn them of the problem but they had no authority to harvest the trial and it was subsequently lost.

APPENDIX 9

QUESTIONNAIRE FOR FARMERS INVOLVED IN FIELD VERIFICATION TRIALS:

1977/1978

Governorate: \_\_\_\_\_ Village: \_\_\_\_\_  
Zone: \_\_\_\_\_ Farmer's name: \_\_\_\_\_  
District: \_\_\_\_\_

1) Number of years farming in area: \_\_\_\_\_ 2) Age: \_\_\_\_\_

3) Total family size (incl. farmer and those living with and supported by him):  
\_\_\_\_\_

4) Number of family working on crops this season: \_\_\_\_\_

5) Other occupations (farmer and family members) e.g. livestock, business, other  
employment:

Activity	Location	Time away
_____	_____	from village _____

6) What are the usual rotations he follows according to soil type?

Soil type, colour depth: \_\_\_\_\_

Rotation: \_\_\_\_\_

7) What rotations do most of farmers in area follow, if different to above?  
\_\_\_\_\_

8) Approx. what is the proportion of each soil type in the surrounding area?  
\_\_\_\_\_

9) What proportion of his land is irrigated, if any? \_\_\_\_\_

## 10) Areas of different crops this year 1977/1978:

<u>Crop</u>	<u>Variety</u>	<u>Area</u>	<u>Crop</u>	<u>Variety</u>	<u>Area</u>
Wheat	_____	_____	Barley	_____	_____
Lentils	_____	_____	Fallow	_____	_____
Summer crops	_____	_____	Trees	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

11) Total No. of Plots: \_\_\_\_\_

12) Machinery ownership: Tractor \_\_\_\_\_ Cultivator \_\_\_\_\_ Disc plough \_\_\_\_\_  
 Combine \_\_\_\_\_ Thresher \_\_\_\_\_ Pump \_\_\_\_\_ Lorry \_\_\_\_\_ Other \_\_\_\_\_

13) On field where trial is located. Area: \_\_\_\_\_ Soil type: \_\_\_\_\_  
 Is the field typical of this soil type? \_\_\_\_\_

14) Crop, variety: 1976/1977 \_\_\_\_\_ 1977/1978 \_\_\_\_\_

15)

Operations	Type	Date	Source	Rate/Cost	Comments
Ploughing/76-77					
Cultivation					
77-78					
Seed					
Seed dressing					
Planting					
Fertilizer					
Manure					
Herbicide					
Hand weeding					
Irrigation					
Grazing					
Harvesting					
Post harvest					
Other					



16) Are these the cultural practices he usually follows for cereals? \_\_\_\_\_

Do they vary according to variety or soil type? \_\_\_\_\_

How far are they representative of practices in the area: \_\_\_\_\_

(esp. in land preparation, seed rate, fertilizer rate, herbicide, grazing):  
\_\_\_\_\_

17) What is his estimation of his wheat and barley yields this year according to soil type? \_\_\_\_\_  
\_\_\_\_\_

18) Are his yields this year: 1 2 3 4 5  
V. Good Above average Average Below average Poor  
Wheat \_\_\_\_\_ Barley \_\_\_\_\_ Lentils \_\_\_\_\_ Others \_\_\_\_\_

19) How much wheat and barley does he keep for household and livestock consumption?  
\_\_\_\_\_

20) Trial plot: Is the trial representative of the field, in soil type, depth, fertility and other characteristics? \_\_\_\_\_

Has he any comments on its location, access etc? \_\_\_\_\_

Treatment of trial	Type	Date	Rate	Comments
Land preparation/ planting				
Fertilizer				
Weed control				
Irrigation				
Harvest				

21) Was the trial damaged at any time, e.g. by grazing, vehicles, etc? \_\_\_\_\_  
\_\_\_\_\_

22) What were the main weeds, diseases and pests this year?

On trial plot? \_\_\_\_\_

On adjacent field? \_\_\_\_\_ On other fields/crops \_\_\_\_\_

23) What is his general impression of the varieties grown on the trial?

