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**GENDER RELATED ASPECTS OF AGRICULTURAL
LABOR IN NORTHWESTERN SYRIA**

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by

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ABSTRACT

In rural Syria, men and women work in agriculture, mostly in small farms. Mechanization of some tasks, new opportunities for off-farm employment, and the increase of skilled rural jobs have affected the division of labor between men and women and between household and hired labor.

This paper draws on a survey of 47 landowning households in four villages of Aleppo Province, Syria, supplemented by visits to villages supplying labor. The labor market and opportunities for men and women are discussed. Various factors are evaluated for their effect on the choices to use male or female, household or hired labor in crop and livestock production.

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INTRODUCTION

It is well known that technological change is an essential part of economic and social development (Cain, 1981). It is also clear that technological change can have far-reaching effects on rural communities. Therefore, policy makers, donors and agricultural research centers are giving greater attention to socioeconomic factors in the design and extension of new technologies. Of particular interest to this workshop are gender-related issues.

New technologies may shift the sexual division of labor, increasing men's or women's work loads, sometimes with adverse effects. They may also affect the balance of opportunities and access to economic resources. One common pattern is for the mechanization of tillage to reduce men's labor, since tillage is often a male task. However, improved tillage or increased crop area may lead to more crop production, which increases post-harvest, female tasks (Spence and Byerlee, 1976; Nyanteng, 1985).

On the other hand, where new technology reduces women's labor, this may also have adverse effects if poor women depend on the income from agricultural labor. In Java the introduction of

rice mills is said to have replaced 12 million female work hours (ILO, 1981), while herbicide use in Kenya has eliminated weeding as a job opportunity for some rural women (UNGA, 1978).

Hand in hand with technological change, a second major factor affecting many rural populations is the development of off-farm income opportunities. These are usually in urban areas and often most available to males. Off-farm incomes can stabilize household incomes and offset declining farm sizes; however, the absence of adult males may increase the labor burden of women, children, and old persons (Dasgupta, 1977; Nash, 1983; Tully, 1984). Paradoxically, men's migration may reduce household women's and children's labor if non-agricultural income satisfies household needs. They may be replaced by hired labor if it is available, or else a general labor shortage may develop. For example, agricultural decline in Oman and Yemen has been related to extensive labor migration (Birks and Sinclair, 1980).

Thus, data on the division of labor and income-generating activities are becoming increasingly important in farming systems research. Labor issues need to be assessed, since they may limit the adoption and diffusion of technological change (Somel and Aricanli, 1983). Studies by ICARDA's Farming Systems Program have addressed gender-related issues (Nour, 1985). Gender issues will also be considered in a new project on mechanization and labor constraints in the Middle-East and North Africa, which will

be conducted in collaboration with national research organizations. The results are expected to have implications for research design, organization and priorities.

AGRICULTURAL CHARACTERISTICS OF SYRIA

Syria is among those Middle Eastern countries where agriculture is a major factor in the national economy. It is a rich country with regard to its land and water resources. Fundamental changes have occurred in the last thirty years, both in technique and in the organization of production. New technologies were rather quickly adopted in Syria. For example, land preparation is almost completely done by tractor today and an increasing percentage of harvesting, particularly of cereals, is being mechanized. When cereal is hand harvested, virtually all is threshed by standing mechanical threshers, rather than the animal-drawn sled formerly used. Herbicides are used by the majority of wheat farmers in wetter areas, and seed drills have replaced broadcasting to some extent.

The organization of production has also changed tremendously with the Agrarian Reform of the 1960s. Land was distributed in a more equitable way to increase the number of small holdings. Currently, three quarters of the holdings are less than 10 hectares, 24 percent of farms are from 10 to 100 hectares, and fewer than 1 percent are more than 100 hectares (FAO, 1982). As part of the reform, cooperatives and credit facilities were

organized to give farmers access to inputs and new technologies.

Although farms are small, agricultural production has shown remarkable progress in recent decades. Agriculture's contribution to GDP grew at a respectable 4.4% rate in the 1960s and at 7.2% in the 1970s. Syria also increased its food production per capita by 68% during the 1970s, while most Middle Eastern countries have been unable to increase food production at the rate of population increase. However, the industrial sector and oil production have grown faster than the agriculture sector, resulting in a decrease of agriculture's relative importance in the national economy. The percentage of the labor force in agriculture dropped from 53 percent in 1965 to 33 percent in 1983. The contribution of agriculture to GDP decreased from 29 percent to 19 percent from 1965 to 1981 (World Bank, 1985).

