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FEMALE ROLES IN AGRICULTURAL MODERNIZATION:
AN INDIAN CASE STUDY

by

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Abstract: The United Nations declaration of the decade of the seventies as International Women's Year focused attention on integrating women in economic development. Increasing awareness of the adverse effects of economic development on female populations calls for comparative studies of female participation patterns in rural economies under varying regional-cultural frameworks. This study is an answer to that call. Based on extensive field work conducted in three different crop regions along the culturally varying border areas of Madhya Pradesh, India, the study revealed (1) a high degree of female participation in agricultural production and decision-making, (2) a gradual elimination of female roles in the wake of mechanization, and, finally, (3) a cognizable level of indifference in governmental services and prospective plans for integrating female roles in the developmental effort.

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RURAL FEMALE ROLES IN AGRICULTURAL MODERNIZATION:
AN INDIAN CASE STUDY¹

Never before perhaps in the documented history of mankind has the issue of rural women acquired such international prominence as it has today. The publication of Ester Boserup's ground breaking study Women's Role in Economic Development revealed women to be the victims rather than the beneficiaries of economic development (Boserup 1970, pp. 5-6) and thus spawned a national and international concern for an investigation of the problems related to women's socioeconomic role, political status and rights, and contribution to both traditional and modernized economies of the Third World. Successively, the problem of women was awarded a formal, international dimension through the United Nations Declaration of 1975 as International Women's Year, and, at the same time, its decision to dedicate the decade of the 70s to the promotion of equality between the sexes, the ensuring of the integration of women in the development effort, and the strengthening of the contribution of women in world peace (United Nations 1976).

In the mid-seventies, the world female population was calculated to be 2,201 million, of which 1,617 million (73.5%) were located in less developed parts of the world. Seventy-two percent of these 1,617 million women were concentrated in rural areas with reproduction and agricultural production being their main occupations (Population Reference Bureau 1980). Clearly an examination of this overwhelmingly large proportion of the rural female population of the world can reveal the issues affecting them, particularly those relating to their roles as contributors to economic production and the reproduction process. This examination is all the more important because it is now known more clearly than before that rural women not only are excluded from vital labor statistics but are seldom considered in rural development planning, notwithstanding their significant contribution to the family and economy. Studies coming forth from various parts of the Third World reveal that thousands of women living on small to medium-sized farms make significant contributions as unpaid family laborers, as decision-makers of agricultural modernization, and as supplementers of family income in the role of wage earners, workers in household industries, and as craftpersons marketing their own crafts. The very dimensions of the problem, however, because of their intensity and complexity, demand an investigation into the cultural-ecological phenomena of the sexual division of labor and of female roles in technologically changing rural economies.

Historically, the shift to newer forms of technology is known to result in some disruption in the existing division of labor, a division that emerged over a prolonged period of time. "Female" farming systems (wherein women perform most of the tasks of producing food) located in countries of Asia and in parts of Africa--areas that are characterized by shifting cultivation--have been known to give way to "male" farming systems (wherein men perform most of the tasks of food production) under pressures of population and with the introduction of the plough (Boserup 1970, pp. 34-35). Such shifts have also been observed when there is an intensification of cultivation techniques through the introduction of irrigation technology. Such displacements, however, need not be and are not always a permanent phenomenon. The introduction of a new technology

may result in unprecedented increases in production, thereby sustaining a labor force not fully harnessed in the production process. Gradually, however, increased pressures of population may force further intensification of the production process, creating greater demands on labor, and gradually absorbing the displaced labor. Thus, given a reasonable framework of time and environment, the displaced labor is likely to be harnessed back into the economy, establishing once again an equilibrium and complementarity in the sexual division of labor.

We are witnessing a similar phenomena in critical cases where, as a result of pressures exerted by the population on existing food production, there is a call for and finally a breakthrough in agricultural technology in the form of the bio-geo-chemical technology, popularly known as the "Green Revolution." The new technology has created, as expected, a dichotomization of existing sex roles by creating unequal access to modern factors of production. The results of such a process are evident in the large scale displacement of women from production functions as their services and skills are replaced by newer modes of production. The process does not really stop here. The range of female activities inside and outside the home is often the key indicator of female autonomy, and female income supplementing opportunities a decisive factor of female status (dependent upon the degree to which female employment and income is crucial to family survival). The diminishing range of female economic activities that is set afoot by the process of modernization is linked to a slow erosion of female roles as decision-makers in the production and the reproduction processes. The loss of the labor market and consequent depletion of female status and power is bound to produce serious socio-economic repercussions in at least two major ways which are pertinent to the problem: one relates to the demographic area of birth rates, death rates, and life expectancies that restrict a female's power over her life and reproductive process; the other relates to the area of economic development per se that restricts the rate of development by serious underuse of available plentiful resources.

Undoubtedly, given the advantages of time and environment, the labor displacements may only be temporary, eventually shifting toward some form of equilibrium. The reason why the women's issue in relation to agricultural modernization has acquired alarming dimensions is that there is little time to lose as pressures escalate for higher agricultural productivity and a greater degree of economic solvency for farm families. While planning agencies in developing nations mount their planning programs, apparently oblivious to the resultant displacement of labor, timely and accurate documentation of areas of continued female involvement may help to bring about improved efforts to integrate and harness the disadvantaged rural female populations. Needless to say, if democratic institutions are to be preserved, the attention of planners must be directed toward the creation of equal opportunities for economic participation and involvement in the entire spectrum of the rural economy and in the organization of all sectors of the population. The principle of such participation, now formally accepted by the United Nations and its member states, implies redistribution of both the control of resources and power in favor of those who live by the products of their own labor (Pearse and Stiefel 1979).

A number of questions seem to be pertinent to the issue of the impact of technological development on women. A select number of the queries pursued in the research described in this paper on the rural female population were:

1. What is the range of female participation in rural societies?
2. To what degree are women's functions being eliminated from the productive process?
3. To what extent does the severity of the adverse effects of development depend upon varying economic-cultural-ecological preconditions?
4. To what degree are different developmental models effective in alienating or integrating women's services and skills in the developmental effort?

The hypothesis to be examined in this paper against the background of the Indian rural scene is that rural female participation in the garb of wage labor or unpaid family labor, varying with economic-cultural preconditions, continues to be reasonably high notwithstanding substantial displacements due to modern technology. A significant factor that has been ignored by most of the development agencies is the positive relationship between a woman's role as an active family laborer and her role as a decision-maker in the adoption of modern technology.

Background Information on India

India's female population according to the latest available data was 264 million, one of the largest in the world. Approximately 80 percent of India's population is rural, primarily belonging to the subsistence sector. Female participation in the rural economy, inadequately documented to date, varies widely from one cultural zone to another and with specific forms of production. Not much data exists on the basic features of women's participation in the agricultural sector or on the effects of capitalistic development on their work role, and so, on their status. The census and the National Sample Surveys include some information on wage labor participation. Using these data and others, the Committee on the Status of Women for the Government of India reported in 1974 that women have lost ground in all industrial employment categories since 1911 (Government of India 1974). The most dramatic decline for women took place in the secondary sector, i.e., in industry, trade, and commerce (Table 1). Between 1961 and 1971--the decade of the transfer of modern agricultural technology to the developing world--this trend was observable in traditional agricultural operations and household industries, the sphere of major technological innovations (Table 2).

Table 1

Ratio of Female to Male Workers In
Secondary Activities, 1911-1961
(per 1000 males)

	<u>1911</u>	<u>1921</u>	<u>1931</u>	<u>1951</u>	<u>1961</u>
Processing of food grains*	12,075	7,779	7,065	1,520	331
Bread and other bakery products	1,644	1,466	1,662	447	64
Production of vegetable oils	688	656	595	347	458
Footwear and repair	232	201	141	88	81
Earthenware and pottery	572	540	490	402	507

*Greatest decline in processing.

Source: J. P. Ambannavar, 1975, p. 353.

Table 2

Decline in Women Participation Rate in Rural India
Age 15-59, 1961-1971

	<u>W.P.R. 1961</u>	<u>W.P.R. 1971</u>
Cultivator	30.02	7.13
Agricultural Labor	12.60	11.80
Plantations, etc.	0.92	0.58
Household Industry	3.42	0.77
Manufacturing	0.37	0.34
Construction	0.13	0.09
Trade and Commerce	0.51	0.22
Other Services	2.70	0.77

Source: Maria Mies, "Capitalist Development and Subsistence Reproduction; Rural Women in India," Bulletin of Concerned Asian Scholars, Vol. 12 (1), 1980, p. 5.

