Seasonal Migration of Tribal Labour
An Irrigation Project in Gujarat

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Though most seasonal migration is between rural areas, much of the literature on the subject is concerned with rural-urban migration. This paper attempts to study the seasonal migration of tribal labour from the predominantly rural district of Panchmahah in Gujarat Mo the rural areas of the neighbouring Kaira district falling under the command area of Mahi-Kadana irrigation project. It examines the phenomenon both at the origin of the migration and at the destination of the migratory labour.

The paper is in four sections. Section one provides the general background to the two districts and section two examines the data of the first study conducted at the origin of migration. Section three constructs a model utilising more recent data collected at the destination of migration, and the last section presents a summary of the findings.

IN the literature on migration of labour, far greater attention has been focused on rural-urban migration than on rural-rural migration,[1] Though it is recognised a*t* most seasonal migration is rural-iral and that it is dependent on complementary peaks of labour demand, not many detailed studies are available. Further, existing studies are for one short-time period, seldom more than one year, Moreover, they are not two-ended analyses of migration processes, dealing with migrating households both at origin and at destination.[2]

The present paper is an attempt to fill these gaps. It is a study of the economic causes behind the seasonal migration of members of tribal households from the depressed hilly district of the Panchmahals into the irrigated plains of the neighbouring Kaira district falling under the command of an irrigation project in Gujarat. The data utilised relate to two-time periods, 1971 and 1978. Data for 1971 were obtained from the survey of seasonal migration of pabour conducted at origin by the state government;[3] and the data for 1978 were drawn from the author's study on labour utilisation in the command area of the Mahi-Kadana Irrigation Project which is the destination.

The paper is divided into four sections, Section one provides the background information regarding the two districts) and the second section examines the data of the first study conducted at the origin of migration. Section three constructs a model utilising the more recent data collected at the destination to test conclusions reached by the earlier study. The last section offers a summary and lists out certain conclusions.

The Background

The Panchmahals district is one of the economically backward districts of Gujarat. Its economic backwardness can be attributed to proneness to scarcity conditions due to frequent failure of the monsoon. The territory of the district is rather hilly, the main mountain being that of the Aravalli system. The chief physiographic units are undulating uplands, mountain foothills and valleys adjoining the territories of Rajasthan and Madhya Pradesh. The Aravalli system does not offer sufficient obstruction to the south-west monsoon for inducing precipitation.

The annual rainfall recorded varies from 548 mm to 2,067 mm. Rainfall occurs mainly during four months Juno to September, and the average number of rainy days in the year are 52. Heavy erosion occurs during the first two months of the rainy season when lands remain barren as compared to the later part of the season. After the monsoon is over, soil moisture is the limiting factor and evaporation increases till it attains its peak in summer.

The main agricultural season is the monsoon period during which maize and paddy are grown. Maize is generally grown where lands are slopy, while paddy is grown in the flatter area where soil moisture is available. During winter wheat is grown only as an unirrigated crop. If the soil moisture is less, gram is sown. Except for wells, there is no perennial irrigation in the district. Though an irrigation project on the river Mahi flowing through this district has been recently completed with a loan assistance from the World Bank, the command area of about 11,000 hectares has yet to receive water since the distribution system has not been completed.

Tribal population in the district is substantial forming 39 per cent of total population. Land ownership is largely in the hands of tribal and land reform measures enacted as early as in 1957 have given the title of ownership to the tribals. But their primitive outlook and illiteracy, coupled with inadequate infrastructure, have led to their not going beyond single crop farming depending mainly on rain-fed agriculture.

The state government has undertaken various activities as part of an intensive rural development scheme under the drought prone area development programme to reduce the rigours of scarcity. These activities comprise subsidised construction of minor irrigation works, and watershed projects with a view to preserving soil moisture beyond the rainy season to enable farmers to take to one more crop and cattle rearing and poultry fanning to supplement their farm incomes. It would take some time to have the impact of these schemes felt. Until then, the seasonal migration of labour from the district into the neighbouring districts of Kaira, Baroda and Ahmedabad might continue. Table 1 presents a comparative picture of the districts in regard to their agricultural and non-agricultural characteristics.

