FARMERS' PERCEIVED PROBLEMS IN AGRICULTURAL PRODUCTION IN THE EASTERN MARGIN OF CENTRAL ANATOLIA

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ABSTRACT

Farmers perceptions on problems in developing small-scale farming is crucial. The grain yields of major crop in the Eastern Margin of Central Anatolia (EMCA) are substantially less then in other areas in the Anatolian highlands. The challenge of agricultural researchers is, therefore, an adequate diagnosis of the present production conditions, understanding how farmers themselves understand their marketing problems, and how they set their production priorities. The farming community is dominated by small farmers comprising 42.5 percent of the total sample size. Farmers, although their production practices are not as recommended, concern mainly about their inputs being expensive and outputs being cheap along with abiotic and biotic stresses.

RÉSUMÉ

La perception des problèmes de l'agriculture sur petite échelle dans les pays in voie de développement de la part des agriculteurs est d'une importance cruciale. Le rendement en grains des pricincipales cultures de la Marge Orientale de l'Afrique Centrale (Eastern Margin of Central Africa (Emca) est bien inférieur qu'en d'autres régions des hauts plateaux de l'Anatoile. C'est, donc, aux chercheurs agricoles la tâche de faire un diagnostic adéquat des conditions de production actuelles, en essayant de comprendre la perception des agriculteurs vis-à-vis des problèmes de commercialisation et de la fixation des priorités de production. La communauté agricole est dominée par de petits agriculteurs qui représentent 42,5% de la taille de l'echantillon total.

Les agriculteurs, dont les pratiques de production ne correspondent pas à celles recommandées, se plaignent surtout du coût élevé des entrants et du faible prix des productions ainsi que des effets du stress biotique et abiotique.

Turkey has shown a significant increase in crop production since the establishment of the Republic in 1923, mainly as a result of rapid mechanisation and development of high yielding varieties with improved agronomic techniques.

Now the major objective of the Turkish government in agricultural sector is to further modernise and disseminate improved production techniques to raise productivity, production, and farmers' income. Accordingly, the Government has taken measures to strengthen agricultural research.

However, the National Agricultural Research System (NARS) has, thus far, focused largely on the biological aspects of production, and only a little attention has been paid to the socio-economic situation of farm families.

The Central Research Institute for Field Crops (CRIFC) of the Ministry of Agriculture and Rural Affairs of the Turkish Government (MARA) and International Center for Agricultural Research in the Dry Areas (ICARDA) jointly started an interdisciplinary collaborative research project in 1991 with the objective of determining agricultural structures and constraints to increased production in the highland areas of Kayseri and Sivas provinces.

These two provinces are located at the Eastern Margin of Central Anatolia (EMCA) at an elevation of over 1200 meters. The population of Kayseri (772,200) and Sivas (864,000) is overwhelmingly rural and most of the people are engaged in small-scale agricultural enterprises (SIS, 1991).

In comparison to other parts of Turkey, these two provinces contain a disproportionately large percentage of disadvantaged farmers, and crop yields are substantially less then those of the other western provinces in Central Anatolia (CA).

These two provinces have a combined surface area of 4,540,516 ha – Sivas with 2,848,767 ha and Kayseri with 1,691,749 ha (TOPRAK SU, 1984; KHGM, 1985).

Approximately 40 percent of the total land in these two provinces is arable. The topography is dominated by mountain ridges interspersed with valleys of varying degrees of slope and width. It is in the valley and long plateau (*Uzun Yayla*) area where agriculture, especially cereal production, is principally practiced. The annually sown areas of Sivas and Kayseri are 1,191,735 ha and 788,146 ha, respectively. Dry farming systems are predominant, and irrigation is restricted to small areas along the rivers and banks (ANONYMOUS, 1990 and 1991).

In the past, most research activities have been selected and conducted in a "top-down" manner, with little consideration for the indigenous knowledge of the farmers or of the economic and social environment that they inhabit in. For example, no research has been conducted in eastern Turkey on the subject of whether or not the newly developed technologies for western Turkey are compatible with the farmer technologies used in eastern Turkey. In addition, it is not yet known if farmers have the knowledge, and skills to apply these new

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technologies and, whether or not the inputs associated with the new technologies are available to potential users in eastern Turkey.