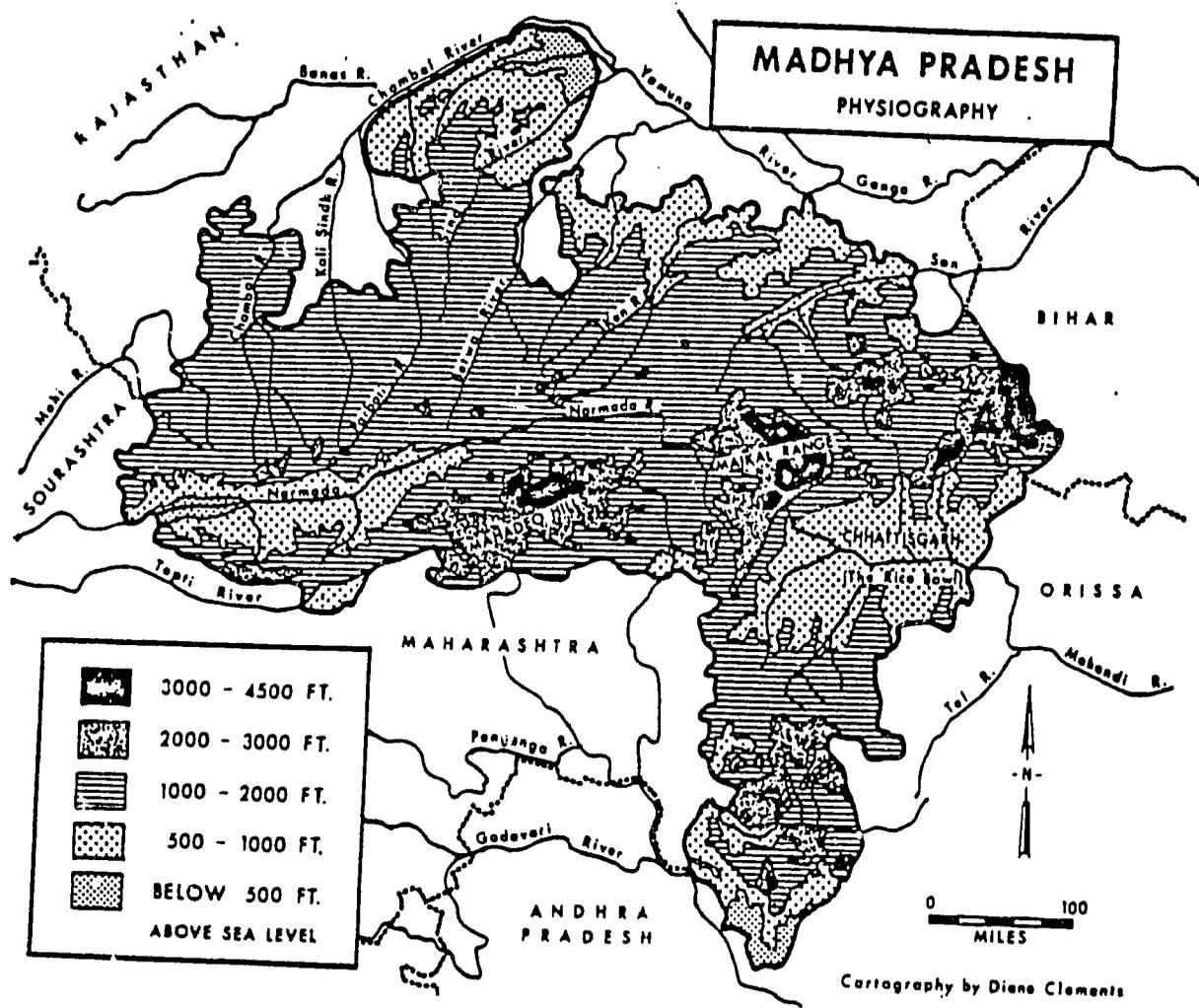
Research Methodology

The cultural-ecological diversity of India renders the task of identifying general patterns of female participation formidable. Female roles are culture-region-specific, and trends differ from region to region, from community to community, and from class to class. Within the constraints of available time and resources, it was felt necessary to examine as many cultural-ecological examples as possible; yet, it was not feasible to conduct field work in different states of India. Further, since agricultural programs vary from state to state, it was felt necessary to confine the research to a single state in order to provide for the statistical control of a uniform and single standard of developmental strategy in the evaluation of development impacts on varying communities and regions.

The state of Madhya Pradesh--bounded by the cultural regions/states of Uttar Pradesh, Bihar, Orissa, Andhra Pradesh, Maharashtra, Gujrat, and Rajasthan--was selected for the case study. The field surveys scattered along the border areas of the state were to provide samples from a range of cultural zones (Map 1). The state of Madhya Pradesh is a cultural "shatterbelt" (i.e., an area subject to various cultural and historical influences), possessing not just an uneven mix of tribal-nontribal populations but also a cultural diversity resulting from prolonged historical interaction between the distinctive cultural traits that are of interest in the context of women, and which are a result of differential affiliations, are the observance or nonobservance of Purdah (female seclusion) in the northern and southern Madhya Pradesh, respectively, and caste and class distinctions in general. Further, bordering on the north are the two states of Rajasthan and Uttar Pradesh--both dissimilar in certain cultural features. Rajasthan has been the seat of the Rajputs--martial dynasties of militant and valorous groups--waging wars to protect their principalities from western incursions. The militant Thakur class rather than the priestly Brahmins, hence, constitute the upper echelon of the caste structure. Female seclusion and observance of restricted female exposure to males is customary, but the virtues of valor, honor, and duty are embedded in the cultural fabric. Women have been trained (from historic times) to shoulder economic responsibilities in times of warfare. The states of Uttar Pradesh and Bihar, in contrast, are steeped in rigid caste taboos and norms of female seclusion--strengthened from ancient through medieval times--at first as seats of ancient Hindu culture, and later as areas of resistance to cultural impositions by the Moguls and the British. The states of Maharashtra and Andhra Pradesh bordering on the south are distinctively dissimilar from the northern states having less restrictive norms about female mobility--undoubtedly as a result of the influence of the dominant cultural system of Southern India, the Indodravidian. Further, the densely forested range of Mahakal, that runs east to west in central Madhya Pradesh, has harbored numerous tribal communities while at the same time acting as a sentinel for the south against northern incursions (Map 2). The tribal, non-Sanskritized, sociocultural elements, hence, are discernible in these parts of the state.



MAP 1.



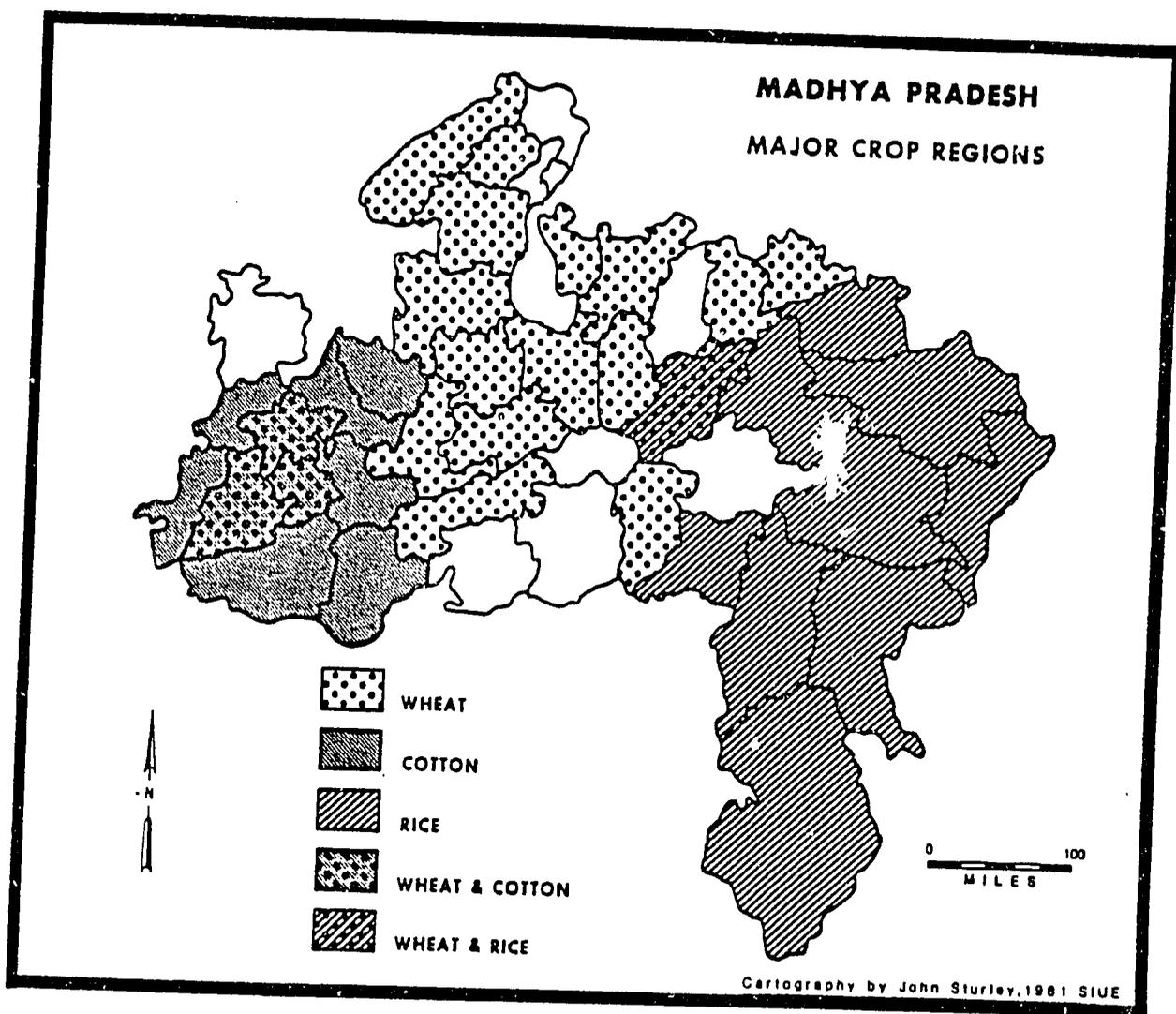
MAP 2.