Overall, rural development with the increase of agricultural production, industrial labor demand (off-farm employment) and the extension of new technology have affected the division of labor between men and women and between household and hired labor. This has also led, as will be shown later on, to a predominance of women in the unskilled rural labor force while most of skilled jobs within or outside rural areas are dominated by men.

METHOD OF THE STUDY

This paper draws on a survey of 47 landowning households in four villages of Aleppo Province in Syria, supplemented by visits and interviews to major labor supplying villages.

Data were collected on farm labor for the production of crops and livestock for the 1982/83 cropping season. Twelve households were randomly selected from each of four villages located in Northwestern Aleppo Province. Two villages were selected in a relatively wet area "zone 1" as defined by the Syrian Government with approximately 450 mm mean annual precipitation. In this area, wheat, barley, legumes and summer crops (melons, sesame, etc.) are grown. Two other villages with approximately 325 mm mean annual rainfall were selected in "zone 2". The same patterns of crops are found except that chickpea is not grown in zone 2. Data from the households were collected at three different periods corresponding to the different seasonal tasks. Both husband and wife were present at each interview session, and information was collected from both. Labor has been disaggregated by age and sex, and household labor has been distinguished from hired labor. The number of hours spent by each age and sex category has been calculated for each task and each crop. (For more details on the method used in the study, see Rassam, 1985.)

LABOR INPUT IN ON-FARM ACTIVITIES

Labor input for agricultural tasks by gender, whether it is provided by the household or hired labor, differs among crops and the techniques used in accomplishing the tasks. Some tasks are mostly carried out by males, particularly the mechanized operations. Male tasks include land preparation, chemical weed control, mechanical harvesting and threshing. Among manual tasks, chemical fertilizer application and seeding are generally done by males in the villages studied. Females' contribution in these tasks usually consists of helping, however, in some villages where men are heavily involved in non-agricultural work, women may broadcast seed or fertilizer themselves. Activities such as spreading manure in the field, selecting seed, planting summer and tree crops and hand weeding are normally done by females. Seed preparation and the various steps in the harvest process seem to be shared jointly by male and female labor although there is also specialization by sex within the processes themselves. On the other hand livestock activity is found to be divided between males' and females' tasks. For example feeding livestock is done mostly by household females while herding animals is usually carried out by household males. Shepherds from the villages and children also contribute to this task. Selling sheep is a male task while selling poultry is a female task. Dairy product can be sold by either sex.

To simplify the presentation we omit the contribution of children under the age of 13 (and usually over 10) who supply approximately 7 percent of labor hours. Their productivity in major tasks, such as harvesting and weeding, is estimated by farmers at about half that of an adult. Children tend to work with their mothers, especially in hired labor; the correlation between children's and adult women's hours in labor hired from outside the village is .87. Henceforth, the percentages of various categories of labor presented will be based on the total adult labor hours.

In general males' and females' contributions to agricultural labor (in terms of hours of physical work and including both family and hired) are almost equally divided (Table 1). Household labor provides 61 percent of the total workhours in agricultural operations and females provide 57 percent of this. On the other hand, hired labor is equally divided by gender in the total agricultural production.

The work provided by each sex depends on the degree to which the production is mechanized. For example, in cereal crops where most of the operations are mechanized, the contribution of hired males is higher than that of hired females (33 percent vs. 5 percent). The opposite is found in legume crops where most operations, particularly harvesting, are not mechanized. Females' and males' contributions are 36 percent and 12 percent respectively. Tables 2 and 3 show the contributions of males and

females by crop and by activity as well as the proportions of hours devoted to each task.

The cereal harvest is a good example of current trends, because it is partly mechanized and partly manual, and both sexes are involved in manual harvesting. Only one farmer manually harvested the entire cereal crop, but an additional 12 farmers harvested some cereal by hand, so it is possible to make a comparison between groups by technique (Table 4). Even when the cereal is combine harvested, there is also associated hand labour, primarily gathering up the straw for use as feed.