The said target area was selected because the gap between farmers potential yield appears to be large, and farmer's yields are low when compared with the national and the Central Anatolian average levels (Mizrak et al., 1986). Substantial progress has been made through farmer adoption of improved technological packages in Central and Western Anatolia. However, despite this program's efforts, there has been little progress in the less researched areas of eastern Anatolia (Keatinge, 1993). The present study was therefore directed specifically to answering the question of "how farmers in the Eastern Margin of Central Anatolia (EMCA) see their agricultural production problems, and why they have not adopted improved technologies which have been widely accepted by the farmers in what appears to be agro-ecologically similar areas in central and western Anatolia".

The challenge therefore, to agricultural researchers and policy makers is to discover why farmers in Kayseri and Sivas have not achieved the yield gains experienced in the past decade in other areas in the Anatolian highlands. The first step towards meeting this challenge is therefore an adequate diagnosis of the present production conditions and problems perceived by farmers in Kayseri and Sivas provinces which is a principal objective of this research study.

The development objective of the study was to increase average grain yields of wheat, barley, chickpea, and lentil in Kayseri and Sivas provinces to national average levels. It is assumed that this goal will be achieved ultimately by increasing the adoption rate of the recommended production packages among the farmers of the two provinces. However, increased adoption is best achieved through a careful characterisation of the farming system and targeting farmers appropriately within recommendation domains. This requires an adequate understanding of how farmers themselves understand their production problems, how they set their production priorities, and how they decide to adopt or not to adopt recommended changes in their production practices.

The immediate objectives of the study were to (a) identify the demographic and economic characteristics of farm households in selected villages of Kayseri and Sivas provinces which are representative of the harsh environmental conditions experienced in the *Uzun Yayla area*, (b) describe, based upon production practices and yield levels, the agricultural structure of the farms, including current technologies employed, and preferred practices within specific agro-ecological and socio-economic contexts as the results of indigenous knowledge, (c) determine production problems perceived by farmers, including their prioritization of agricultural needs, (d) make recommendations for appropriately targeting technology transfer by specific agricultural research institutes and departments of the Ministry of Agriculture and Rural Affairs.

Methodology

The study focused on farm-level data collection and analysis including objective, qualitative data concerning the socio-economic structure of the households and farms, farm parameters, enterprise patterns, production practices, technical production problems, marketing and consumption patterns. By considering the characteristics of the target population, both quantitative and qualitative open-ended questions were used to gather such data from the farmers.

Qualitative data collection began with the selection of a sub-sample of farmers participating in the survey. This subset was examined intensively, with data being collected using the participant observation technique. Qualitative information obtained in this way has been used to interpret the quantitative results.

A total of 62 randomly selected villages (35 in the informal survey and 27 in the formal survey) were visited, and a total of 207 farmers was interviewed. The study area and its population appear to be largely homogenous in terms of climate, soil type, crop pattern, cultivation practices, family composition, institutional support, family size, land tenure, capital assets and existing technology.

Likert Scales

In order to quantify and measure qualities including attitudes, values, and other characteristics, it was necessary to use a scale. The Likert Scale which has been one of the most widely and successfully used to measure attitudes (Ary et al., 1985). This method was selected to get farmer perceptions on a range of problems besides their difficulties with expensive inputs.

This scale assesses attitudes towards a topic by asking respondents to indicate how important the problem listed was on a five-point (1-5) scale, where 1 indicates insignificant importance and 5 indicates substantial problem importance. Problems receiving a rating of 4 were considered most dominant. In order to score the scale, the response categories (five-point scale) were weighted. An item analysis was also done to identify the number and/or percentage of respondents for each problem listed, item mean, and standard deviation. Farmers surveyed were grouped into four categories according to land holding size and subsequent analyses were carried out between and across these categories.

Results and discussion

Characterisation of farm households

Farmers surveyed were grouped into four categories ac-

cording to land holdings (**table 1**). The data in the table indicate the preponderance of small farmers in the area.

The land distribution among the groups is also widely varied. While 6.3 per cent of the farmers owned 2 per cent of the land, 42.5 per cent of the farmers owned only 13.7 per cent of the total cultivated land.

Table 1 ***Farm size groups.***

Farm Size Groups	Land Holdings	Number of Household	% of Total Land Area	% of Human Population
Small	1-10	88	13.7	42.5
Medium	10-25	67	26.7	32.4
Large	25-50	39	34.6	18.8
Very Large	50 +	13	25.0	6.3

Farm sizes varied widely ranging from 1 to 140 ha with an average of 20.5 ha. Seventy-three percent of the cultivated land is owned by the operating farmers. The average farm size varied between groups. The average number of plots per farm was 13 with an average plot size of 1.6 ha.