Unlike many other states of India, Madhya Pradesh also possesses an ecological diversity in its specific crop regions. Wheat is the dominant crop in the Chambal valley in the north. Cotton is the major cash crop in the black cotton soils of the west. The plain of Chattisgarh in the southeast, with its moist alluvial tracts, is the Rice Bowl of the state (Map 3).

The sample villages were distributed in the border districts of the above three crop regions so as to include specific cultural traits that spilled over from the neighboring cultural regions (Map 4). The districts were also selected with a view to acquiring an even mix of tribal and non-tribal populations in order that comparative assessments of female roles in the social economies of tribal and nontribal populations might provide insights into the differential impacts of modernization plans on differing social economies. Village samples in each district were then distributed on the basis of the physio-cultural characteristics of the districts. The villages of (1) Moondla, (2) Kalamooda and (3) Ranipura in the west of district Morena were sampled to represent the border-lying tribal economies of the north. The villages of (4) Dompura and (5) Ghatena from the same district were picked to represent the non-tribal irrigating farm population, bordering on the state of Uttar Pradesh. The sample villages of (6) Sambalpur and (7) Kochbai from the paddy-growing districts of Raipur were selected to stand for the tribal paddy economy and (8) Mangsa, (9) Semarthara, and (10) Parastarai were picked to represent the non-tribal Hindu population bordering on the state of Bihar. In the cotton region, the villages of (11) Jamothi, (12) Talagpur, (13) Badi, and (14) Bhagiapur from the district of Khargone, bordering on Maharashtra and Gujerat, were sampled for their predominantly tribal population and the villages of (15) Bakhari and (16) Sayadpur from the adjacent district of Khandwa were sampled to represent the non-tribal Hindu population bordering on the state of Andhra Pradesh.

Approximately 10 to 15 percent of the village population was sampled from each of the villages which ranged in total population from 100 to 400. Each crop region contributed approximately one-third of the total sample of 181 cases. Cases were selected from the village register on a random number basis. The total village sample was further stratified on the basis of landholding sizes, i.e., small, medium, and large, according to the distribution of landholding size in respective villages.

Case-by-case interviews of husband-wife farming teams or female householders (in the absence of male landholders) were conducted in the privacy of a village classroom or the village community center. Responses were recorded on a prepared questionnaire that was translated and checked for accuracy and comprehensiveness by officials of the State Department of Agriculture. Care was taken to allow for a relatively free and relaxed atmosphere for the interviews. Once the initial discomfort of the interview situation eased, the female respondents were found to be surprisingly articulate about their activities, problems, and needs, often readily volunteering information.



MAP 3.

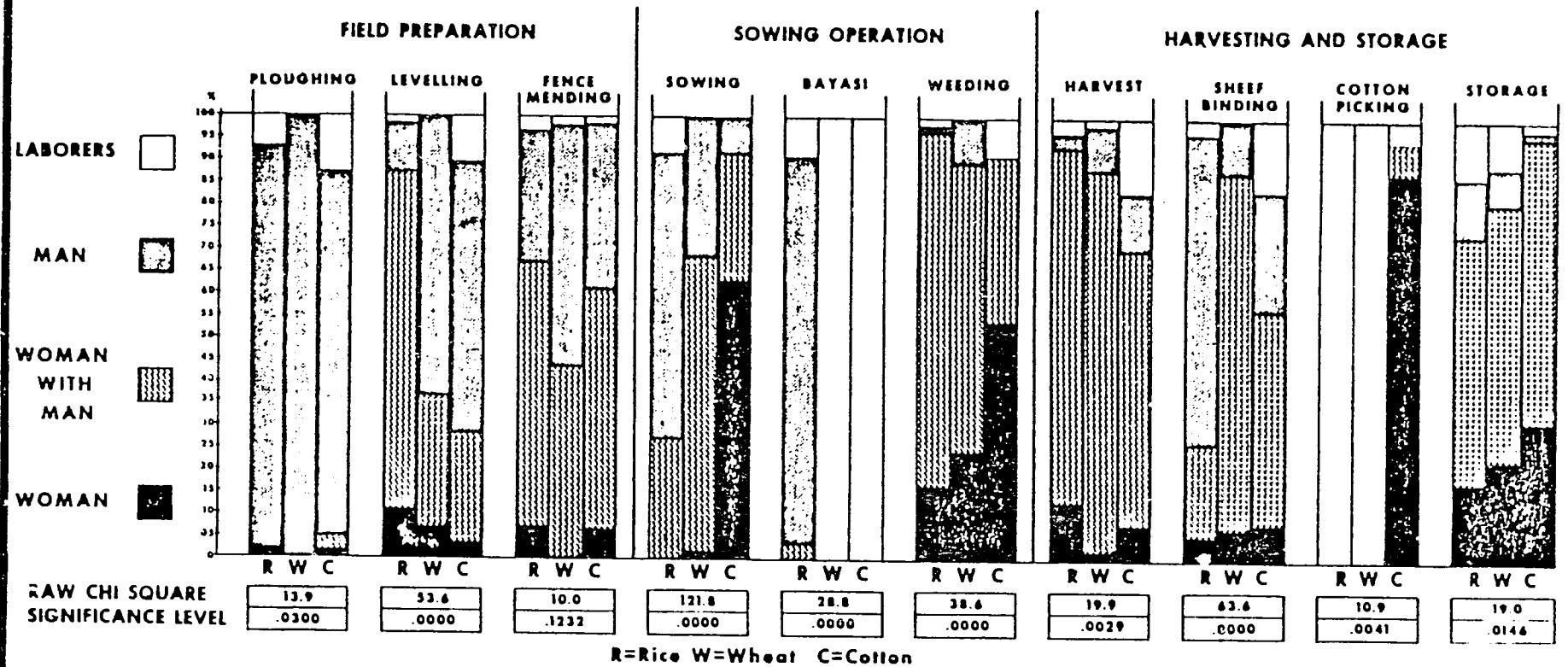
The data collected were later processed through the SPSS (Statistical Package for Social Sciences) system at Southern Illinois University. The total number of variables processed were 2308. The variables were grouped according to (1) personal data, (2) land-labor relationships, (3) on-farm activities, (4) farm decision-making, (5) crop processing, (6) marketing, (7) subsidiary off-farm occupations, and (8) employment patterns. In all these activities, female participation patterns (solely, or jointly with males) and their impact on modernization trends were maintained as the focus of investigation.

Participation in Farm Activities

India's farming system--a system of plough cultivation (in contrast to a system of shifting cultivation that is largely prevalent in Africa)--is considered to be traditionally a male farming system in which men rather than women play the dominant role (Boserup 1970, pp. 15-31). Nevertheless, the traditional division of labor has undergone shifts toward greater female participation in times and areas of intense population pressure that demand intensification of production. One must also bear in mind that the system under investigation is the traditional subsistence system that has been exposed to colonial and capitalistic modes of production and is presently undergoing transformation under Western modes of capitalism. The introduction of an ultra-new technology is likely to produce further shifts in labor. Nevertheless, close inspection of the division of labor reveals fewer tasks reserved exclusively for males and more abundant and laborious farm-related tasks reserved for females, over and above their customary "nurturant-type tasks" relating to supervision and care of the family (Sharma 1980, pp. 90-91). The intent of the following analysis is to provide empirical evidence of female participation in the agricultural production process.

The farm activities examined ranged from ploughing to harvesting and storage (Figure 1). The data showed some basic patterns of female work. Female participation in the handling of the plough was minimal.² In the successive land preparation operations of levelling and fence mending (bunding), women worked jointly with men, particularly in the paddy region. Normally paddy in most of India is sown the transplanted way, and the activity is heavily dependent on female labor. In the research area, however, paddy was sown broadcast. The successive operation of Bayasi--running the plough to etch furrows and loosen the weeds--is exclusive to this area and was handled entirely by males. Acreage under high yielding new varieties of paddy, however, were on the increase at an annual rate of 17 to 20 percent (Directorate of Agriculture 1977). The introduction of transplanted rice was opening jobs to females in this area--evident in the joint operation data contained in Figure 1--unlike in other paddy areas in India where male labor (better trained to handle the new rice) was encroaching and in some instances taking over the transplanting operation (Mies 1980, pp. 8-13). The sowing operations in the cotton region were largely handled by females, either solely or in conjunction with men. In the wheat region, sowing was predominantly a joint operation. Weeding operations, traditionally a female task--

FEMALE PARTICIPATION IN FARM OPERATIONS BY CROP REGIONS, MADHYA PRADESH, INDIA



Source: Survey data by author, 1979

Graphics by John Starley, SIUS

FIGURE 1.

evidences of which were noticeable to some degree in all three crop regions but more clearly in the cotton districts--was largely a joint operation (eight-tenths of the sample reported joint participation).

Harvest activities include cutting and binding of sheaves, cotton picking, and post-harvest grain storage. Cutting and binding of sheaves was predominantly a joint male-female task, whereas picking of cotton continued to be solely a female operation. The introduction of hybrid cotton (the cross pollination operations of long-stapled shankar char with the indigenous short-stapled disease-resistant variety) had, however, opened up new channels for female employment. The diffusion of hybrid cotton, nevertheless, was slow due to low adoption rates by farmers. As a result, the state had been compelled to restrict seed production, thereby raising the price of hybrid seed and further limiting the adoption rate. Economics, more than politics, was responsible in this case for the restricted employment potential for women in the modernization process. Storage of grain was found to be a shared task, though, not infrequently, it was solely a female responsibility.