In households which hand harvest part or all of their cereals, there is more work for both males and females, but especially females. This is also true for hired labor; the male contribution is not significantly different for hand and mechanical harvesting, but the female contribution is much higher where hand harvesting is done. Interestingly, while mechanization decreases the female proportion of total labor in this task, it does not significantly affect the female proportion of household labor. The mechanical operations are largely done by hired persons, and thus do not affect the household ratio. The mean female proportion of hired labor is extremely small where harvesting is done by combine.

Thus, mechanization of the cereal harvest substantially reduces female labor inputs, from a mean of 180 hours per family

to a mean of 51. This is in spite of larger crop areas associated with combine harvesting. Approximately half of the reduction comes from household labor, while the other half comes from hired labor. The gross amount of hired male labor, on the other hand, is not significantly affected by mechanization. However, what these figures do not show is that in the mechanized harvest, hired male hours include a larger proportion of machine operators rather than manual laborers than is the case in the manual harvest. The number of hired male machine operators is increased, substituting for both household and hired labor, male and female.

LABOR INPUT IN OFF-FARM ACTIVITIES

In this section we will be describing the gender differences in off-farm activities, whether these activities are carried out for agricultural or non-agricultural tasks. The discussion will be divided into two parts. Emphasis will first be placed on the four survey villages, with few landless families; then villages will be discussed with a higher percentage of landless households.

Working off-farm depends largely on farm size, the crop productivity, and access to work opportunities. In the survey villages, 63 percent of income comes from crops and livestock vs. 37 percent from off-farm activities. Thus farming is the more important activity. Even so, there is a difference related to the productivity of agriculture. Off-farm income provides only 29 percent of income in the wetter two villages (zone 1) compared to

44 percent in the drier less productive area (zone 2). In fact working outside the village is more frequent in the drier villages; from the 24 households in zone 2, 42 percent of the family heads work in non-agricultural activities compared to 22 percent in zone 1. The farmers from zone 2 usually work as labourers, mainly in the construction industry. The off-farm activities of zone 1 farmers consist of running a business in the village, driving a taxi or teaching in the village school.

No women from the four survey villages work in non-agricultural activities outside the village. A few women work off-farm, but their tasks consist of agricultural labor within the villages, mainly planting summer crops or harvesting legume crops. Their work is limited to a few days per year, and is not an important component of household income.

By contrast, in many villages having less land, agricultural labor, especially by women, is a major operation. Men in such villages mostly pursue off-farm activities, while the women work more in agricultural labor. For example, in one village of 5000 people, 37% of the households are landless. Approximately 300 men commute 50 km to Aleppo every day to work as laborers in a government construction company. Another 100 men and some women work in construction in the village, while others work driving tractors, pickup trucks, etc. Approximately 300 women work regularly in agricultural labor, as well as about 100 men,

(usually either unmarried young men or old men). By combining planting summer crops, weeding, and harvesting of various crops, approximately six months of work are provided over the course of the year. This source of income is not as regular or as well-paid as urban work, but it clearly forms a larger portion of household income than in villages with more land.

The overall pattern of labor input by sex has been presented. Beyond this, we have attempted to explain patterns of variance within the data, particularly to determine factors affecting the male and female labor inputs, and the relative importance of household and hired labor. The following analysis is restricted to hours spent in crop production.

The most important variable affecting all labor categories is holding size. Total land area is significantly correlated with all categories of labor, including male household ($r=.66$), female household ($r=.56$), male total ($r=.86$), female total ($r=.77$), hired total ($r=.84$), and total labor ($r=.85$). Thus all categories of labor increase with higher land areas. Within the range of sizes of landholdings observed, the relationships of area to labor appears to be linear. In larger holdings one might expect to see an effect of substitution of capital for labor, but this is not observed on these small farms.

In view of the strong effect of the size variable, it is not surprising that there are also significant correlations among the

labor variables, such as total male labor with total female labor ($r=.83$) and household with hired labor ($r=.41$). As requirements increase, men and women both increase their labor and hire more labor as well. It is interesting to note that the female proportion of hired labor is negatively correlated both with household labor ($r=-.29$) and with the female proportion of household labor ($r=-.29$); this bears out the point that female labor is hired mostly for manual jobs that can be carried out by unskilled family members if they are available.

Because of the strong effect of holding size, in considering other variables it is essential to consider land simultaneously. For example, where the male head of household has a steady job, this appears to have a strong effect on labor inputs, with male household labor hours averaging 406 if he has no job and 136 if he does. Large differences in means are found for other labor variables as well.