The district of Kaira is agriculturally more advanced due to various reasons. The land is far more fertile and has excellent irrigation facilities. Much before the present dam across the Mahi at Kadana in Panchmahals came to be completed, a weir constructed across the river down stream as early as in 1959 had brought nearly 1,00,000 hectares under surface irrigation. Added to this, a sizeable number of wells and tube wells has also contributed to multiple cropping in addition to raising high yielding varieties and cash crops such as tobacco, cotton and sugarcane offering year-round demand for agricultural labour. While Kaira district is intensively agricultural, the relatively more industrialised Baroda and Ahmedabad districts present additional opportunities for construction-labour.

TABLE 1 : AGRICULTURAL AND NON-AGRICULTURAL CHARACTERISTICS

Items	Panchmahals	Kaira	Baroda	Ahmedabad	Gujarat	India
Gross cropped area in hectare per capita	0.29	0.23	0.29	0.21	0.38	0.30
Ratio of net irrigated area to net cultivated area	0.05	0.28	0.13	0.12	0.13	0.20
Ratio of gross cropped area to net cultivable area in hectare	1.02	1.06	1.02	0.95	0.98	1.02
Ratio of Agricultural workers to total population	0.03	0.07	0.10	0.04	0.07	0.09
Ratio of non-Agricultural workers to total population	0.05	0.08	0.11	0.21	0.11	0.10

Note: Agricultural data pertain to 1972-73 and population data refer to 1971.
Source 1"Gujarat, 1978 : Socto-Economic Review of Gujaiat State", Bureau of Economics and Statistics, Government of Gujarat.

TABLE 2 : DISTRIBUTION OF MIGRATING HOUSEHOLDS BY CULTIVABLE LAND POSSESSED

Area in Hectares	Number of Households			
	Moti-kharaj	Nani-kharaj	Bra-hmk-heda	Total (Percentage in Parentheses)
No land	3	—	—	3 (1.32)
Upto 1.00	110	36	71	217 (96.46)
1.01 to 2.00	—	—	2	2 (0.89)
2.01 to 3.00	1	—	1	2 (0.89)
Above 3.01	1	—	—	1 (0.44)
Total	115	36	74	225 (100)

II

Study at the Origin

The survey of seasonal migration of labour district conducted by the Bureau of Economics and Statistics of the state government in the Panchmahals district consisted of monthly rounds of contacts with each of the selected households for a whole year, from August 1971 to July 1972, in three villages of Motikharaj, Nanikharaj and Brahmkheda, whose inhabitants were known to migrate during the agriculturally slack months. Motikharaj had 485 households (total population 3,312) out of which 448 households had at least one member migrating during the preceding year. The corresponding figures for Nanikharaj were 147 (1,048) and 145 and for Brahmkheda 324 (1,126) and 298. Number of households selected for monthly rounds of contact for twelve months in these villages were: Motikharaj, 115 (750); Nanikharaj 36 (248); and Brahmkheda 74 (512) — the figures in parentheses denoting population.

All the selected households were in possession of agricultural land in Nanikharaj and Brahmkheda but in Motikharaj, 112 out of 115 sample households had agricultural land. Thus, the average land possessed by these households in Motikharaj, Nanildiaraj and Brahmkheda worked out to 0.60, 0.59 and 0.74 hectares per household! respectively (Table 2).

Besides agricultural income, the members of the households under survey were also deriving non-agriculturai income (Table 3). Table 4 presents the distribution of livestock owned. The estimated average per capita annual income of sample households was Rs 222, Rs 265 and Rs 288 respectively for the three villages.

The results of the survey indicate that there was no set pattern of migration; that is, all households reporting migration during the previous year (at least one member per household) did not necessarily report migration in the following year. During the year under survey 86 per cent of sample households were migrating at one time or another whereas 14 per cent stayed at home.

The monthwise pattern of migration shows that during the months of August, September and October, which are agriculturally busy months, the incidence of migration was very little (less than 7.5 per cent) whereas from January to May more than half of the population of the sample households migrated. The high-est number of migrants migrated to Kaira district, and next in importance were the districts of Surat, Broach and Baroda. Other places to which migration was reported, though on a small scale, were other rural areas of the state and in the neighbouring state of Madhya Pradesh.