Participation Patterns by Cultural Regions

Female participation patterns in farm activities also seemed to bear an observable relationship to the cultural differences of the sample areas. The paddy region bordering on the state of Maharashtra, for example, is generally free from the cultural imposition of the spatial seclusion of women (Purdah), and a greater degree of female participation was observed both in actual agricultural operations and in agricultural decision-making in the adoption of modern factors of production. However, the wheat-growing region bordering on the state of Uttar Pradesh--known for its rigid caste taboos and restriction of female mobility--revealed a much lower female participation level as compared to the western area bordering on the state of Rajasthan. In Rajasthan, women, although observant of Purdah, continued to engage in production on the land, as they had traditionally during times when men were engaged in the time-honored occupation of defense (Parry 1979, pp. 122-23).

Participation Patterns by Caste

The stratified caste structure of the Hindu village system (in which the Brahmins or Thakurs traditionally occupy the top of the hierarchy, the agriculturists and the artisans occupy the middle, and the Harijans or untouchables make up the lowest stratum) was found to bear a discernible relationship to levels of female participation (Table 3). The prevalent form--joint participation--seemed to increase as one moved down the hierarchial structure. Sole female participation was considerable in the operations of weeding and cotton harvesting. Women who were active as sole participants were from the middle caste and tribal groups. In the cotton harvesting activity, however, there was little variation on the basis of caste. It is also worthy of mention that joint male-female participation in the tribal community was comparable to the level of joint male-female participation found in the community of low caste (with which

Table 3

Participation Pattern in Farm Operation of Major Female Involvement by Caste
(Percent of Cases)

	High					Middle					Low					Tribal					N	x ²	Sig. Lev.
	M	F	JT	L	n	M	F	JT	L	n	M	F	JT	L	n	M	F	JT	L	n			
<u>Field Preparation</u>																							
Levelling	65	0	25	10	20	57.1	07.1	32.1	3.6	28	37.1	08.1	53.2	1.6	62	44.3	08.2	42.6	4.9	61	171	11.06	.23
Fence Mending	70	5	20	5	20	46.4	03.6	42.9	7.1	28	35.5	04.8	58.1	1.6	62	31.1	04.9	63.9	0	61	171	17.06	.03
<u>Sowing Operations</u>																							
Sowing	60	5	25	10	20	14.8	14.8	66.7	3.7	27	45.2	12.9	37.1	4.8	62	16.4	42.6	37.7	3.3	61	170	39.07	.00
Weeding	20	20	50	10	20	0	46.4	50	3.6	28	03.3	24.6	70.5	1.6	61	0	38.3	70.5	3.3	60	169	27.07	.001
<u>Harvest Operations</u>																							
Harvest	25	0	55	20	20	25	07.1	64.3	3.6	28	07.6	09.7	82.3	6.5	62	03.3	08.2	8.2	6.6	61	171	29.15	.0001
Sheaf Binding	36.8	0	47.4	15.8	19	25	17.9	57.1	0	28	35.5	04.8	50.0	9.7	62	38.3	06.7	48.3	6.7	60	169	11.09	.21
Cotton Picking	0	83.3	16.7	0	6	0	100	0	0	10	0	0	90.9	9.1	11	0	80.6	12.9	6.5	31	58	04.06	.60

NOTE: M - Male, F - Female, JT - Joint Male & Female, L - Laborers,
n - Actual Number of Cases
N - Total of Sample
X² - Chi Square Value

Source: Survey Data by Author, 1979-80

the tribal community is economically on a par) thereby verifying, to a degree, one school of sociological thought pertaining to the process of gradual adoption (Sanskritization) of the traits of the Hindu village society by the tribal population (Srinivas 1956, pp. 481-96). Nevertheless, a greater degree of female autonomy and responsibility was evident in the tribal systems in which women had high rates of participation in operations.

Participation Patterns by Economic Classes

The economic status of women is known to be associated with the degree of female visibility in public places. Studies have documented a shift in female labor participation since India's independence, particularly in the "Green Revolution" areas, as prospering farmers have replaced family labor with hired labor (Nath 1965, pp. 813-16). Some have argued that the process existed even before the "Green Revolution."³ On the other hand, downward economic mobility following enactment of Land Reform laws, resulting paradoxically in the worsening of the economic climate for the small farming community, was accompanied by greater female input into the agricultural production process. Increasing female participation with decreasing holding sizes was validated by the research data and was found to be statistically significant (Table 4). A significant fact that needs to be mentioned is that the decline in female participation among women in the upper economic class did not reach an absolute. It was presumed, and also observed, that except for very large landholders, women in the upper class continued to contribute their share of labor to agriculture.

In all those areas of activity where female participation (either singly or jointly with males) predominated, more than 80 percent of the cases reported working full days on these operations. More specifically, during the periods of field preparation, weeding, and harvesting, women on the farm universally worked from dawn to dusk, extending their work hours (including domestic chores) to more than 14 to 16 hours a day.

Agricultural Decision-Making

The emerging set of patterns of participation in farm activities, varying by region, caste and class, raised another set of questions as to the nature and degree of female participation in agricultural decision-making. Labor inputs into household and agricultural production are considered vital indicators of female status, and, consequently, determinants of women's role in decision-making. The investigations of decision-making regarding selection, the amount of acreage set aside for commercial crops, and the adoption and use of modern factors of production such as credit, fertilizer, seeds, pesticides, and equipment, revealed clear patterns of female inputs in the decision-making process. The investigation, however, was not directed toward traditional, agricultural practices, since such practices are mostly accomplished by a "collective conscience"--a combination of age old knowledge and practices--rather than by individual choices and decisions. When changes in the system are being introduced, however, and information regarding the change is reaching

Table 4

Participation Pattern in Farm Operations of Major Female Involvement by Land Holding Size
(Percent of Cases)

Field Preparation	SM					MD					LG					Total N	x ²	Sig. Lev.	
	M	F	JT	L	n	M	F	JT	L	n	M	F	JT	L	n				
Levelling	38.5	09.5	48.7	3.8	78	52.1	05.5	41.1	1.4	73	54.5	04.5	27.3	13.6	22	173	11.00	.08	
Fence Mending	33.3	09.0	56.4	1.3	78	41.1	01.4	54.8	2.7	72	63.6	04.5	27.3	04.5	22	172	12	.06	
<u>Sowing Operation</u>																			
Sowing	35.9	11.5	46.2	6.4	72	30.6	30.6	38.9	0	72	22.7	36.4	27.3	13.6	22	172	18.5	.005	
Weeding	03.9	32.5	62.3	1.3	77	05.5	31.5	61.6	1.4	73	0	28.6	47.6	23.8	21	171	24.66	.0004	
<u>Harvest Operation</u>																			
Harvest	07.8	13.0	74	5.2	76	12.3	01.4	83	2.7	71	04.8	04.8	61	28.6	22	169	26.03	.0002	
Sheaf Binding	34.6	06.4	51.3	7.7	78	37	09.6	53.4	0	73	36	0	36.8	26.3	19	170	19.42	.003	
Cotton Picking	0	85.7	14.3	0	21	0	81.5	18.5	0	27	0	64.3	14.3	21.4	14	62	11.00	.026	

NOTE: SM - Small Holdings of 5 acres and less; MED - Medium Holdings of above 5 to 20 acres;
 LG - Holdings larger than 20 acres.
 M - Male, F - Female, JT - Jointly by males and females, L - Laborers.
 n - number of cases in the category,
 N - Total of sample

Source: Survey Data by Author, 1979-80.

individual entrepreneurs from external sources, then individual decision-making becomes necessary. If the source of information is someone other than fellow villagers, it becomes imperative to collate information and consult men and women of the household in order to arrive at a decision (Sharma 1980, p. 102). If women happen to be fellow workers in farm activities, it is easier and more practical for men and women to arrive at decisions together.

Decision-making regarding the amount of acreage set aside for commercial food crops was overwhelmingly joint, rather than solely male or female in all three crop regions. This pattern, however, changed in the direction of greater male decision-making in the case of cash crop acreage.⁴ In addition, joint participation in both food and cash crops declined considerably in favor of individual male decision-making with increasing size of land holding. Further, the commonly held notion that the subsistence sector of production is mostly controlled by females was not validated by the data. The substantial level of male input in decision-making in the subsistence sector could be an indication of low employment opportunities for males in the area, leaving them no alternative but to tend their own farms (Tables 5 and 6).

More important, however, is the value of ascertaining female input in decisions concerning modern factors of production, a phenomenon that might prove to be a significant factor in agricultural change along with factors such as education, income, ownership status, and attitudes (Obibuaku 1979, pp. 43-52; Michaelwait 1976, pp. 79-96). As women are found to be equally active or more active than males in some areas of farm activity, it can be hypothesized that their contribution is of equal, if not more, importance in the adoption of new factors of production. This hypothesis was tested by asking whether decisions regarding modern factors of production were made unilaterally by males, with inputs from females, or whether the decisions were made in joint consultations between male and female respondents. It was also felt necessary to investigate the nature of governmental extension programs with regard to the female sample since women's role as participant decision-makers in the adoption of modern inputs is likely to depend upon their knowledge of the input package. The modern technology package, as is well known, includes irrigation, chemical fertilizers, high-yielding hybrid seeds, pesticides, mechanical equipment, and non-private credit allowances to assist in the acquisition of these items. With regard to fertilizers, pesticides, seeds, and equipment, questions were asked concerning who decided whether or not to purchase the items and the amount of funds to invest. With regard to mechanical equipment such as tractors or irrigation pumps, it was more important to know who made the decision to purchase the equipment rather than who handled the equipment. With regard to credit, the questions consisted of who decided on borrowing and the amount to be borrowed from non-private sources. In cases where the decision-maker happened to be someone other than the interviewed couple, that person was assigned to the category "others."