\_\_\_\_\_

24) How do they compare with his own crops? \_\_\_\_\_

25) Which varieties if any, is he most interested in and why? \_\_\_\_\_

\_\_\_\_\_

26) Does he think that such trials on farmers fields are useful? Why? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### COMMENTS

Has he any specific comments on any of the varieties? e.g. on growth stages, yields, straw quality, lodging.

APPENDIX 10

FIELD VERIFICATION TRIALS 1978/1979

Province: \_\_\_\_\_ District: \_\_\_\_\_ Village: \_\_\_\_\_  
 Rainfall Zone: \_\_\_\_\_ Farmer's name: \_\_\_\_\_

- 1) How many years has he been farming in the area: \_\_\_\_\_
- 2) Total area or holding: \_\_\_\_\_ Type of ownership: \_\_\_\_\_  
 Shared/rented (from others): \_\_\_\_\_
- 3) Age: \_\_\_\_\_ Level of Education: \_\_\_\_\_ Family size: \_\_\_\_\_  
 Labour employed: \_\_\_\_\_ Other occupation and % of income: \_\_\_\_\_

4) Areas and crops 1978/1979

Crop	Variety	Area	Crop	Variety	Area

- 5) Total number of plots: \_\_\_\_\_ Irrigated area: \_\_\_\_\_
- 6) Machinery ownership: \_\_\_\_\_
- 7) Livestock owned: Sheep \_\_\_\_\_ Goats \_\_\_\_\_ Cattle \_\_\_\_\_
- 8) How does he define the main soil types on his land?

	1	2	3	4
Colour				
Depth				
Texture				

9) What are the main soil types in the area, and the per cent of each?

1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_ 4) \_\_\_\_\_

10) What are the usual rotations he follows on each soil type?

	1	2	3	4

11) Do the rotations followed by the farmers in his area differ from the above?

\_\_\_\_\_

12) Have there been any recent changes in the rotation of the area? What are the reasons for change?

\_\_\_\_\_

\_\_\_\_\_

FARMER'S FIELD WHERE TRIAL WAS LOCATED

13) What is the soil type on the field where the trial was located? \_\_\_\_\_

14) How representative is the field where the trial was in terms of soil type, depth, fertility and other characteristics?

\_\_\_\_\_

15) What was the crop: 1976/77 \_\_\_\_\_ 1977/78 \_\_\_\_\_ 1978/79 \_\_\_\_\_

16) For the field where trial was located:

Variety: \_\_\_\_\_ Area: \_\_\_\_\_ Yield: \_\_\_\_\_

	Implement	Date	Source	Cost	Comments
Ploughing 1978					
Cultivation 1					
Cultivation 2					
Cultivation/covering					
Planting method					
	Quantity				
Seed rate					
Seed dressing					
Fertilizer 3 SP					
Mix 3 SP/N					
N					
Manure					
Herbicide					
Hand weeding					
Irrigation					
Harvesting	Method				
Rejad					
Post harvest					

17) Was the crop grazed at any stage of growth? \_\_\_\_\_  
 Date and duration \_\_\_\_\_

18) Are these the practices he usually follows for cereals: \_\_\_\_\_  
 Do they vary according to soil type, variety, rainfall etc? \_\_\_\_\_

19) How far does he thinks his practices -- land preparation, seed rate, variety  
 fertilizer, herbicide, grazing, etc. are typical of the area? \_\_\_\_\_

- 20) Can he estimate for his area: Average seed rates \_\_\_\_\_  
 Average fertilizer rates \_\_\_\_\_  
 % Using herbicide \_\_\_\_\_  
 % Drilling \_\_\_\_\_  
 % Grazing crops before harvest \_\_\_\_\_

- 21) Can he estimate wheat and barley yields in the area, according to soil type?