The age of farmers surveyed ranged from 27 to 55 with and average of 50. Family size ranged from 2 to 28 members with an average of 6.5 persons / family. The average man power unit (MPU) available per farm was 3.8, and the total number potential days of labor per farm were 826 a year.

However, only 37 percent of these MPU were employed in on-farm activities. Some farmers were also involved temporarily in off-farm work.

Farm buildings consisted of houses and animal barns. The average size of houses and animal holding capacity of barns were 55 m2, 15 cattle, and 91 sheep, respectively. On an average, 52 percent of all farmers owned tractors. However, there were only 21 seed drills and 21 combine harvesters owned by the surveyed group. In economic terms a tractor should be able to cultivate 80 ha of land a year.

In the farms surveyed the average amount of land cultivated per tractor was 39.5 ha. Most farmers owned standard domestic appliances found in an urban context.

A wide variety of crops are grown in the region. However, annual cropping is overwhelmingly devoted to cereals which constitutes 82 percent of the cropped land. Fallow land constitutes an additional 37.5 percent of the cultivated area. In the smallest farm size group, 2.8 ha of land was devoted to wheat whilst in the largest group 30.3 ha of land was devoted to wheat. The average area of sown land in the smallest farm size group was 4.7 ha whilst in the largest group it was 44.4 ha. The average yield of crops is well below the national level except for barley.

Although animal production is important in the farming system of the region the average number of livestock was less than expected, but numbers increased as farm size increased.

Wheat is the most important crop in the region. Small farmers produce wheat mainly for their own home consumption. Forty-two percent of the wheat produced was sold, and 14 percent was retained for seed. Barley and rye were mostly fed to animals. Lentil and chickpea are produced primarily for cash sales. Almost all dairy production was consumed within farm households. The annual wheat consumption is 266 kg per person.

Of the 207 farmers surveyed, 105 sold wheat, and the market share of larger farms was also substantial. The Turkish Grain Board (TMO) was the purchaser for most crops. TMO bought 79 percent of all wheat. Very few farmers sold livestock.

Turkish Agricultural Credit Cooperatives (TACC) are the primary sources of credit. In addition, farmers also borrow money from Agricultural Bank (AB) and specific individuals.

Abiotic and biotic constraints to increased agricultural production

The central theme of this study was to identify the constraints to potential increases in production in the EMCA. Variability in rainfall and low temperature largely influence the variability in potential growing season length which is one of the most important factor determining productivity.

Poor agronomic management was another major constraint for limiting increased yields. The most common factors in this were inadequate tillage and seed bed preparation, inappropriate seed rates and late planting, inappropriate fertiliser application, use of low yielding poorly adapted varieties, and insufficient control of weeds, insects, and fungal diseases.

Varietal adaptation is an important issue. Kose 220/39, a very old variety, still accounts for 52 percent of the wheat sown area. Newly released varieties are not easily available to farmers.

Seed rates ranged from 150 to 360 kg/ha. Fertiliser use also varied considerably. Nitrogen use ranged from 22 to 98.8 kg/ha, and phosphorous use ranged from 23 to 119.6 kg/ha. For sowing, both seed drills and hand broadcasting methods were used, and harvesting was done both by combine harvester and hand harvesting.

Legumes are a part of agricultural production system. Lentil and chickpea are viewed principally as cash crops. However, farmers use minimum input in their production. Poor agronomic management is a primary cause of low yields.

The most common crop rotation is a two-course cereal-fallow sequence accounting 88.5 for percent of the total cultivated land. In a two-year crop sequence legumes

are grown after cereals in the place of fallow.

Although livestock in the region plays an important role in the farming system of the region a small share of agricultural income is from animal and animal production. Livestock production appears to be not well integrated with crop production and not given adequate priority by farmers. Feed shortages are an important problem. Generally natural pastures are used for the grazing of animals. The carrying capacity of grazing land has been reduced considerably in the recent years. In addition, the physical condition of the barns is not conducive to good management practices, and farmers tend to manage even their pedigree cattle as they manage the native stock.