Table 5

Participation Pattern in Decisions over Subsistence Crops
and Cash Crops by Crop Regions
(Percent of Cases Reporting Growing of Subsistence and Cash Crops)

By Crop Regions

	<u>n</u>	<u>Male</u> <u>%</u>	<u>Joint MF*</u> <u>%</u>	<u>Female</u> <u>%</u>	<u>Other</u> <u>%</u>
1. Decisions on Food Crops and Acreages:					
Rice	57	10.5	66.7	12.3	10.5
Wheat	59	15.3	83.1	0.0	1.7
Cotton	58	19.0	79.3	1.7	0.0
Total Sample (n)	174	14.9	76.4	4.6	4.0

Chi-Square: 22.68
D.F.: 6
Signif. Level: .0009

2. Decisions on Cash Crops and Acreages:					
Rice	8	37.5	50.0	0.0	12.5
Wheat	54	29.6	70.4	0.0	0.0
Cotton	57	33.3	64.9	1.8	0.0
Total Sample (n)	119	31.9	66.4	.8	.8

Chi-Square: 15.63
D.F.: 6
Signif. Level: .015

*NOTE: MF - Male and Female
Other - Other than respondent

Source: Survey Data by Author, 1979.

Table 6

Participation Pattern in Decisions over Subsistence Crops
and Cash Crops by Holding Size
(Percent of Cases Reporting Growing of Subsistence and Cash Crops)

By Holding Size

	<u>n</u>	<u>Male</u> <u>%</u>	<u>Joint MF*</u> <u>%</u>	<u>Female</u> <u>%</u>	<u>Other</u> <u>%</u>
1. Decisions on Food Crops and Acreages:					
Small	94	8.5	77.7	8.5	5.3
Medium	61	13.1	83.6	0.0	3.3
Large	19	52.6	47.4	0.0	0.0
Total Sample (n)	174	14.9	76.4	4.6	4.0
Chi-Square: 31.37 D.F.: 6 Signif. Level: .000					
2. Decisions on Cash Crops & Acreages:					
Small	57	28.1	70.2	0.0	1.8
Medium	46	30.4	67.4	2.2	0.0
Large	16	50.0	50.0	0.0	0.0
Total Sample (n)	119	31.9	66.4	.8	.8
Chi-Square: 5.38 D.F.: 6 Signif. Level: .49					

*NOTE: MF - Male and Female
Other - Other than the respondent

Source: Survey Data by Author, 1979.

The hypothesis of a high level of female input in the decision to adopt new inputs was validated by the data. Irrigation as an input in farming was highly valued; if water was available, and was within the procurement means of the farming family, the decision was universally in favor of adoption.⁵ Hence the input is excluded from analysis.

Female input was significant in decisions concerning chemical fertilizers and in decisions regarding the amount to be annually invested in the input. The high female involvement in the decision to adopt and use chemical fertilizers seems to be related to women's knowledge of fertilizer use, as is evidenced by the data in Table 7. Nearly three-fourths of the sampled females in both the rice and cotton regions and more than one-half in the wheat region reported knowledge about the use of chemical fertilizers. The high prevalence of such knowledge among females of the large landholding class is worthy of note and suggests their interest in the new input, despite the fact that they may participate less in decision-making or in the actual use of the input. The lesser extent of knowhow in the medium landholding group requires explanation since females in this group exhibited a high degree of participation in farm activities. The use of chemical fertilizers is closely tied to the size of the farm. Both the small and the medium landholding groups were likely to be constrained in fertilizer use due to restricted availability of water. But, women from small landholding classes in their added role as wage laborers on larger farms were likely to be more advantaged in acquiring the knowhow than females from the medium landholding class.⁶

Concurrently, it was felt to be of some importance to trace the source of knowledge about the chemical fertilizer package and its dissemination to the female population. If the knowledge was acquired through the efforts of the government's extension services, then the inevitable conclusion to be reached was that the government does recognize the female factor in farm operations. The data, however, revealed that only one-third of the sample was being reached by extension services. Slightly less than one-half of the sample drew its knowledge from neighbors and villagers. The government extension program, in this respect, seemed to operate more efficiently in the paddy region than in the cotton and wheat regions. In addition, the data revealed that the large landholder class had greater accessibility to extension services than the small and medium landholding groups, which seemed to benefit more from each other than from extension services.

The general trend of female involvement in decision-making in the three crop regions is depicted in Figure 2 and can be summarized by the following points.

1. Joint male-female decision-making was greatest in the wheat region, substantially lower in the cotton region, and least in the paddy region.
2. Female input in male decision-making was highest in the paddy region.

Table 7

Knowledge of Chemical Fertilizer Use Among Male and Female Population
by Crop Regions and Farm Size
(Percent of Cases Reporting Use of Chemical Fertilizers)

<u>Regions</u>	<u>n</u>	<u>Male & Female Team (Percent)</u>
Rice Region	43	74.4%
Wheat Region	47	53.2
Cotton Region	57	70.2
Total Sample	147	97.0
 <u>Farm Sizes</u>		
Small	79	67.1
Medium	17	47.1
Large	51	70.6
Total Sample	147	66.0

Source: Survey Data by Author, 1979.

FEMALE PARTICIPATION IN THE DECISION MAKING PROCESS BY CROP REGIONS, MADHYA PRADESH, INDIA

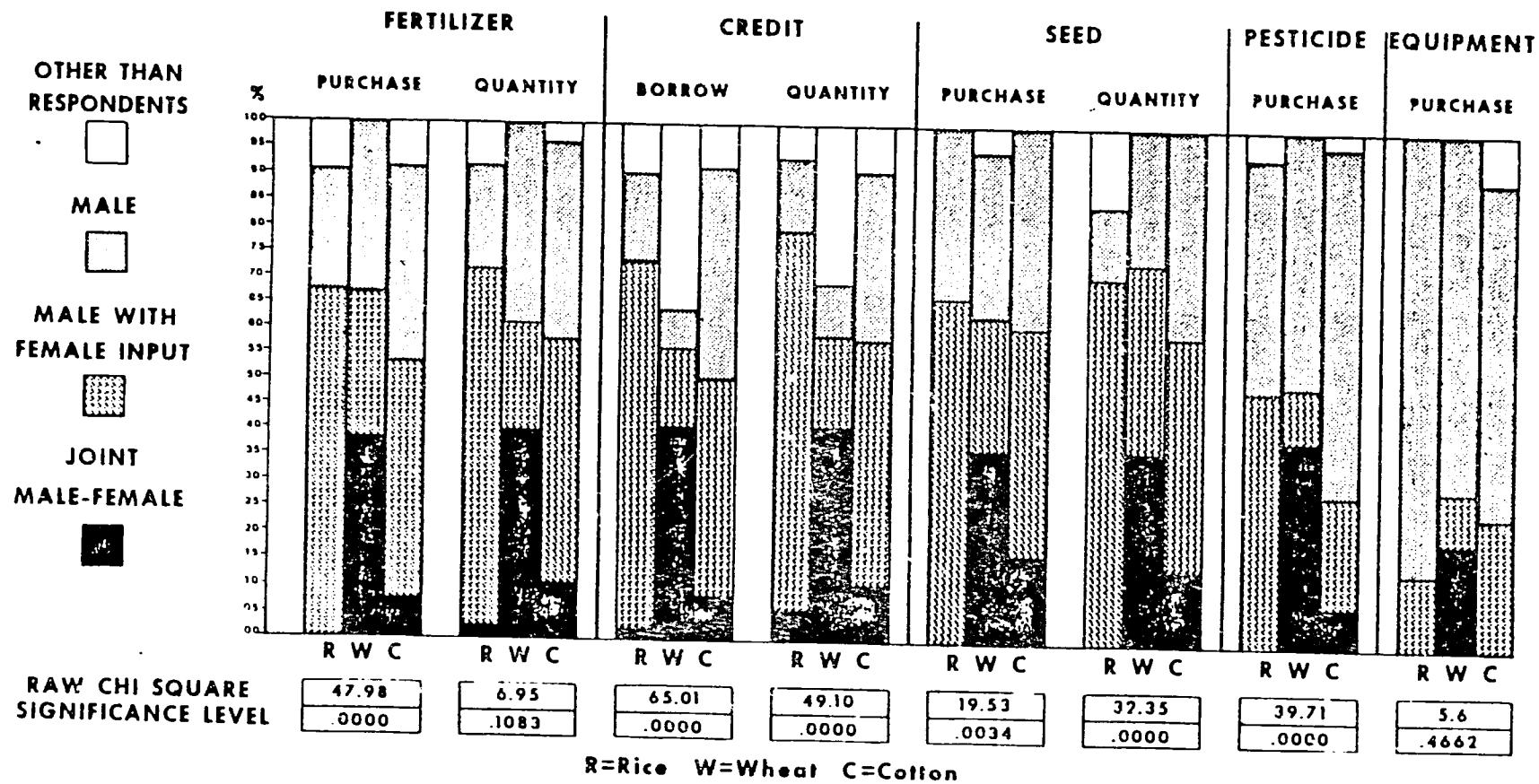


FIGURE 2.