The longest period of migration was for a period between 121 and 150 days. 42 persons (8 per cent) from Motikharaj village and 11 persons (6 per cent) from Nanikharaj village and none from Brahmkheda village figure under this category. The largest percentage of persons (47 per cent with 52 persons) migrated from Motikharaj village for a period from 91 to 120 days. Similarly, 45 per cent of migrants numbering 88 was away from Nanikharaj village for the same period of work. In the CB| of Brahmkheda village, the highest number of population (47 per cent) migrated for a period between 61 and 90 days.

Table 5 presents the distribution of migrating persons by type of work. Gang work on road absorbed the largest number of migrants (62 percent), closely followed by house construction (31 per cent), agricultural labour (5 per cent) and non-agriculture workers (2 per cent).

The main findings of the survey can be summarised thus:

(i) Of the total 225 sample households, 2 per cent were not in possession of any cultivable land, 97 per cent of members were in possession of land upto 2 hectares whereas only one per cent of members possessed more that 2 hectares of land,

(ii) Out of the selected household for the three villages, there were 87 per cent of households from which at least one or more members had migrated during the period of year round survey.

(iii) The highest number of migrants had moved to the urban areas of Kaira district/The other areas to which the movement took place were, in order of importance, rural artftsof Surait, Kaira, Broach ana. Baroda districts.

(iv) During the period of migration the migrants were mostly engaged in gang work on roads, house construction activities and agricultural labour.

(v) The incidence of migration was less than 7.5 per cent of the population during the busy, rainfed agricultural season (August to October) at the origin of migration, whereas during the period from January to May more than half of the population had migrated.

TABLE 3 : DISTRIBUTION OF MIGRATING HOUSEHOLDS BY AGRICULTURAL AND NON-AGRICULTURAL INCOME GROUPS

Income Group (Annual Income in Rupees)	No of Agri-Income Households				No of Non-Agri-Income Households			
	Motikharaj	Nanikharaj	Brahmkheda	Total (Percentage in Brackets)	Motikharaj	Nanikharaj	Brahmkheda	Total (Percentage in Brackets)
Nil	2	—	—	2 (0.89)	1	—	—	1 (0.44)
Upto 250	5	1	2	8 (3.56)	2	—	—	2 (0.89)
251 to 500	39	2	2	43 (19.11)	27	6	13	46 (20.45)
501 to 700	35	9	18	62 (27.56)	30	8	15	53 (23.56)
701 to 900	16	9	3	28 (12.44)	25	12	17	54 (24.00)
901 to 1,200	12	6	34	52 (23.11)	17	4	18	39 (17.33)
1,201 to 1,500	4	6	4	14 (6.22)	9	5	2	16 (7.11)
1,501 to 2,500	1	3	10	14 (6.22)	3	1	9	13 (5.78)
2,501 to 4,000	1	—	1	2 (0.89)	1	—	—	1 (0.44)
Total	115	36	74	225 (100.00)	115	36	74	225 (100.00)

III

Survey at the Destination

One of the destinations of migration for the labour from the Panchmahals district is the rural area of Kaira district. A major part of the agricultural lands in this area falls under the command of the Mahi-Kadana irrigation porject Due to irrigation facilities, both from canal and well sources, cropping intensity has been observed to be fairly high in-the command area and this has given rise to a sustained level of demand for agricultural labour throughout the year.

Agricultural labour finds employment in the Kharif season (July to September) in pe paddy fields in the command area for highly labour intensive jobs like transplanting and weeding. Though this is also the period of busy agricultural activities in the Panchmahals district, some labour was still found to be trating outside the district in search york. Migrants of this period might be belonging to larger sized households and, therefore, might have been able to move out leaving agricultural work to others. In some cases it was observed that they had just sown maize and left their villages for work elsewhere only t return in time for harvesting maize in late September.

A survey of 100 households of agricultural-seasonally migrated labour employed in paddy cultivation was conducted in randomly selected villages in the command areas during the kharif season of 1978 (July to September).

While 52 per cent of them stated that they would return to their homes in Panchmahals by October, 48 per cent of thorn said that they would continue to seek work until the end of May in the coming year. None of the households hailed from the sample villages referred to in Section 11 though they all belonged to the same district.

