Land Degradation and Migration in a Dry Land Region in India

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Abstract

Migration literature has always considered environmental constraints as one of the prime movers of populations, especially from dry regions, where water rather than land is the primary limiting factor. In this study, we seek to analyze the impact of degradation of private land, as well as common pool land resources, on migration decisions. We focus on three dryland districts in Gujarat and analyze data from a survey of over one thousand households. Our study finds that economic assets and natural capital have differential impacts on short-term and long-term migration decisions. The rich tend to partake in long-term, precautionary migration. Their assets, skills and social capital allow them to migrate out perhaps permanently. The poorest rural households in dry land regions, on the other hand, are the least likely to migrate. Thus, any employment creation in rural dryland regions is most likely to help the poorest. Further, we find that degradation of common-pool land resources influences short-term but not long-term migration. Better management of common-pool resources would strengthen the livelihood base of traditional herder communities and limit migration among middle-income households. Overall, in dry areas such as Gujarat, access to irrigation, rather than land ownership is likely to deter migration.

Key words: Migration, dry regions, land degradation, common-pool resources, India.

Land Degradation and Migration in a Dry Land Region in India

Amita Shah

1. Introduction

Environmental constraints have long been seen as one of the prime movers of populations. In many parts of the world, populations have had to move to new areas after sedentary agriculture exhausted natural soil fertility in the former location. Increasing demographic pressure in the recent decades has only expedited this process. In dry regions, where water rather than land is the primary limiting factor, population growth has resulted in over-use of water and land and, in turn, eventual out-migration (Bilsborrow, 1992).

Existing migration theories treat environmental-change-induced migration as a distress phenomenon influenced by "push" factors. Such migration can in turn lead to sub-optimal land-use and further degradation of land (Scherr and Yadav, 1998). For example, income earned from out-migration could expedite the degradation process by inducing private investment in water extraction. Alternatively, public and private investment in soil-water conservation measures may help promote more sustainable use of these resources and, in turn, contain distress migration. Environmental factors, in general, form part of the set of structural factors that motivate households to make a variety of decisions, including migration.

In India, there is ample evidence of long-term migration of people from drought-prone regions of Gujarat, Maharashtra, Rajasthan, etc., to other parts, including hilly areas in the north. Historically, dry land regions in India have been more prone to out-migration (NIRD, 2000). To a large extent, weather-induced uncertainty and low level of land productivity appear to be responsible for this pattern. