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MECHANIZATION, MIGRATION, AND LABOR IN AN EGYPTIAN VILLAGE

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The decade of the 1970s has seen a considerable acceleration in the spread of farm mechanization in rural Egypt. This acceleration has spurred a debate about the implications and consequences of this mechanization. The present paper is a contribution to this debate with reference to a single village of Upper Egypt, based on an anthropological field study. The particular reference point of the paper is the relationship between mechanization and labor, and the consequences of this relationship for migration out of the village. Hence the focal point will be the effect that mechanization has on the organization of work, and in particular on the role of the household as the basic unit for organizing labor.

The literature on agricultural mechanization stresses the tendency for mechanization to displace labor, and hence to act as a 'push' factor in rural-urban migration. While the effect is doubtless genuine, it has proven hard to document in any precise sense in Egypt. The argument often runs the other way: because there is migration from the village, therefore mechanization must have a displacing effect. The labor displacement effect may be valued by farmers who see it as a way to reduce their dependence on labor. The opposite argument, also used by farmers in Egypt, is that mechanization is necessary because labor has already migrated and so they are faced with a labor shortage. Part of the confusion derives from the tendency to neglect the organization of labor. The market for labor is not perfect because of organizational

Farm mechanization also creates the need for new institutional arrangements. Once the machines are in place there is a long-term tendency for the owners to seek to increase their holdings to march the capacity of their machines. This will have effects on the land tenure system, including perhaps the displacement of tenants, though there is no evidence yet for that. There may also be an effect on systems of credit and delayed payment. Certainly a range of institutions from repair shops to credit banks, passing through cooperatives, will be called into being or enhanced. Mechanization could ultimately affect the basic institution, the family-based household, by changing the division of labor between the sexes. Women's roles in agriculture or the household might be directly affected, if mechanization of this role means that it is transferred to the male sphere (as sometimes happens), or they might be indirectly affected through the changing organization of male labor. One indirect effect that is sometimes true in Egypt is that mechanization of plowing has allowed people to abandon their draft cattle in favor of buffaloes (with a higher yield in milk and higher fat content of that milk), and this in turn gives women more work to do since they care for the animals at home and milk them, prepare cheese, etc. A furtherpoint is that work with machines may require a totally different social organization than work without them. Whether work gangs are recruited from the household or from the market, are paid by time or piece rates, or reflect an internal division of labor or not, has implications for social structure that reverberate through the system.

In thinking of the social impact of farm mechanization, all these aspects have to be borne in mind. This analysis of the total impact is an important one and will be attempted elsewhere. However, what is

75 to 100 years ago. Until 1964 the land was flooded annually from September 20th until the end of October, and remained moist until January.

The basic cadastral survey for Asyut was carried out in 1905. This survey still provides the basis for land boundaries in the village, although those who use the list must have considerable knowledge of genealogy as well as of sales and other transactions, since the current generation of landowners are the grandsons or greatgrandsons of those of 1905. However, more important than ownership in the village is the landholding (hiyaza), taken to be owned land plus land rented in and minus land rented out. This system appears to be a product of the land reform and t enancy changes following the revolution of 1952. Most landholders, no matter how small, have a combination of owned and rented land. The difference between the two systems is vividly expressed by these figures: there are 4500 landowners and 1500 landholders. Thus the hiyaza system represents a first step towards reconsolidation of land divided excessively by inheritance. About 13% (185 of 1435) of the landholders are recorded as holding more than five feddans and so are clearly in a position to derive their living from agriculture alone. There are approximately 2500 households in the village, so that a little less than 50% of the households are without a holding (this assumes roughly one ha'iz to a landho lding household; probably there are something like 1250 households containing one or more ha'izin). At the upper end of the scale, there are two farming enterprises with more than 300 feddans, and another five or six with more than one hundred feddans. These amounts are larger than those allowed by law, but reflect the fact that several holdings are farmed together as a single unit. The same process of consolidation means that very few fields (parcels) are less than one feddan.

The history of mechanization in Musha reaches back to the beginning of the century. The first pumping engines were erected in 1908; they

between the summer and winter crops in November and in April-May. Most commonly there is a two year rotation so that cotton follows lentils and chickpeas (which are harvested relatively early) and precedes wheat or beans which in turn are followed by maize or sorghum. Animal husbandry is important in the village. There are substantial numbers of buffalo, cattle, sheep, goats and camels. About one-third of the households (36% of a sample of 107) have buffalo or cows and thus are presumably involved in the production of milk and cheese and other dairy products.