Source: Survey data by author, 1979

* Percent of cases reporting use of inputs

Graphics by John Sturley, SIUE 1981

3. Universally, a greater number of females exercised their say in the decision over the quantity of fertilizer, seed, or credit to be acquired, thereby displaying a greater control over the financial element in the decision-making process.
4. Female input in decision-making was distinctively lower than male input with regard to the use of pesticides and farm equipment. Items of mechanical equipment were generally handled by males, and pesticides that required a special expertise beyond even the reach of the male population were used only with extension assistance.
5. Female participation in decision-making showed a clear and inverse relationship to farm size (Figure 3). Decreasing farm size entailed a higher degree of female involvement in decision-making, presumably being linked to the degree of involvement in farm operations. Females with small and medium sized landholdings, having demonstrated a higher degree of participation in farm activities, were able to provide greater input in decisions concerning the adoption of modern factors of production. Similarly, the relatively small female input in decision-making in the large holder's group seemed to coincide with their lesser participation in farm activities that was observed earlier (see Table 4).

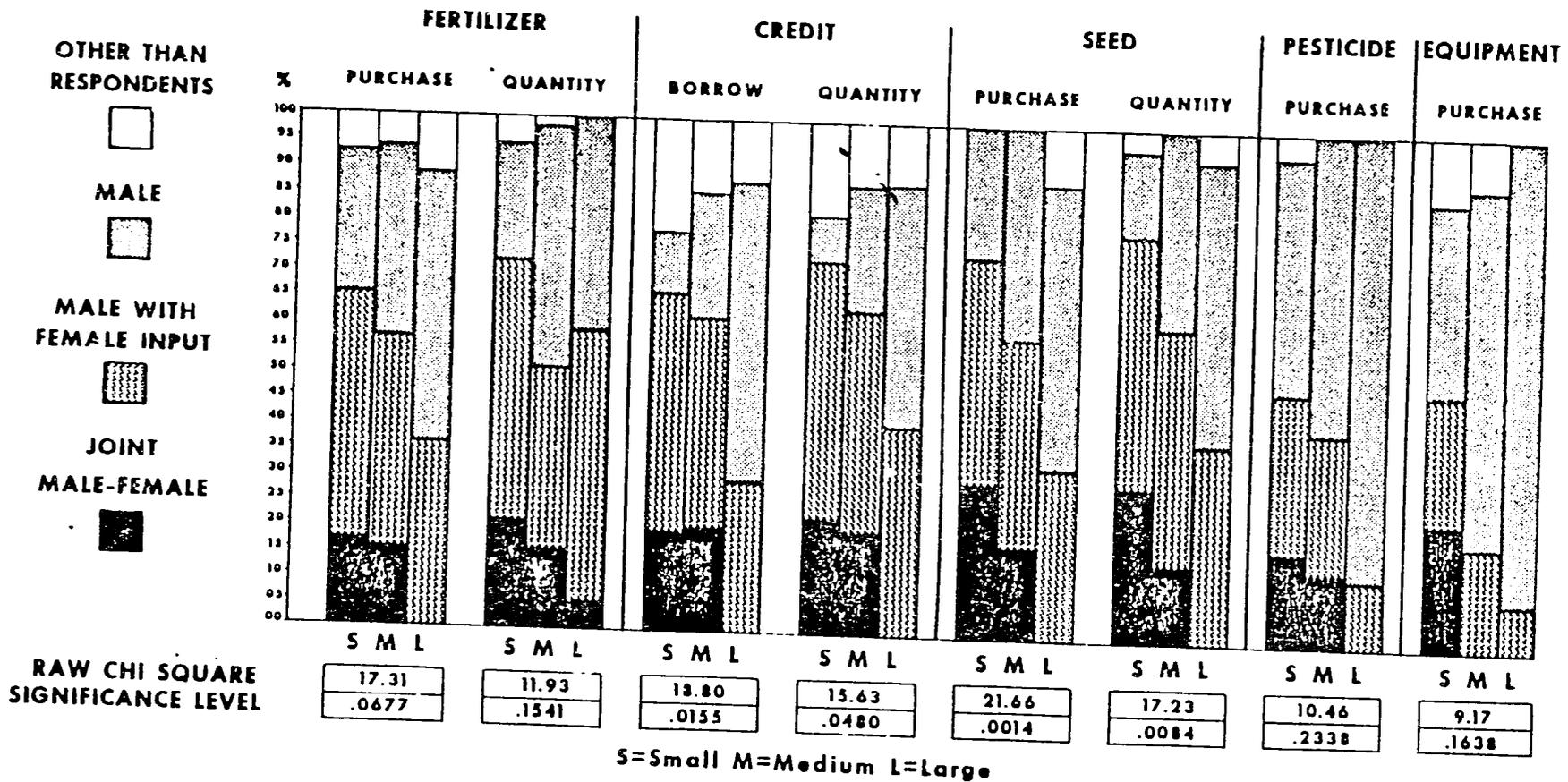
Role of Extension Services

The government, rather than private agencies, is the chief agent of the modernization effort in India. The extension wing of the State Department of Agriculture--through its personnel, farm demonstrations, and sub-regional agricultural training camps--assists in the diffusion of modern technological knowhow. The package farm demonstrations are conducted in season on a few select village farms considered "optional," i.e., that already are endowed with the necessary support systems.

Participation in such demonstrations by the sample was highest in the paddy region (73%) and lowest in the cotton region (26.7%). Less than half of the participating sample reported joint male-female participation patterns in farm demonstrations. Joint participation was highest in the paddy region and among the large landholder group (Table 8).

Occasionally, agricultural training camps were organized in specific regions, drawing on a select farm population that was paid a monthly stipend while attending camp. A little over one-fifth (20%) of the sample reported having attended agricultural training camps. Participation patterns appeared to be mostly male except in the paddy region where moderate rates of female participation were observed. Participation by females within the small holder's group was nil, despite their active participation in farm operations and decision-making.⁷

FEMALE PARTICIPATION IN THE DECISION MAKING PROCESS BY LAND HOLDING SIZE, MADHYA PRADESH, INDIA



Source: Survey data by author, 1979

* Percent of cases reporting use of inputs

Graphics by John Sturley, SIUE 1981

FIGURE 3.

Table 8
 Participation Rate and Patterns (Male and Female)
 in Farm Demonstrations and Agricultural Training
 Camps by Crop Regions and Holding Sizes
 (Percent of Cases Reporting)

	<u>(a) N</u>	<u>(b) Percent</u>	Participation Pattern (c) Percent of (b)		
			<u>Male</u>	<u>Joint MF*</u>	<u>Female</u>
ATTENDING FARM DEMONSTRATIONS:					
<u>By Crop Regions</u>					
Rice Region	59	72.9%	42.8%	48.1%	2.3%
Wheat Region	60	26.7	68.8	31.3	0.0
Cotton Region	62	53.2	57.6	42.4	0.0
Total of Sample	181	50.8	55.4	43.5	1.1
<u>By Holding Sizes</u>					
Small Holders	99	46.5	45.7	52.2	2.2
Medium Holders	63	52.4	60.6	39.4	0.0
Large Holders	19	68.4	76.9	23.1	0.0
ATTENDING AGRICULTURAL TRAINING CAMPS:					
<u>By Crop Regions</u>					
Rice Region	59	23.7	78.6	21.4	0.0
Wheat Region	60	10.0	83.3	16.7	0.0
Cotton Region	62	13.0	100.0	0.0	0.0
Total of Sample	181	21.0	85.7	14.3	0.0
<u>By Holding Sizes</u>					
Small Holders	99	11.1	100.0	0.0	0.0
Medium Holders	63	15.8	72.7	27.3	0.0
Large Holders	19	31.6	83.3	16.7	0.0

*MF - Male & Female

Source: Survey Data by Author, 1979.

Agricultural Crop Processing

Studies of village life in India in the nineteenth century well document the specialized participation of women in various agricultural processing activities such as shelling and clearing of grain, cording and spinning of cotton, flour grinding and processing of various milk products for domestic or village consumption (Kessinger 1974, p. 54). Many of these activities take place outside the household using mechanical processes, creating major imbalances in traditional sex roles. Grain was husked and ground in power-driven mills that have appeared in almost every single village. Oil extraction mills were fast replacing the home extraction process. Commercially produced vegetable oil had replaced the domestic production and consumption of clarified butter (Ghee). Machine loomed cloth had encroached upon home spinning and weaving areas (Sharma 1980, p. 119). The process can be viewed in several ways. One may view it as a measure of progress in the village society whereby women achieved greater leisure time. It may also be interpreted as an insidious step toward lesser self-sufficiency and greater vulnerability to market forces. Alternatively, the process of mechanization and commercialization can be viewed as one that pushed women out of their traditional roles, eroded their employment and income opportunities, and dispossessed them of their share of specific services to family and village society (Stoler 1977, pp. 87-89).

The participation patterns for grain threshing operations were mainly joint male and female in the paddy and wheat regions and solely female in the cotton region. Mechanization of the threshing process was slack in the wheat region, substantial in the rice and cotton regions, and strong in the tribal and non-tribal villages. The tribal females, however, were far more active singly in threshing operations than their non-tribal counterparts.

The variables of caste and economic status, known to play a dominant role in such activities, continued to be a significant factor as demonstrated by the data. In the high caste group, female participation, singly or jointly with males, in the manual threshing operations was nil, apparently substituted by a high incidence of mechanized threshing. The middle caste group of active agriculturists revealed a very high degree of joint participation in manual threshing and little prevalence of mechanized threshing. The lower caste group exhibited mostly joint participation and a substantial and equal degree of manual and mechanized threshing. Economic status, determined by small, medium, and large landholding sizes, also was inversely correlated with female participation in manual threshing operations.