Tables 6 and 7 present the distribution of the sample households whose members seasonally migrated during 1978 from Panchmahals into Kaira by landholdings size and annual earnings per household. The average annual earnings' and the average size of land holding were Rs 586.20 and 1.50 hectares. While the average size of the migrating household was 8 persons the average number of migrants from Panchmahals into the rural Kaira was 3 per household.

The average expected earnings per sample household were Rs 461.00 per season. Thus the calculation on the part of the immigrant labour working in the paddy fields was that they would earn at least Rs 153 per person during the season (Table 8). In addition to these earnings,' they were provided meals and a place to stay during their period of work by the employer-landlords. However, the expenditure on transportation from their origin to destination was borne by the migrant labourers themselves. Some of these migrant households also maintained livestock which was cared for during their absence by their members of the household.

The findings of the earlier study on migration of labour from the Panchmahals district conducted at the origin and the above preliminary observations reached by the present survey would lead us to formulate certain hypotheses relating to migration reponse of labour. Utilising the data, we may construct a model and test the validity of these hypotheses.

It may he hypothesised that migration of labour signified by number of persons migrating per household is directly influenced by expected earnings at their destination. It may also be said that there is a positive relationship between the number of persons migrated per household and the size of the household. On the other hand, the larger the size of the land holding of a given household, the lower would be the number i persons migrating from it since it would absorb a larger amount of labour of the members of the household. Similarly a negative relationship may be suggested to exist between the number of migrating members of a household and the earnings of the latter at the place of the origin.

The above hypothesised relationships may be presented in a functional form as below:

$$Y = f(X_1, X_2, X_3, X_4)$$

where,

Y = number of migrants per household

X_1 = expected earnings of the migrants per household at the destination.

X_2 = size of landholding per

TABLE 4 : DISTRIBUTION OF HOUSEHOLDS BY LIVESTOCK OWNED

Name of Village and Sample House-hold	House-holds Owning Livestock	Livestock Owned				
		Cattle	Buffaloes	Goats	Poultry	Total
Motikharaj (115)	85	425	11	143	48	627
Nanikharaj (36)	25	92	11	29	15	147
Brahmkheda (74)	65	309	14	150	75	548
All villages (225)	175	826	36	322	138	1322

household at the place of origin,

X_3 = total number of members of the household, and

X_4 = income per household at the' place of origin.

'live data used in the regression analysis were drawn from the survey relating to 100 sample households of migrants at the place of destination. An inter-correlation matrix of the explanatory independent variables given in Tabic 9 rules out the presence of any serious multi-collinearity problem. Choosing the linear form of the above functional relationship, a regression equation was fitted by the method of ordinary least squares adding two dummy variables and a stochastic error term. The two dummy variables are of, which assumes the value of unity if there existed some source of irrrigation facilities and zero in the absence of any such facility and Do, which assumes the value of unity if the household at the place of origin had maintained livestock and zero if they had not maintained any livestock. These two dummy variables were found necessary since the migrants could not give precise information about the area under irrigation and number of livestock. In order to capture the influence of variations in multi-cropping enabled by irrigation and of Tearing of cattle on the.variations in the dependent variable, these two dummy variables were included while running the regression.

The estimated equation is:

Y = 1.520 4- 0.004 X_1 + 0.048 X,
    (3.72)   (8.02)   (0.23)
    4- 0.126 X, — 0.001 X,
    (2.46)   (—1,34)
    — 0.292 D, — 0.837 D9>
    (—0.61) (—2.29)

Adjusted R^2 = 0.5519
Number of observations — 100
F ratio -- 21.3278
Decrees of freedom = 93

(Figures in parentheses denote com puted t'' values).

Among the explanatory variables, only the size of the landholding turned out to have the theoretically unexpected positive sign but it was found statistically not significant.[4] The other three, variables

emerged with theoretically expected signs. Expected earnings and size of the household were found statistically significant at 5 per cent level, whereas annual income per household was found significant only at 10 per cent level. Among the two dummy variables irrigation was found not significant, though it had the theoretically expected sign, but the dummy variable for livestock with the expected negative sign was found significant at 5 per cent level. All the explanatory variables and the dummy variables together were found to explain the number of migrants per household to the extent of 55 per cent.