However, households with jobs hold an average 10 ha compared with 19 ha for those without. That is, on farms with small holdings the male head of household is more likely to seek off-farm work. When holding size is entered into the analysis of variance as a covariate, there are no significant differences in any labor variables between families where the male head has a job and those where he has not.

However, factors besides holding size such as demographic variables do have an effect on labor allocation. Using multiple linear regression, four variables were found to explain most of the variance in the labor variables; these are holding size, number of adults in the family, number of family members absent on a daily basis (either working, in military service, or away in school), and "excess of females" (number of adult females minus number of adult males).

For comparative purposes, regression statistics are shown for all labor variables with all four independent variables (Table 5). There are interesting differences among the results.

First, it should be noted that household labor is primarily linked to household size, and female household labor is also related to the number of females. Male labor, as one should expect, is reduced by male absentees. Holding size is also important; all other things being equal, household members work more if their farms are larger. However, that variable appears to be less important than demographic factors. By contrast, the only variable significantly related to total hired labor is holding size. Large farms hire more labor than small ones. This fact also is shown by the ratio of household to total labor; larger holdings are associated with a greater proportion of hired labor. Thus it appears that hired labor is used for large farms where family labor is not sufficient. Family size increases the

relative contribution of household labor. However, from the total labor inputs, it appears that farmers do not hire as much labor as they would use if family labor were available. Family size and the number of absentees still have an effect on total labor expended. Thus it appears that either sufficient hired labor is not available, or family labor is valued more cheaply than hired labor.

As one would expect, the female proportion of household labor is related to the number of females in the household. So also, it appears, is the proportion of the hired labor force which is female; where household females are numerous, hired females are fewer. This is related to the division of labor, since hired females are involved in manual labor which can also be accomplished by household females.

The substitution effect is also apparent in the differences between male and female hired labor. Male, not female labor, is hired where family size is small, indicating a higher rate of mechanization by small holders where hiring males increases when family males work off-farm. On the other hand, where females are more numerous, less female labor is hired. The female proportion of total labor expended is positively associated with household size, although the female proportion of neither household nor hired labor is significantly related to size. Possibly this indicates that large families are more likely to grow legumes,

since they can contribute to the harvesting themselves, but they will still have to hire from the predominantly female labor force. On the other hand, the female proportion of total labor is negatively associated with holding size; on large farms, mechanization predominates and labor intensive crops may be avoided.

CONCLUSION

The role of gender in agricultural labor in northwestern Syria has been considered. It was noted that male and female time contributions to crop production are approximately equal; however, males are more often involved in mechanical operations and other activities in new technology. Females are more involved with crops requiring hand labor, such as legumes. Hired labor for mechanical operations is predominantly male, while that for manual operations is predominantly female.

Overall the trend in Syrian rural areas has been towards more mechanization and more off-farm employment of males. Thus the male rural labor force has been reduced, and those remaining have been increasingly involved in using new technologies. The female labor force has also been reduced as families have moved to cities, and female work opportunities in rural areas have also declined. Continuing mechanization, particularly of legume and summer crop production, will continue to reduce female agricultural activities, including both household and hired labor.

The next task is to assess the effect of these changes on demographic trends, nutrition, income, equity and agricultural productivity.

Table 1 Contribution of males and females as percentages of the total time spent in on-farm agricultural production.

Contribution	Cereal Crops	Legume Crops	Summer Crops	Tree Crops	Total
A. Household labour					
Male	23	18	44	47	26
Female	39	34	42	28	35
Sub-total	62	52	86	75	61
B. Hired Labour					
Male	33	12	9	24	20
Female	5	36	5	1	19
Sub-total	38	48	14	25	39
C. Grand Total					
Male	56	30	53	71	46
Female	44	70	47	29	54
D. % of Area Allocated to Each Crop.					
	50	25	19	6	100
E. % of Hours Spent in Each Crop.					
	30	40	22	8	100
F. Mean Hours/ha					
	46	135	94	99	--

Source: From villages surveyed in study.

Table 2 Contribution of males and females as percentages of hours spent in legume and cereal production.