Table 2 ***Farmers' response to problems related to input use in agricultural production in Sivas and Kayseri provinces in the EMCA.***

Input	Number of Respondees	%	Mean score 1/	Standard Deviation
Credit				
High rate of interest	178	86	4.7	0.5
Unavailable when needed	172	83	3.4	1.4
Bureaucracy	167	81	3.3	1.4
Fertiliser Use				
Expensive	207	100	4.5	0.7
Lack of knowledge for effective use	207	100	2.9	1.2
Unavailable when needed	207	100	2.6	1.5
Bad quality	163	79	1.9	1.1
Chemicals				
Expensive	177	86	4.0	1.1
Lack of knowledge for effective use	166	81	2.3	1.2
Bad quality	141	68	1.9	1.2
Unavailable when needed	173	83	1.8	1.2
Seed				
Expensive	159	77	4.1	1.1
Unavailable when needed	154	74	2.8	1.4
Lack of knowledge for effective use	149	71	2.5	1.3
Bad quality	131	63	2.4	1.3
Machinery and equipment (M+E)				
Repair and maintenance	149	74	4.2	1.5
Expensive	73	35	3.8	1.5
Inadequate M+E	136	65	3.4	1.5
Lack of knowledge for effective use	87	42	2.5	1.5
Irrigation				
Inadequate access channels	79	38	3.7	1.5
Expensive water	66	32	3.7	1.5
Lack of knowledge for effective use	63	30	2.9	1.3
Bad quality water	60	29	1.7	1.3

1/ Based on a 1-5 rating scale where 1 indicates insignificant importance and 5 a substantial importance of a problem.

Prioritised problems to agricultural production perceived by farmers

The most dominant problems experienced by were high interest rates on credit, high cost of fertilisers, seed and other agricultural chemicals, and the repair and maintenance costs of farm machinery (**table 2**).

Farmers mainly concerned about economic problems. They considered that their only and most important problem was the input and output prices, the former being expensive and the latter being cheaper. In this context, they considered the cost of credit, fertiliser, chemicals, improved seed, and machinery and maintenance as expensive and perceived them as important problems to agricultural production.

Farmers did not pay much attention to the effective use of inputs and production practices as indicated by an average score of less than 2.9 for the lack of knowledge for effective use of inputs, a score close to below the mid-point of the scale. This indicated that lack of knowledge was not a serious problems for farmers from their point of view.

Farmers' response to marketing problems for four product categories (cereals, legumes, livestock, and dairy products) is presented in **table 3**. Low producer prices were the first farmer concern in marketing in marketing of their produce with a mean value of 4.2 for cereals, 4.1 for legumes, 3 for livestock, and 3.3 for dairy products.

Other problems had a mean value of less than the point of 3. Farmers did not indicate any additional substantial problem.

Informants response to rank problems related to biotic and abiotic stresses to agricultural production is presented in **table 4**.

According to farmer perceptions, factors limiting to agricultural production as indicated by a mean score of 4.3 out of a maximum score of 5. These important factors in descending order as perceived by farmers are cold and long winters, drought, hot summer winds during cereal anthesis, inadequate rainfall and occasional hails (**table 5**).

Salinity is considered the least important factor.

Among the biotic stresses, weeds and diseases were the second most important problems by a mean score of 3.6 farmers faced.

Biotic stresses of diseases, weeds, and pests that limit crop production in EMCA were further examined. These factors were further elaborated in each group (**table 6**).

Farmers felt that the economically most important disease limiting crop production was yellow rust in wheat as considered by 87 percent of the.

The second most important disease considered was

Table 3 ***Farmers' response to problems related to marketing of agricultural production in Kayseri and Sivas provinces in EMCA of Turkey.***

	Number of Respondees	%	Mean score 1/ Deviation	Standard
Cereals				
Low Producer Price	156	75	4.2	1.1
Transportation	145	70	2.3	1.3
Buyer	147	71	2.2	1.3
Legumes				
Low Producer Price	65	32	4.1	0.9
Buyer	66	32	2.3	1.3
Transportation	62	30	2.2	1.3
Livestock				
Low Producer Price	116	56	3.0	1.2
Buyer	115	56	1.9	1.2
Transportation	110	53	1.9	1.2
Dairy Products				
Low Producer Price	47	22	3.3	1.2
Buyer	51	2 5	2.6	1.5
Transportation	50	25	2.3	1.3

1/ Based on a 1-5 rating scale where 1 indicates insignificant importance and 5 a substantial importance of a problem.

Table 4 ***Farmers' response to biotic and abiotic stresses as problems to agricultural production in Kayseri and Sivas provinces of EMCA of Turkey.***

Problem	Number of Respondees	%	Mean score 1/	Standard Deviation
Climatic Factors	160	77	4.3	1.0
Weeds	197	95	3.6	1.1
Diseases	199	96	3.6	1.1
Pests	187	90	2.7	1.3

1/ Based on a 1-5 rating scale where 1 indicates insignificant importance and 5 a substantial importance of a problem.