Elasticity co-efficients of the significant explanatory variables were calculated at their arithmetic means. The elasticity of number of migrants per household with respect to expected earnings was 0.582, whereas the elasticities of number of migrants with respect to the size of the household and to annual earnings at the origin were 0.314 and 0.185 respectively. This would mean that on the basis of the sample survey, one per cent increase in expected earnings — given other things — would approximately lead to 0.6 per cent rise in the number of migrants per house while one per cent increase in the annual earnings per household at the origin would reduce the migration flow by 0.2 per cent.

The findings of the sample survey on seasonal migration of 100 households of tribal families from the Panchamahals district engaged in agricultural labour in the rural area falling under the command of the Mahi-Kadana irrigation project are the following.

(i) Expected earnings per household significantly influence the. migration behaviour.
(ii) The size of the household is a significant determinant,
(iii) Employment activities associated with livestock maintenance at the place of origin have a significant negative effect on migration.
(iv) Actual annual earnings at the place of origin also have a significant negative impact on their migration behaviour.

IV

Summary and Conclusion

This paper attempted to determine the economic factors behind the seasonal rural-rural migration of landowning agricultural labourers from the backward Panchmahals district of Gujarat into the neighbouring districts of the same state. The study utilised the data of two sample surveys, one conducted in three villages at the place of origin on a year-round basis in 1971-72 and the other at the destination of migration, namely, the command area of an irrigation project in the adjacent district of Kaira during the paddy crop season of 1978.

While the earlier survey showed that 98 per cent of the sample migrant households in three villages in — Panchmahals district possessed land, the latter study revealed that all the hundred households under sample survey owned land.

It is thus apparent that mere variations in landholding alone do not determine the migration response. The reasons are that agriculture at the place of origin had been chiefly dependent on rain and agricultural activities were at a peak only during the monsoon months, "June to September. Incidence of migration from the Panchamahals district during the monsoon period was observed to be the least. Once the monsoon crop is harvested, agricultural activities nearly come to an end and the incidence of migration becomes more marked. This is understandable since the households do not have any other activities during the rest of — year which might usefully absorb the labour of their members so as to discourage their migration in search of jobs.

A migration-response model utilising the data collected in the second study showed that variations in the size of the landholding did not have statistically any significant impact on number of migrants per household whereas variations in actual earnings per household did have a significantly negative influence. The expected earnings at the destination and size of the household were also found to be significant determinants having a positive relationship with the dependent variable.

Irrigation facilities would enable the farmer to raise more than one rain-fed crop. Such multiple cropping possibilities would reduce the incidence of mig-

TABLE 5: DISTRIBUTION MIGRATING PERSONS BY TYPE OF WORK

Village	Type of work	Number of Persons Engaged in Work												
		Aug 71	Sept 71	Oct 71	Nov 71	Dec 71	Jan 72	Feb 72	Mar 72	Apr 72	May 72	Jun 72	Jul 72	Total
Motikharaj	Gang work on road	—	3	—	—	3	9	59	141	1	14	31	96	357
	House construction	—	10	—	—	6	2	25	56	—	—	22	18	139
	Agri-labourers	—	4	7	—	9	5	4	2	—	—	3	—	34
	Non-agri-labourers	—	1	1	—	—	—	—	—	—	—	—	—	2
	Other mix services	—	—	—	—	—	—	—	—	—	—	—	—	—
	Total	—	18	8	—	18	16	88	199	1	14	56	114	532
Nanikharaj	Gang work on road	—	4	—	—	3	2	6	24	—	16	—	—	55
	House Construction	—	6	—	—	—	4	13	41	—	4	28	33	129
	Agri-labourers	1	—	—	—	7	—	5	—	—	—	—	—	13
	Non-agri-labourers	—	—	—	—	—	—	—	—	—	—	—	—	—
	Other mix services	—	—	—	—	—	—	—	—	—	—	—	—	—
	Total	1	10	—	—	10	6	24	65	—	20	28	33	197
Brahmkheda	Gang work on road	—	8	6	—	2	6	38	89	—	45	124	12	330
	House Construction	—	12	—	—	2	—	37	25	—	10	19	1	106
	Agri-labourers	—	3	—	—	—	2	7	—	—	—	—	—	12
	Non-agri-labourers	1	1	—	1	—	1	7	—	—	—	—	—	11
	Other mix services	—	3	—	—	—	—	—	4	—	—	—	—	7
	Total	1	27	6	1	4	9	89	118	—	55	143	13	463