	1	2	3	4
Wheat				
Barley				

- 22) What was his total wheat production:  
 Amount sold \_\_\_\_\_ Price/kg \_\_\_\_\_ Household \_\_\_\_\_ Seed \_\_\_\_\_
- 23) For how many years has he been growing his present varieties? \_\_\_\_\_  
 \_\_\_\_\_
- 24) From where or whom did he originally get the seed? \_\_\_\_\_  
 \_\_\_\_\_
- 25) Had he seen it growing before he acquired it? \_\_\_\_\_
- 26) From where does he obtain seed now? \_\_\_\_\_
- 27) If he is only planting local varieties, what does he know about newer varieties?  
 \_\_\_\_\_  
 Has he tried them? \_\_\_\_\_ Why didn't he continue \_\_\_\_\_
- 28) Where and who did he first see drilling? \_\_\_\_\_  
 Why did he first decide to try it? \_\_\_\_\_  
 \_\_\_\_\_  
 If he isn't drilling - why didn't he try it? \_\_\_\_\_  
 What are the advantages of drilling? \_\_\_\_\_

29) How and in consultation with whom did he decide on his fertilizer levels?

---

30) Where did he first see herbicide used? 

---

Has he ever tried it? 

---

Why or why not continued? 

---

---

31) For the trial only

Operations	Farmer Operated	Farmer Present	Ministry rep. present	Comments
Land preparation				
Drilling				
Fertilizer application				
Weed control				
Irrigation				
Harvesting & weighing				

32) Were there any problems in connection with the location of the trial? e.g. vehicle damage, grazing, weeds, diseases, pests, flooding, etc? 

---

---

33) How common are they in the area? 

---

34) What is his impression of the varieties in the trial compared to his own? 

---

---

35) How do the cultivations and inputs on the trial, compare to his own practices, esp. seed rate, drilling, fertilizer levels? 

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36) Which variety, if any, did he prefer and for what reasons? 

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37) Has he any suggestions as to how the trial may be made more useful? i.e., to show whether varieties are an improvement on the ones he currently uses and suitable for his area? 

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## APPENDIX 11

TRIAL No. 1      WHEAT VARIETY x FERTILIZER EXPERIMENT.      VILLAGE 1B/05

Location: 1 km from center of Atareb village, 50 m North of Bab al-Hawa road.

Previous crop: Watermelons, 1978

Soil: Deep red cracking clay loam. Stone free

Rainfall: 370 mm average

Treatments:	Crop varieties	a) Bayadi b) Mexipak
	Seed rate	130 kg ha <sup>-1</sup>
	Nitrogen	20, 40, 60 kg ha <sup>-1</sup> N as ammonium nitrate
	Phosphate	30, 60 kg ha <sup>-1</sup> P <sub>2</sub> O <sub>5</sub> as Triple phosphate
	Control	No fertilizer

Design: Randomized block factorial with three replications  
Variety confounded with blocks