Agricultural Activities	L E G U M E					C E R E A L				
	% Hours Spent by Task	% Total Adult Input		Household Only		% Hours Spent by Task	% Total Adult Input		Household Only	
		Male	Female	Male	Female		Male	Female	Male	Female
Tillage Operations	3.7	100	0	32	0	10.1	100	0	32	0
Seeding	1.5	86	14	30	14	5.1	86	14	19	14
Herbicide Use	--	--	--	--	--	0.8	95	5	20	5
Fertilizer Use	0.9	81	19	49	19	11.0	79	21	31	21
Hand weeding	16.1	14	86	13	67	20.6	5	95	5	95
Pest Control	2.5	71	29	51	29	8.5	73	27	54	27
Harvesting	58.4	15	85	11	26	26.2	38	62	10	39
Transport	5.3	74	26	36	26	12.0	84	16	34	16
Threshing	6.6	57	43	31	43	4.6	62	38	35	38
Winnowing	1.6	89	11	48	9	0.4	83	17	47	17
Cleaning	2.4	34	66	34	66	0.4	27	73	21	61
Bagging	1.0	44	56	44	56	0.2	66	34	66	34
Total	100.0	30	70	18	34	100.0	56	44	23	39

Source: Villages surveyed in study.

Table 3 Contribution of males and females as percentages of hours spent in summer crop and tree crop production.

Agricultural Activities	S U M M E R C R O P					T R E E C R O P				
	% Hours Spent by Task	% Total Adult Input		Household Only		% Hours Spent by Task	% Total Adult Input		Household Only	
		Male	Female	Male	Female		Male	Female	Male	Female
Tillage Operations	11.1	100	0	24	0	16.0	100	0	23	0
Planting	20.0	18	82	18	57	22.0	34	66	19	62
Thinning & weeding	27.0	37	63	37	63	2.0	21	79	21	79
Pruning	24.0	76	24	75	24	35.0	70	30	57	30
Hoeing, Irrigating & Fertilizer use	3.0	91	9	91	9	24.0	92	8	78	8
Pest control	2.0	32	68	32	68	1.0	17	83	6	83
Harvest and transport	13.0	45	55	45	55	-	--	--	--	--
Total	100.0	53	47	44	42	100.0	71	29	47	28

Source: Villages surveyed in study.

Table 4 Mean hours of labor in cereal harvest: differences between farms using mechanical and manual techniques.

Labor Variables	All Combined	Part Manual
Household		
Male	7.9	18.2(NS)
Female	20.3	76.2 **
Total	28.2	94.4 **
Hired		
Male	19.2	20.8(NS)
Female	4.7	60.2 *
Total	23.0	85.9 **
All		
Male	27.9	39.9(NS)
Female	23.3	140.4 **
Total	51.1	180.3 **
Ratios		
Female/total hh	.77	.79(NS)
Female/total hired	.03	.40 **
Female/total all	.57	.81 **
hh/all	.43	.53(NS)

** F significant at .01

* F significant at .05

Table 5 Regression results on labor variables.

DEPENDENT VARIABLES	INDEPENDENT VARIABLES (Beta Values)				Adjusted r ²
Household Labor	Holding Size	Number of Adults	Number of Absentees	Excess of Females ¹	
Male	.36**	.60**	-.42**	-.08(NS)	.54
Female	.22(NS)	.61**	-.18(NS)	.27*	.50
Total	.31**	.67**	-.33*	.11(NS)	.60
Hired Labor					
Male	1.03**	-.45**	.25 *	.08(NS)	.70
Female	.69**	.07(NS)	-.10(NS)	-.27**	.55
Total	.92**	-.15(NS)	.05(NS)	-.14(+)	.70
All					
Male	.70**	.33**	-.25*	-.04(NS)	.77
Female	.49**	.51**	-.19(NS)	.09(NS)	.68
Total	.61**	.45**	-.23*	.03(NS)	.77
Labor Ratios					
Female/total hh	-.25(NS)	.05(NS)	.27(NS)	.49**	.24
Female/total hired	.25(NS)	-.05(NS)	-.20(NS)	-.45**	.18
Female/total all	-.50**	.67**	-.18(NS)	.07(NS)	.15
hh/all	-.49**	.75**	-.26(NS)	.20(NS)	.20

1 Adult females minus adult males.

** t significant at .01

* t significant at .05

(+) t significant at .06

(NS) sig. of t>.1

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