TABLE 6 : DISTRIBUTION OF SAMPLE MIGRANT HOUSEHOLDS BY SIZE OF LANDHOLDINGS

Area in Hectares	Number of Households
Upto one	43
1.01 to 2.00	33
2.01 to 3.00	16
3.01 to 4.00	4
4.01 to 5.00	2
5.01 to 6.00	2
Total	100

TABLE 7 : DISTRIBUTION OF SAMPLE MIGRANT HOUSEHOLDS BY ANNUAL INCOME AT ORIGIN

Annual Earnings per Households in Panchmahals (in Rupees)	Number of Households
Below 200	10
201-300	15
301-400	22
401-500	8
501-600	19
601-700	1
701-800	9
801-900	2
901-1000	—
1,001 and above	14
Total	100

TABLE 8 : MEANS OF THE VARIABLES EMPLOYED IN THE REGRESSION ANALYSIS

Variables	Arithmetic Mean
Migrants per Household (Persons)	3
Expected Earnings per Household at Destination (rupees)	461.00
Size of landholding per household (hectares)	1.49
Size of Household (persons)	8
Annual Earnings per Household at Origin (rupees)	586.20

TABLE 9 : INTER CORRELATION MATRIX OF DEPENDENT VARIABLES

	X_1	X_2	X_3	X_4
X_1	1.0000			
X_2	0.1405	1.0000		
X_3	0.3238	0.1791	1.0000	
X_4	0.2930	0.6904	0.3650	1.0000

ration. Similarly, livestock maintainance which provides year round employment and income would also decrease the flow of migration. Dummy variables were employed in the repression ana-

lysis for capturing the influence of structural shifts due to migration and livestock maintenance.

The analysis showed that the dummy variable for irrigation was not .significant. The reason appears to be that there was negligible . inter household variation in the presence of irrigation facilities. On the other hand, the dummy variable for livestock maintenance was found statistically significant confirming the hypothesis that animal husbandry did provide gainful employment resulting in an inverse relationship with number of migrants per household.

The current programme of integrated rural development with stress on subsidised minor irrigation schemes such as digging of wells and watershed management projects undertaken in this district would enable the farmers to raise at least one more crop beyond the usual rain-fed crop. Further, under the programme the farmers are assisted to acquire livestock so as to lessen their total dependence on agriculture alone. Thus, the state sponsored activities are aimed at increasing the earning capacity of the cultivators as well as providing greater employment opportunities. These will in turn reduce the incidence of migration. However, until these project activities gain momentum and their effects are felt, the present trend of seasonal migration is likely to continue.

1 For a brief review of various theories of migration and empirical studies, see P A Yotopolous and I B Nugent, "Economics of Development: Empirical Investigations", Harper and Row, New York, 1976, pp 223-36.

2 John Connel *et al.* "Migration from Rural Areas", OUP, Delhi, 1977, pp *15-6* refer to various studies (such as R Reals and C F Menezes 'Migrant Labour and Agricultural Output in Ghana', Oxford Economic papers, Vol 22, No 1, 1970, pp 109 27) to show that seasonal migration was essentially rural-rural and circular in movement and that only a few studies were two *fed* analyses (such as P A Pathare, et al, 'Seasonally Migrating Agricultural Labourers at a Co-operative Sugar Factory in Maharashtra', Indian Journal of Agricultural Economics, Vol 27, No 4, 1972, p 237),

3 Appendices to 'Final Report on the Survey of Seasonal Migration', Government of Gujarat, Bureau of Economics and Statics: T*he Bulletin of Economics and Statistics;* Vol XIV, No 2, 1974.

4 One-tail t-test rather than two tail t-test is used because the algebraic sign of the co-efficient is presumed to be known. See, P Rao and R A Miller, "Applied Econometrics", Wadsworth, Belmount, California, 1971. pp 130 31.