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Mechanization in Musha

In June 1981 there were 48 functioning tractors in the village. The total horsepower was 3090 and the average size tractor was 64 hp. The most common brand were the Romanian Universals (13 of 80 hp size and 12 of 65 hp). The others included a scattering of brands: Nasr 50 hp (6), Nasr 60 hp (3), Massey-Ferguson 65 hp (3), Belarius 80 hp (2), IMT 55 hp (2), John Deere 45 hp steel wheel (2), Deering steel wheel (2), International Harvester, McCormack and Zetor (1 each). These 48 tractors belonged to 35 different individuals and partnerships. One family owned three tractors, and there were ten who owned two each (including the cooperative). The tractor owners tended to be those with the most land. Of the 35 owners and partnerships, at least 18 farmed more than 50 feddans, and the seven operations with more than 100 feddans owned 13 tractors between them. Nine of the tractors were owned by partnerships, and another nine were owned by what might be called family corporations based on common ownership among sets of brothers (the four represented here are among the biggest outfits in the village). Two were owned by the cooperative, and 28 by individuals. Among the partner-

In addition to the owners, there are two other important social roles connected with the pumping stations. The mechanic (usta) has the job of running the machine. The guard (ghafir) has the responsibility for guarding the machine and the fields attached to it. He also has the job of determining which ditch will receive water on a given day, and of alerting the landholders along this ditch so they can be present if they wish to irrigate. For these jobs the ghafir is paid 5LE per feddan. This role is a good starting point for an entrepreneurially minded person. Several of the present group of tractor owners were or are ghafir-s, sometimes in partnership with a richer man whose tractor they operate for a share of the ownership and profits. The owners and their representatives are responsible for cleaning the irrigation ditches.

The maximum size of these pumps is 65 hp, but the majority are in the 18-25 hp range. Assuming an average strength of 25 hp, this represents a total horsepower of around 1750. Together with the 3090 hp of the tractor population, this gives a total horsepower for agricultural machines of 4840, or nearly 1 hp per feddan. This is about four times the national average of .23 per feddan (calculated by USAID). Counting only tractors, there is a ratio of .62 hp per feddan. Putting it another way, there is one tractor per 100 feddans in the village.

This horsepower is concentrated on certain tasks. Waterlifting is done entirely by machine. Tillage is also entirely mechanized although final field preparation and planting are done by hand. Virtually all threshing is done mechanically, using a tractor-powered drum thresher for wheat, sorghum, bersim and most beans, and a tractor-norag combination for lentils, chick peas and some beans. A great deal of local transport is done by a tractor and wagon, especially the transport of the crop in from the fields to the threshing grounds at the edge of the village. The larger farmers also

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The organization of labor in Musha

In order to grasp the labor situation in Musha we must go beyond a simple equation between people and theoretical work levels in agriculture. We can look at labor from the point of view of the principal job or source of income, from the point of view of the organization of labor in the fields, or from the point of view of managerial solutions.

In the spring of 1981, I interviewed a sample of 107 households in Musha chosen randomly from a list compiled by the health authorities in 1979. Table I gives, for this sample, the breakdown by occupation cross-tabulated aginast size of landholding. The division into occupations is only approximate since both individuals and households combine more than one income source. However, keeping in mind the approximately quality of these figures, one aspect emerges very quickly -- the more or less equal proportion of those farming their own land, those available for day labor, those holding jobs (civil servants for the most part), and those living from trade and crafts. Somewhere between a third and a half of the village's households do not directly rely on agriculture for a living.

The households that rely principally on agriculture for a living are largely those holding over 3 feddans of land. Of the 35 households in this case, 16 (46%) are among the 18 households that hold three or more feddans of land. Thus in general one can say that those households with access to enough land to sustain a profitable agriculture do so. The other households in this category (i.e., claiming a full-time devotion to agriculture even though their holding is less than three feddans) include some that have been able to make a viable operation on the smaller farm, and others where cultivation of their own land is combined with

workers. Thus the dominant pattern, especially among the landless, is that households have tried to move away from agricultural labor altogether. When considering the labor situation in the rural areas, this finding may be more important than migration. In terms of a household's self-perception, the cutting point appears to be whether one holds more or less than one feddan. Above this level, we have farming families with supplementary incomes. Below this level, we have households that rely on the labor market -- though not necessarily in agriculture.

Let us now look at the labor situation from the point of view of the organization of agricultural labor in the fields. We can perhaps distinguish three fairly typical situations: where the work requires only one persons, or at most two working together; where the work requires a gang of three to eight or nine workers; and where the work requires a group of ten or larger.

The first situation includes such tasks as using a tractor for plowing, irrigating, application of fertilizer or weeding on relatively small fields. The farmer who rents a tractor to plow his field also hires the driver that the tractor owner supplies; however, usually the farmer or a member of his family accompanies the tractor to the field to make sure that the work is done satisfactorily. Irrigating is generally a job that one man does alone, and frequently by a hired hand.