$$(((3 \times 2) + 1)2)3 = 42 \text{ plots}$$

Plot size: 3 m x 10 m = 1/333 ha

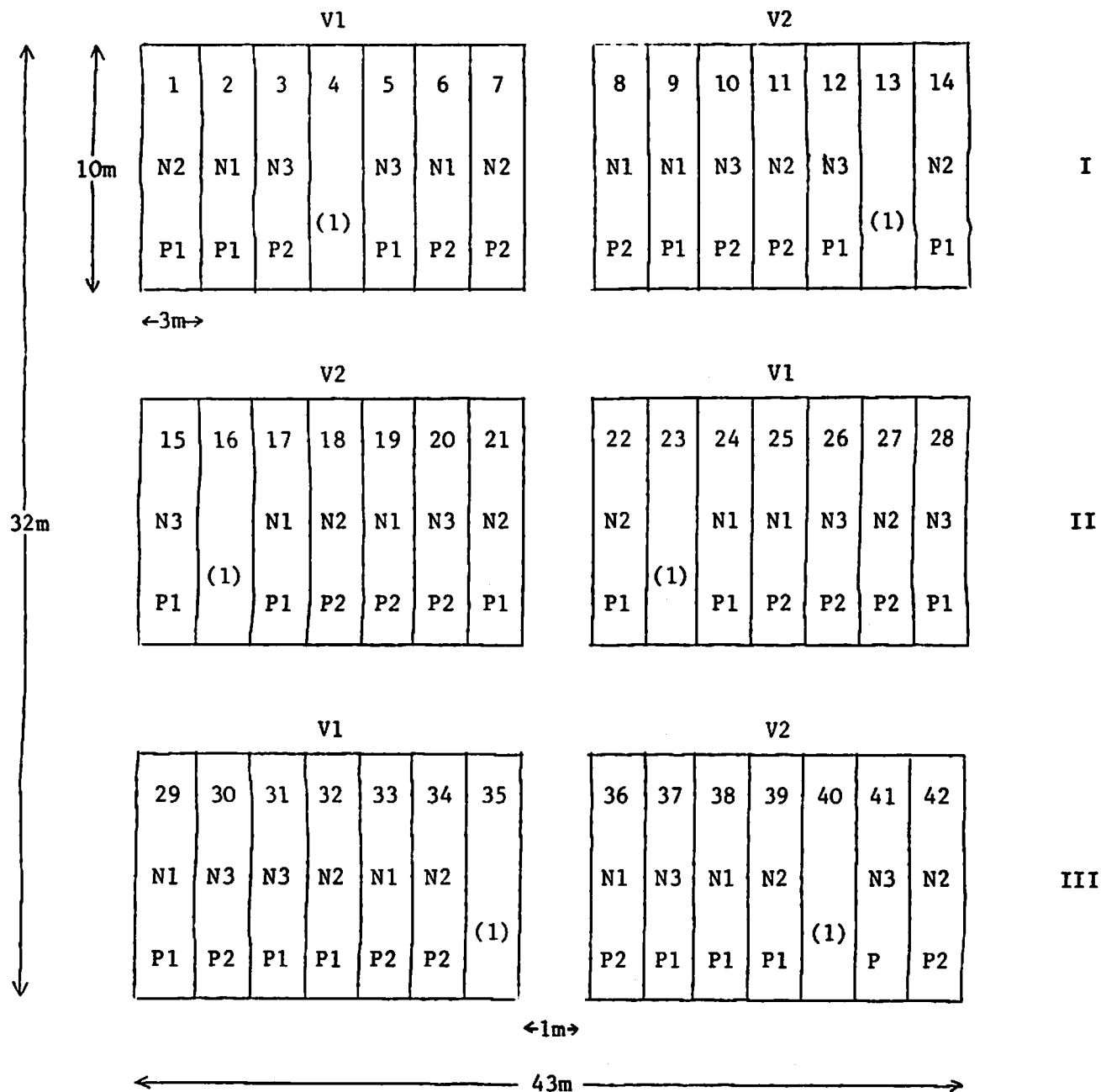
Total land area: 32 x 43 m = 1376 m<sup>2</sup>

Methods:

- 1) Land prepared by feddan after melons, second cultivation was Ayar, soil sampled -- all plots.
- 2) Plots marked out and fertilizer applied November 8th, 1978.
- 3) Covering (Rdad) by feddan November 9th, 1978.
- 4) Records and observations -- emergence, growth rate, vigour, colour, flowering, maturity.
- 5) Comments from farmer and neighbours.
- 6) Harvest June 3rd and 4th -- 4 people.
- 7) Analysis and summary of results.

## FIELD PLAN - FS/FFT/1/78

Replicates

N1 = 20 kg ha<sup>-1</sup> NN2 = 40 kg ha<sup>-1</sup> NN3 = 60 kg ha<sup>-1</sup> N

(1) = Control (no fertilizer)

P1 = 30 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>P2 = 60 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>

V1 = Bayadi wheat

V2 = Mexipak wheat

TRIAL No. 1      PLOT WEIGHTS - TOTAL AND GRAIN (kg plot<sup>-1</sup>)