In the paddy region, although domestic pounding of rice continued to be widespread, mechanized hulling had gained significant ground (Table 9). Flour milling was widespread in the cotton region and less widespread in the wheat region. Economic status, by way of landholding sizes, again was a key determinant of the degree of female participation; it was negatively correlated with home processing and positively correlated with mechanized processing. By contrast, machine grinding was found to be

Table 9

Female Participation Pattern in Processing:
Rice Hulling and Flour Grinding
(Percent of Cases)

	<u>N</u>	<u>At Home%</u>	<u>Machine%</u>	<u>At Home & By Machine%</u>
By Region:				
Rice	53	43.4	28.2	28.3
Wheat	59	88.1	0.0	11.9
Cotton	61	11.5	60.7	27.9
Total of Sample	173	47.4	30.1	22.5
By Caste:				
High	25	61.0	26.0	13.0
Medium	31	61.3	32.3	6.5
Low	59	45.8	25.4	28.8
Tribal	58	36.2	34.5	29.3
By Holding Size:				
Large	24	20.8	50.0	29.2
Medium	72	50.0	23.6	26.4
Small	77	53.2	29.9	16.9

Source: Field Survey Data by Author, 1979.

popular in all three caste groups. These differences were observed in two ways. First, the low caste and tribal females, who contributed substantially to home processing, were also dependent to a great degree on mechanical grinding, an understandable finding in view of the demand on their time for alternative wage earning endeavors. Second, the high and medium caste groups had a very high prevalence of home grinding, suggesting their adherence to traditional discretionary attitudes and rigid taste factors.

In the cotton growing region, however, the entire oil extraction process was mechanized, so much so that even the traditional community of oil extractors (Telis) were found to be dependent on mechanical oil extraction. No evidence was found anywhere of female involvement in supervisory or in wage labor capacities in the mechanized processing system.

Work Hours in Processing

Manual grain threshing and husking operations were still prevalent in the area and continued throughout the day and into the night during the season. Women ran the bullocks and worked mostly during the day. The winnowing (Udoni) operations were reported to entail a full day's work in the rice and wheat districts (Table 10). Such extensive participation was high in the middle and lower caste groups, but decreased to half a day's work in the high caste group and among tribal women. By economic class, the percentage of women working long hours decreased with increased size of landholding, the larger landholding group displaying shorter work hours. Regarding the operations relating to flour grinding and rice hulling, the daily work period for the majority of cases was one to two hours, more often extending to three to four hours (half-day). Noteworthy was the absence of variation in work hours by caste or economic class in the home processing activity. Women of the high caste and the large landholding group reported preoccupation with the activity in substantial proportions. What emerged was the fact that the work carried out within the "female space" had the capacity to cut across caste and class boundaries.

Employment Patterns

A little over half of the sample in each crop region reported employing female labor in farm operations. All landholding classes employed some female labor but the prevalence was three times higher in the large landholding class. Weeding and harvesting operations demand the highest input of female labor and the demand was uniformly high in all economic classes. Demand for female labor in sowing and grain clearing operations followed a close second, being very high in the cotton districts and in the large landholding class.

Table 10

Female Participation by Daily Work Hours in Grain Processing:
By Crop Regions, Caste and Landholding Size
(Percent of Cases Reporting Participation)

	Districts			Caste				Holdings		
	Rice %	Wheat %	Cotton %	High %	Med. %	Low %	Tribal %	Sm %	Med %	Large %
<u>Husking:</u>										
<u>Daily Hours</u>										
App. 1 hr. or less	-	-	19.2	-	-	-	20.7	07.1	06.1	22.4
1-4 hrs. (1/2 day)	27	-	61.5	100	-	22.6	44.8	17.9	36.4	44.4
4 hrs. (full day)	75	100	19.2	-	100	77.4	34.5	75.0	57.6	33.3
n	20	24	20	1	9	31	29	28	33	9
<u>Flour Grinding/Rice Hulling:</u>										
<u>Daily Hours</u>										
App. 1 hr. or less	71.1	40.7	50	64.7	38.1	55.8	48.6	53.7	49.1	58.3
1-4 hrs. (1/2 day)	29.9	59.3	45.5	35.3	61.9	44.2	48.6	46.3	50.9	33.3
4 hrs. (full day)	-	-	04.5	-	-	-	02.7	-	-	08.3
n	38	59	22	17	21	43	37	54	53	12

Source: Survey Data by Author, 1979-80.

Wage Rates

Differential wage rates based on sex is another drawback suffered by women in the labor market. Studies have revealed wage differentials based on sex, varying with specific operations and tasks depending on who handles them. Operations handled by males more often than not fetch higher wages than operations handled by females (Bardhan, K. 1973; Bardhan, P. 1979a). Such market segmentation in disfavor of females has been attributed to overcrowding of female labor in agriculture due to (1) changing production relations, (2) enforcement of land reform laws, and (3) large scale evictions of tenant farmers.

Wage differentials are known to vary from region to region, narrowing in better developed regions (Mukhopadhaya 1981, p. 98) as was observed in the irrigation wheat districts of the north in the sample area that was integrated into the Irrigation Command Development Program following the construction of the dam on the River Chambal. The in-season wage rates in this area were found to be as high as Rs. 7.00 per day (a little less than U.S. \$1.00) with women reporting almost equal wages to men. In the rest of the sample area, more than half the female sample received lower wages than males, wage rates ranging between Rs. 1.50 to Rs. 3.50 per day. In the cotton-growing areas, 92 percent of the population reported lower wages for females.⁸ Female wage rates ranged from Rs. 1.50 to Rs. 4.00 (approximately U.S. \$.50) in the paddy and cotton regions and a majority reported wages under Rs. 3.00. Sporadic cases of payments in kind were observed, mostly in the paddy region.⁹ Bardhan writes about market segmentation along ethnic lines, and by social hierarchy and caste (Bardhan, P. 1979b). In the research area, differences were based more on ethnic lines than on social hierarchy. The tribal communities were found to be invariably on the lower end of the wage scale. By economic order, few from the upper landholding class reported wage employment. The members of the low caste group figured more in the lower wage bracket than did those from the medium caste groups.

Of those in the sample reporting employment off their own farms, two-thirds came from the small landholder class. Fewer females in the high caste group were engaged in wage employment than in the low caste group.

Females were mainly employed in farming operations. Their employment in the public sector was reported to have risen in recent years, but it was insignificant in the survey area; only 15 to 18 percent of the sample reported employment in public work. No employment was reported in village industries or in the mechanized processing sector. Nonetheless, the latter may not hold true for the entire state since statistics continue to reveal female employment in cotton ginning, Bidi (indigenous cigars) making, shellac manufacturing, and Ganja (Marijuana) processing. The wages received by females, however, continued to be lower than those of males in these jobs, a factor that drove males away from female employment areas (Gambhir 1970; Indian Council for Social Science Research 1979).

Subsidiary Occupations

In traditional and transitional agrarian societies, women are known to engage in various forms of crafts and trades as off-season, income-generating activities. As the process of modernization inevitably leads to the displacement of female labor that does not immediately find an outlet in alternative avenues of employment, the value of informally conducted activities seems to acquire significance in relation to the substitution of family income, thus helping to sustain female status by providing potential areas of gainful activity.

Livestock and Dairying

In an animal-powered system, tending of livestock not only is a significant aspect of the household duty but is shouldered by females with a sense of pride and achievement--particularly the tending of the cows and the milking activities--the latter being symbolic of prosperity on the village scene. The tendency, however, is to relegate such activities to the domestic sphere rather than to perceive of them as parts of the production process (Sharma 1980, pp. 31-33).

The field observations and data revealed a division of labor in livestock management that varied somewhat with crop regions. Activities closer to or within the home were normally carried out by females alone; those extending beyond the home were carried out with the assistance of males. One of the activities found to be a singularly female responsibility was the collection of cowdung and the preparation of cowdung cakes for domestic fuel.¹⁰ The total female involvement in the collection of cowdung for domestic fuel could be viewed as a potential sphere of female activity in the development of rural, renewable energy systems such as (1) the creation of organic fertilizers to facilitate substitution for the high-cost, chemical fertilizers, and (2) the development of bio (gobar) gas as energy for rural households (Srinivasan 1981). Female involvement in the livestock sphere suggests that women can be absorbed in modernized dairy development schemes.

Other than the tribal regions in which females were involved in subsidiary occupations of seed, leaf, and gum picking and marketing, involvement in crafts and trades had eroded in the rural area. Weaving, sowing and basketry activities were sporadically reported in the wheat districts with little evidence that such products were marketed. A clear example of the replacement of a local craft by a market product was observed in a sub-locale in the paddy region; there the traditional crafting of rain covers with Sai (broadleaved deciduous) leaves was being replaced by cheap plastic covers purchased in the village market, setting into motion an inevitable process of a dying demand for the local craft. Further, a drain in the family income was likely to set in as the cheap synthetic material--lacking in durability--had to be replaced annually, creating yet another form of market dependency for the rural population.