Jobs involving from three to nine workers are perhaps the most common. They include work gangs for threshing crops using either the drum thresher or the tractor-plus-norag technique, gangs for planting, and weeding cotton, gangs for harvesting such crops as sorghum or wheat. Some of the threshing jobs are done with family labor, if the job is small enough. This is common for sorghum, where most families grow less than a feddan, so that the total job lasts from 20 minutes to an hour. It is less common for beans or wheat, where the average job can last

the combat against the cotton worm). Another job with a similar labor force but a different pay system is cotton picking. Here gangs of children and adolescents are used, including some gangs from outside the village, but the pay is based on the amount each child picks.

When there is a need for large gangs, the farmer is likely to rely on a labor recruiter to produce the necessary workers since it would be onerous and perhaps undignified for one of the larger farmers to spend his time recruiting 20 or 25 workers. The labor recruiter is especially necessary when bringing in workers, whether child or adult, from nearby villages, since people will generally only agree to be recruited by someone from their own village.

From the point of view of the farmer, labor is a major cost, certainly more than the cost of renting machinery and about equal to the cost of chemical inputs and seeds. The "standard" wage paid in Musha during 1980-81 was PT 150 per five hour day (PT 30 per hour), although this hit a trough of PT 100 in March and a peak of around PT 200 in May-June. This was the rate paid for workers hired to accomplish a certain repetitive task in the fields. People hired for shorter periods of time were paid a higher rate per hour -- up to PT 50 per hour -- for such jobs as threshing with a drum thresher. Boys in their early teens were paid about PT 10 per hour during the summer, and children were paid 30 PT per day, a maximum of PT 5 per hour, for working in the gangs picking off cotton leaves infected by worm eggs. However, many other jobs were paid piece rates. Adolescents picking cotton were paid PT 1 per pound, and most were able to picke between 75 and 100 pounds a day -- a long day, from dawn to a couple of hours before dark (in order to leave time for measuring, weighing and paying before dark). Harvesting wheat was frequently paid by the qirat (at PT 100 per qirat or 24 LE per feddan, plus costs for bundling and gleaning). Those who preferred this way

but not to milk them since that was women's work) and another man to look after his six feddans of grapes, and also had two other men as general workers. As was customary in Musha, these workers would gather at the farmer's house in the early evening to receive their instructions for the following day; additional labor needs would also be evaluated at this time. In a more complicated farm -- such as one of 300 feddans -- the owner worked through a series of foremen and there was also a clerk and accountant just to handle the paper work. In addition to their permanent workers, the larger farmers deal with the pump mechanics and guards and tractor drivers, most of whom are paid by the month though they often receive tips from customers.

When additional labor is needed, the farmers or their labor recruiters attempt to line up men from the remaining floating pool of free labor in the village. This is typically done by visiting the cafés where such men wait and then engaging them for the following day. Sometimes a worker is kept from day to day for a period of time and sometimes a farmer recruits his workers from his neighbors without resorting to the café. During labor demand peaks, it is customary to pay the worker in advance to guarantee that he will come. Many of these laborers are reluctant to work in the afternoon since they have other activities, including looking after their own small plots, often planted in bersim, maize or sorghum for animal fodder. Very fragmentary information suggests that men from this l abor pool -- especially men over the age of 30 or so -- prefer to avoid working in gangs under the supervision of one of the larger farmers and instead seek non-agricultural work or work with a small farmer who will not supervise him so closely and will provide more in the way of tea or cigarettes. As mentioned above, large gangs of men, or of adolescents for cotton picking, are brought from nearby villages by labor recruiters from those villages, usually in response to long-standing relationships and arrangements.

that there was a considerable pattern of male migration at this date during World War I; that males have been counted higher since (assuming that female undercounting was constant throughout) suggests more of a family pattern of migration. These censuses represent periods of approximately twenty years. The period with the greatest total population increase is the 1937-1960 period. This corresponds to the period from 1930 to 1950 when the installation of mechanical pumping stations made double-cropping possible: a greater intensity of both land and labor use. In other words, out-migration has been a factor of maintaining population stability at all times, but was less needed during a period when the local opportunities for labor were increasing.