Replicates Treatment	I		II		III		Mean	
	Total	Grain	Total	Grain	Total	Grain	Total	Grain
V1 (1)	25.8	8.3	23.3	7.7	24.3	8.9	24.4	8.3
N1 P1	26.3	8.7	26.3	9.2	28.0	9.3	26.8	9.1
N1 P2	32.0	8.7	28.0	8.6	30.3	10.4	30.1	9.2
N2 P1	28.8	9.1	29.0	9.6	30.5	10.2	29.4	9.6
N2 P2	28.8	9.9	29.5	10.2	29.8	10.2	29.3	10.1
N3 P1	29.8	10.2	24.5	8.4	27.3	8.9	27.2	9.2
N3 P2	28.8	8.5	30.3	9.8	27.5	9.3	28.8	9.2
V2 (1)	23.8	7.9	14.8	5.4	17.3	6.4	18.6	6.6
N1 P1	28.8	10.2	25.3	9.3	24.3	9.4	26.1	9.6
N1 P2	29.0	9.8	25.5	8.8	25.8	8.6	26.8	9.1
N2 P1	25.5	8.2	27.3	9.8	22.8	7.6	25.2	8.5
N2 P2	32.0	10.2	30.8	11.3	23.8	6.4	28.8	9.3
N3 P1	28.5	9.5	24.5	9.0	23.5	9.1	25.5	9.2
N3 P2	29.8	9.8	29.0	8.2	27.3	9.5	28.7	9.2

## APPENDIX 12

### TRIAL No. 2

#### TIMING AND RATE OF FERTILIZER APPLICATION TO WHEAT. VILLAGE 1A/13

Location: 200 m due south of edge of village on south slope (2%)  
Previous crop: 1978 chickpea - 1976/77 wheat  
Soil: Deep dark red brown cracking clay, very few stones  
Rainfall: 470 mm average  
Treatments: Wheat : Local variety

<u>Fertilizer</u>	<u>Rate Applied (kg ha<sup>-1</sup>)</u>
No nitrogen	0
Low N Autumn	25
Low N Spring	25
High N Autumn	75
High N 1/3 Aut. 2/3 Spring	75
High N 2/3 Aut. 1/3 Spring	75