Notwithstanding the wide scope of public or private planning and developmental efforts, a conspicuous absence of vocational programs or cooperative organizations to aid in local trade and craft was observed. Whereas certain activities were likely to be region-specific--for example, seed, leaf, and gum picking that are specific to forested areas, and soap making that is specific to cotton areas--some activities do possess the potential of universal popularization, e.g., garden cultivation, pickling/preserving of vegetables and fruits, knitting, weaving, apparel sewing, and some forms of craft-related activities. Livestock and dairy related operations, however, hold a high degree of promise in the integration of female skills into development plans by providing viable alternative occupations to rural women, as has been successfully demonstrated in the neighboring state of Rajasthan (Dixon 1978, pp. 50-63). The state of Madhya Pradesh, following the lead of its neighbor state, is presently engaged in dairy development, assisted by funds from the World Bank. Yet, a surprising lack of concern is exhibited in incorporating females in the western districts of the state where Bank money is flowing in to operate the nation-wide dairy development program "Operation Flood" (Dogra 1980, pp. 3-4).¹¹ Admittedly, the structure of the plan might change as the program gets under way and as the concerns of female alienation in development programs surface in the community of planners and administrators. Moreover, the World Bank has already declared women to be the target group of beneficiaries in its "New Style" dairy development projects to be carried out in India (World Bank 1975, pp. 8-9)

People knowledgeable about the bureaucratic structure of developing nations, and about India in particular, are aware that the structure is characterized not only by a slow executive process, but also by a lack of coordination between various wings of the government. It is not in the least surprising to find that in India the Department of Industry and Commerce does not always effectively coordinate its efforts with that of the Department of Agriculture in the development of small scale industries. An example of such weak coordination was observed in the state between the Tribal Welfare and Agriculture Departments. The Tribal Welfare Department, exhibiting a level of recognition of female status in the tribal economy, had embarked on an agricultural training program in which tribal couples (rather than just males) were drawn in to be trained in the hybrid paddy-growing package. The Department of Agriculture lagged behind in putting this kind of project into effect, thereby demonstrating a failure to respond to the phenomenon of active female involvement in the production and decision-making processes. What is more significant, however, is that a private fertilizer and pesticide agency had demonstrated rare insights by involving rural females through their grass roots female organization (Mahila Mandal) in a model scheme for popularizing their product. As a result, the female group was proudly managing a two-acre paddy plot on highly modernized lines with various paddy varieties ripening over staggered time--irrigated and fertilized without male assistance.

The operation, due to its success, was being extended (at the time of the field research) to another five acre plot of land received as a reward from the district administrator for the group's extraordinary accomplishments. The accomplishments of the female group were reported to have created a stir in the female population of the region, and may be expected to produce a ripple effect as the accomplishments of the group diffuse over space and time. Such mobilization and strengthening of the grass roots organizations or Mahila Mandals is deemed the appropriate eco-development model for training, preparing, and mobilizing the rural women, not only toward greater participation in the developing economy, but also as demanders of rights and just shares in the socioeconomic model of integrated development. Efforts of one or of a few such private agencies could lure others into such mutually beneficial endeavors.¹² There is no clear reason why the public sector could not use the model of the people's conscious participation in combination with the concerted efforts of the Departments of Agriculture and Social Welfare. The concept of people's participation (or Panchayat Raj) is an ancient one in India and has been strengthened substantially since the independence of India. Cooperatives even have had as their goal the facilitation of people's participation. The failure of such projects has reportedly been due to their being imposed from above rather than their growing from below. The experience of the past, if it is to be utilized in constructive ways, is suggestive of a preferred low profile by the public sector and the encouragement of non-governmental organizations to motivate and mobilize people in both general and specific developmental tasks. Efforts, without a doubt, ought to be channelled through institutionalized actions rather than individual actions in order to provide strength and life to the endeavors. Fortunately, there exist, in India, a number of such institutions--the Mahila Mandals for example--that could be tapped for such action.¹³ The Sixth Plan of India, for the first time, addressed itself to a program of revitalizing the institution of Mahila Mandal throughout the country. Some 66,000 of these, languishing due to the lack of guidance and support following the dismantling of the Community Development Program, if integrated into the Development Program, are sure to pave the way for a greater role for women in agricultural diversification.

Summary and Conclusions

Varying regionally, culturally, and by economic class, females in the region were active participants not only in actual farm operations but also as decision-makers in the adoption of modern farm inputs. Participation rates were correlated inversely with landholding sizes, rising with the decreasing size of holdings. Female input was more significant in decisions over finances such as government credit and annual expenditures on seed and fertilizer than in decisions about pesticides and equipment. Nonetheless, female participation in farm demonstrations did not compare well with participation rates in decision-making and was decidedly low in agriculture training camps. Regionally, female participation was greater in the paddy and cotton regions in comparison to the wheat region, reflecting, presumably, the cultural freedom from strict female seclusion prevalent in the former areas. A great degree of erosion in female

participation had occurred due to mechanization of agricultural crop processing in areas of grain threshing, rice hulling, flour milling, and oil extraction. Yet, alternative avenues available for female employment were restricted to on-farm jobs and few were involved in jobs in the public sector. Male-female differential wage rates--narrowing somewhat in the command irrigation areas of the north--were the rule. Practically no government programs or schemes directed toward vocational training or employment alternatives for women were observed during the field work.

In conclusion, some displacement of labor is inevitable in the process of technological transformation. So long as it occurs with administrative awareness, steps can be taken to remove the imbalances through innovative plans for utilization of the services and skills of the disadvantaged sector. In the absence of administrative awareness, however, the negative impacts of such displacements can be more far reaching than is apparent, permeating the entire socioeconomic spectrum of rural society--female status, demographic aspects, and the very question of social stability. In addition, it needs to be borne in mind that the degree to which the alienation of women is tied to socioeconomic and cultural factors is likely to be of greater consequence in less constrictive social environments such as those of the research area and for the lower and middle economic classes than for culturally restrained environments and economically affluent groups. Hence, planning efforts ought to be directed more strongly toward the former (as the Sixth Plan of India proclaims) than the latter. The total rural uplift, however, ought not to exclude the resources available in any sector. For restrictive groups that have emerged in this research, and for many more, schemes for a range of activities (such as supervisory roles in agricultural processing or craftwork, or even employment perceived as a continuum of domestic work) to be carried out within the confines of "female space" could assist in generating supplemental family income, simultaneously bringing fulfillment through contribution to the village community. Just as a different set of plans are required for the differing economic, if not caste, groups, so is the need for specialized treatment for the tribal economies. In order that modern technology can spread uniformly over a region, eradicating rather than creating economic and social imbalances, and in order that every sector of the rural population can be given an opportunity to become integrated in the developmental efforts, the female factor, with all its variations, will have to be understood, analyzed, and finally redeemed. Needless to say, if left to themselves, well-rooted traditional societies have a way of readjusting to changes, conditioned albeit by the fact that: (1) exposure to external forces is kept to a minimum and (2) that the pace of change is kept humanly manageable. In the contemporary stampede for increased rates of production and material output, all working plans, strategies, theoretical models, and regional-national efforts must be required--lest the weak be trampled--to compensate for the omissions of the past several decades.

NOTES

1. This paper is a revised version of one presented at the International Interdisciplinary Congress on Women, December 28, 1981--January 1, 1982, Haifa, Israel.
2. A strong cultural bias exists against female handling of the plough. Such bias does not seem to apply to the handling of modern power-driven machinery. The fact that women normally do not operate such equipment is due to reasons other than those applicable to handling of the plough.
3. For a detailed discussion, see M. L. Darling 1928.
4. The cash crops are soybean and mustard in the wheat region, and chili pepper, sesamum and bananas in the cotton region. Practically no cash crops were grown in the paddy region.
5. More than 60 percent of the sample population in each region reported availability of water for irrigation and 90 percent of those (in each region) were irrigating their land.
6. The use of chemical fertilizer is heavily dependent on substantial inputs of irrigation water over required periods of plant growth.
7. Studies on productivity gaps by sex groups are almost nonexistent. A cross-sectional study of female-managed and male/female- (jointly) managed farms in Kenyan sublocations in Africa revealed high productivity levels on female-managed farms, with little farm assistance. Female-managed farms, however, compare poorly in productivity with jointly-managed farms in locales where good farm assistance exists. Women largely cite neighbors and market as their sources of information rather than agricultural extension--an obvious factor in limiting crop diversification and commercialization on female-managed farms. Such institutionalized imbalances, claimed by the author of the study, are bound to enhance, rather than bridge, the economic disparities between the sexes. See Kathleen Staudt 1978.
8. The government wage rate is Rs. 3.50 paisa per day, for both males and females.
9. Wages in kind vary from 2 to 3 kilograms (4 to 6 lbs.) of grain for a day's work.
10. For activity patterns in livestock management, see D. Bagchi 1980.

11. Operation Flood project is an innovative dairy development scheme, launched as a five-year plan in India in 1970, based on agreements with the World Food Program (of free gift supplies of skimmed milk powder and butter obtainable from the bulging food surpluses of the EEC countries). The sale proceeds of the gifts are ploughed back into modern dairy development schemes in order to make the country self reliant in milk and dairy products.
12. The American Friends Service Committee, located in Philadelphia, PA, is one such private agency successfully engaged as development agents in partnership with women's groups in West Africa, helping local women develop labor-saving devices and cooperative enterprise and learn new income-generating skills and fund-raising strategies.
13. Some of the Institutions useful for developmental tasks are (1) youth and women's organizations for promotion of eco-development and environment; (2) voluntary organizations engaged in general development work such as education, health, etc.; (3) organizations of specific beneficiary or interest groups such as self-employed women or farmers or people with common economic interests like marketing; (4) organizations of people living in command areas of irrigation management; (5) religious, social or cultural organizations such as Rotary, Lions or Jaycees undertaking selective projects; and (6) professional academic or non-academic organizations undertaking study, research or social action as part of their professional commitment (Juneja 1981).

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