Table 5 ***Farmers' response on the importance of abiotic stresses as problems to agricultural production in Kayseri and Sivas Provinces of EMCA of Turkey.***

Climate	Number of Respondees	%
Cold	189	91
Drought	178	86
Hot Wind	92	44
Hail	57	28
Salinity	48	9

common bunt followed by smut.
The farmers considered that a substantial amount (20 to 30 %) of yield was lost because of the high density of some of weed types.
Weed grass were considered by farmers as the most important weed closely followed by *Circium arvense and mustard* Among pests, rodents were considered as the most important followed by sunni bug and sting bug.
However, farmers felt that insects did not cause much of a reduction in crop yield.

Conclusions

It seems evident that a knowledge gap exists between farmers and the advisory community (researchers and extension service agents).

Farmers perceive their problem somewhat differently than what they actually are.
They consider high costs of agricultural inputs and lower price for their produce as the most important problems in agricultural production.
Contrarily, updated knowledge for their effective use of inputs is not considered as very important constraint to agricultural production.
However, farmers consider agro-ecological factors as important along with weeds and diseases.
Conventional approach to develop small-farm household systems on a sustainable bases has so far followed "Top down" approach which is formulated with little or no consultation at the farm level and without determining existing constraints and development potential.
Therefore, currently a big gap exists between what is known, what can be done, and what is actually practiced by the farmers.
There is a need to modify the recommended practices and then demonstrate them to farmers to gain their acceptance.
Fertiliser responses and suitable rates for seasonally variable rainfall need to be better determined.
Thus an important requirement is for extensive and carefully planned field experimentation in a multi-disciplinary framework.
The design and results of a new basic discipline-orient-

Table 6 ***Importance of biotic stresses in crop production as per conception of Kayseri and Sivas provinces of EMCA of Turkey.***

	Number of Respondees	%
Disease		
Yellow rust	180	87
Common bunt	135	65
Smut	107	52
Anthracnose	49	24
Brown rust	37	18
Weeds		
Grass weed	109	53
Circium arvense	105	51
Mustard	98	47
Turgenium spp.	79	38
Sinapis spp.	77	37
Wheat grasses	57	28
Pests		
Rodents	57	28
Sunni bug	39	19
Sting bug	35	17
Wheat scarab	20	10

ed research program should be integrated into practical interdisciplinary efforts to understand agricultural systems and to actively solve existing production problems.
Also there is a need for an integrated effort among all disciplines and government agencies to make since efforts remove constraints to agricultural production that now exist.
This calls for an effective systems approach (a system that includes farmers, researchers and extension service agents) to resolve this production gap problem.
No matter what measures are taken by researchers and extension services, small-scale farming will not be adequately developed unless some strict policy measures are adopted with regard to price stabilisation, marketing, credit, input supply, and land reform.
At least economic constraints should be removed as the forefront of the problems to agricultural production. The region offers a challenge to all concerned with income in agricultural production. ●

BIBLIOGRAPHY

Anonymous (1990) - Inventory Report of Kayseri Province, Kayseri Il Mudurlugu, Kayseri p. 88.

Anonymous 1991. Five Year Agricultural Development Plan of Sivas Province, Sivas Il Mudurlugu, Sivas. p.111.

Ary D., Jacobs L.C., and Razaviek A. (1985.) - Introduction to Research in Education. Third Edition. Holt, CBS College Publishing, New York. p. 449

Keatinge J.D.H. (1993) - Agricultural Change in Turkey 1947-87: A Suitable Example for Sustainable and Equitable Development in Dryland Agriculture for West Asia and North Africa? Agriculture, Ecosystems and Environment. 2. 19-23.

Mizrak G., Durutan N., Atli A. Dutlu. C. and Bostanci V. (1986) - Summary of Wheat Research Activities in Turkiye. Central Research Institute for Field Crops Ankara p. 35.

SIS (1991) - Census of Population (1990) - Administrative Division. Turkish Republic Prime Ministry, State Institute of Statistic. No: 1457. Ankara. p. 648.

Toprak Su (1984) - Productivity Inventory and Fertilizer Requirement of Kayseri Province, Ministry of Agriculture. No:28. Ankara. p. 49.

KHGM, (1985) - Productivity Inventory and Fertiliser Requirement of Sivas Province Ministry of Agriculture, General Directorate of Rural Services. No:38. Ankara. p. 65.

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