Basal dressing of Phosphate 60 kg ha<sup>-1</sup>

Design: Randomised block C with four replicates

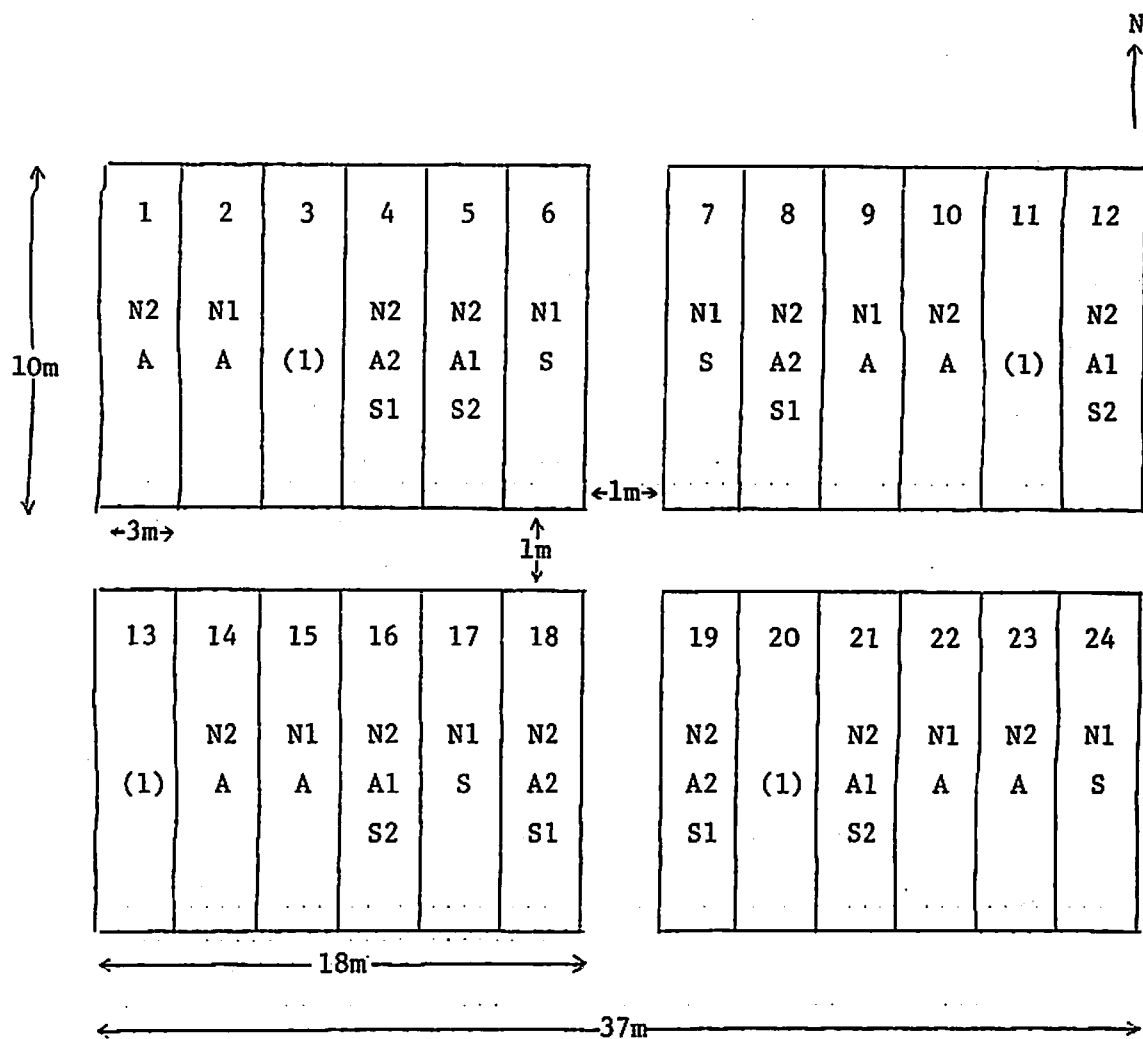
Plot size: 10 x 3 = 30 m<sup>2</sup>

Experiment size: 37 m x 21 m

Methods:

- 1) Land prepared by mould board plough (after chickpea).
- 2) Plots marked out and first treatments applied November.
- 3) Seed and fertilizer covered with mould board plough.
- 4) Soil samples taken from plots' area.
- 5) Observation of growth.
- 6) June, whole area combined by contractor.

TRIAL No. 2      FIELD PLAN - VILLAGE 1A/13 - 1978/79



		Rate (kg N ha <sup>-1</sup> )
Key: No Nitrogen	- (1)	0
Low Aut. Nitrogen	- N1 A	25
Low Sp. Nitrogen	- N1 S	25
High Aut. Nitrogen	- N2 A	75
High Nitrogen 1/3 Aut. 2/3 Sp.	- N2 A1 S2	75
High Nitrogen 2/3 Aut. 1/3 Sp.	- N2 A2 S1	75
Basal P level - 60 kg P <sub>2</sub> O <sub>5</sub> ha <sup>-1</sup>		

## APPENDIX 13

TRIAL No. 3      CHICKPEA: SEED DRESSING x N. FERTILIZER - 1979

**Location:** 500 m south of edge of village 1A/13. East facing slope  
(2%)

Previous crop: Wheat 1977/1978

Soil: Deep red cracking clay, stone free

**Rainfall:** 470 mm average

Treatments: (A) Fertilizer

- 1) No fertilizer
- 2) 17 kg N ha<sup>-1</sup> as ammonium nitrate
- 3) 33.5 kg N ha<sup>-1</sup> as ammonium nitrate