Migration from Musha has been and continues to be of two kinds. On the one hand, there is the usually temporary migration of individual males. In the past this has been from Musha to various locations down-stream -- Mallawi, Beni Suef, the Tanta-Mahalla el Kubra area in the Delta. The most common pattern was that labor contractors from Musha would recruit team of men from Musha for work during the cotton season. The work usually involved loading, unloading and transporting cotton bales and sacks in the ginneries and elsewhere. The labor contractors profited from this system much more than the individual workers, and some of them became quite wealthy. Some invested their money in land and machinery in Musha, and were among those who helped raise the level of the productive forces in the village in the period from 1930 to 1950. Some of these same individuals also invested their money in urban real estate, particularly in Asyut and Tanta. Under this <u>tarahil</u> system, then men would be gone for several months during the year, but would return for at least part of the agricultural cycle. Probably the bulk of the work period fell during the winter slack season. Many of the older men I interviewed in Musha in 1981 had been involved in this kind of labor migration in their youth.

and to provide some money for the family at home until the migrant can begin sending money. Most of the migrants are not young men without family responsibilities but on the contrary are family men. Perhaps one should not be surprised that those young men who have gone are more likely to drop out of sight. My impression is that each person found his own way to Saudi Arabia. Although the labor recruiter pattern exists, it does not involve the numbers that the tarahil system did. It is still, however, a matter of creating an action set of individuals who know each other.

My sample showed four heads of family away and two returned. Among non-heads of household, there were four brothers and two sons. (The sister of one man was also in Saudi Arabia with her husband.) Using household hiyaza as a rough measure, among these twelve: two were landless, three held less than one afeddan, four held between one and three feddans, one held four feddans, one five and one eighteen. The heads of household were from the lower half of this group, though not necessarily from the lower half of the community as a whole. That somewhat wealthier families were more likely to have a brother abroad suggests a division of labor within the family.

We can reach the following tentative conclusions: (1) tarahil is virtually dead although it played an important role earlier in Musha's history; (2) migration to the Arab countries is a migration of the relatively prosperous; (3) the poor migrate to Suez and other cities and they migrate as a family, taking advantage of the social relationships already existing; (4) many of those who migrate abroad are not drawn from the agricultural labor pool; so education plays a key role in the migration process by preparing people to work abroad in a variety of jobs. The community and the individual households made their structural adjustments to migration long ago; in that sense the present pattern is different

quate labor if the plot is rather small. Otherwise, the household must mobilize additional labor either through labor exchanges or through hiring in workers. Furthermore, some of the shortfall in household labor is made up by the use of machines. Where machines are hired in this creates a different pattern of relations between households that is increasingly leading to an accentuation of the division of labor between households.

From the point of view of the farming families, three possibilities may exist. The household may have more land than labor, and so compesnate by hiring in men and machines; while farming remains the principal activity, some younger members may work in salaried jobs or as traders. Or the household may have more labor than land. In this case, the preferred solution (see the figures in Table I) appears to be to work for the government or as a craftsman or trader of some kind. When such a household holds land, it must then take into account the regular earning capacities of its members outside agriculture; this could easily lead to a decision to hire labor even for relatively small jobs and household members would take leave from their work for harvesting, threshing or other bottleneck periods. While a household could be evenly balanced between land and labor, given the dynamics of the household developmental cycle, this equilibrium is likely to be shortlived. Thus hiring men in for work is not a question of overall shortage in the village or region, but rather one of each household seeking to resolve its own labor balance. (The same argument applies to the use of child labor except that here most households come out short inasmuch as the main use of child labor takes the form of large gangs for fighting the cotton worm and harvesting cotton.) By the same token, the household basis of labor very probably serves to spread the work as widely as possible.

Note

This is a preliminary report on a year of anthropological field research carried out in Musha village, Asyut governorate. The report is preliminary in the sense that the data have not been fully analyzed and therefore some of the figures cited here are subject to change. The research was carried out while the author was on a National Endowment for the Humanities fellowship through the American Research Center in Egypt. Certain field research expenses were covered by a grant from the M.E. Awards Program managed by the Population Council office in Cairo. I wish to thank all those involved in both these programs for their support. It should be clear that I also owe a tremendous debt of gratitude to the people of Musha, and in particular Abdelmajid Tammam, Salah Eddin Abdin, Ahmed Mahmoud and my assistant Saber Imam. I am also grateful to colleagues at the University of Asyut, especially Dr. Mohammed Helmi el-Jibali, for their support. For better or worse I am responsible for the direction of the analysis.

The sample referred to in this paper was constructed as follows. The health unit compiled a list of all those in the village in the summer of 1979, organized by family and house (usra and menzel). I chose every 25th name, thus giving a list of 120 names. On interviewing, however, I dealt with the household connected to the name, whereas the original list was in terms of families. Thus the number of people involved is slightly more than 1/25. Of these households, 12 had disappeared either through migration or death, and one refused to be interviewed. Thus for certain purposes, the original number of 120 is significant, while for others, the number of 107 corresponds to those who actually answered. It is probable that the missing 13 households were in the bottom half or even quarter of the range. The health list itself is probably about 90% accurate.