(B) Seed treatment

- 1) None
- 2) Carufuran

**Design:** Simple randomised block with seed treatment confined to blocks. Two replications

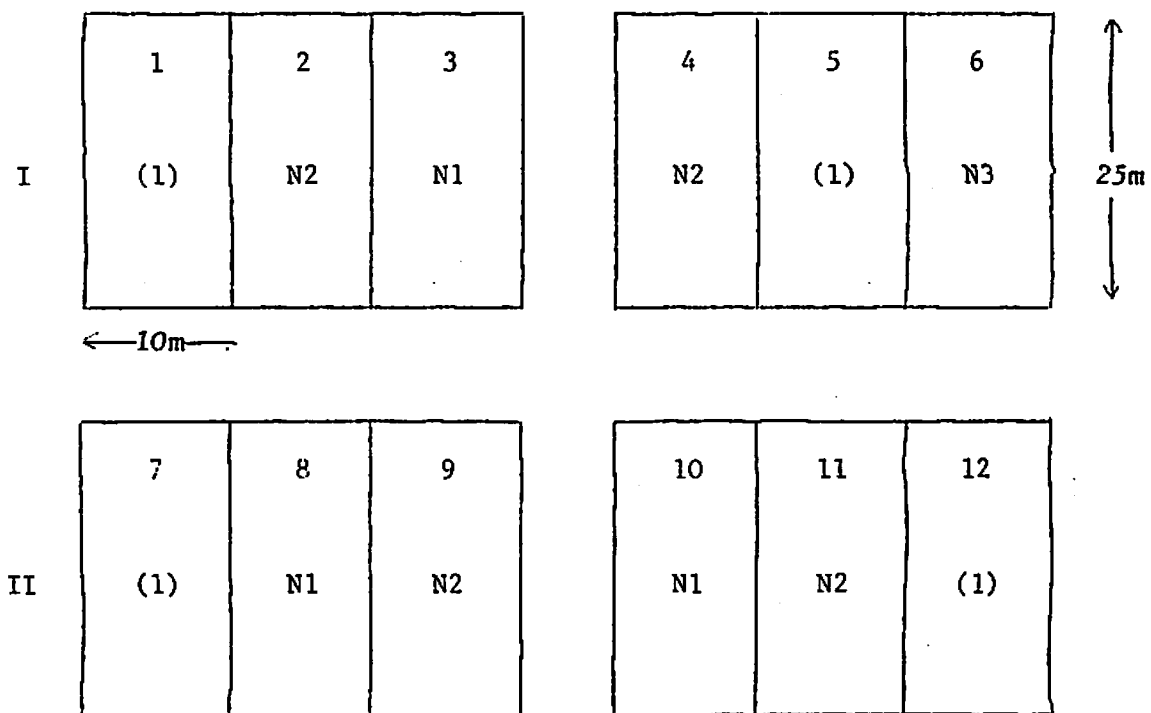
$$((3 \times 2))^2 = 12 \text{ plots}$$

Plot size: 10 m x 25 m      Experimental area: 60 m x 60 m

Methods:

- 1) Land prepared with cultivator and tractor (Ayar).
- 2) Plots marked out treatment applied, seed sown (10.3.79).
- 3) Seed and fertilizer covered with cultivator (Rdad).
- 4) Observation and emergence and early growth.
- 5) Plots all harvested June 20th.

TRIAL No. 3      FIELD PLAN - VILLAGE 1A/13 - 1979



Seed treatment applied to plots 1, 2, 3 and 10, 11, 12.

→ N



## APPENDIX 14

### DEFINITIONS OF LOCATIONS USED IN EXPERIMENTAL RESEARCH PROGRAMS

- Main Research Station: Principal field research station for center  
e.g. Tel Hadya - Main lowland research site.
- Sub-Station: Stations associated with main low or high  
altitude station, e.g. Terbol, Ferdan, Shauback.
- Sub-Site: Piece of land controlled principally by research  
scientist or extension staff. Inputs and all  
operations carried out by research staff. e.g.  
SWAN sites, Aleppo Province.
- On-Farm: Piece of land on trial controlled principally  
by farmer or jointly by farmer and research  
worker and/or extension worker.

#### N.B.

By these definitions the current trials presently carried out by the Commodity programs on farmers lands can be regarded as sub-sites.

It would seem to be important to regard an on-farm trial strictly as one in which the prevailing conditions of land and crop management are important elements within the investigation.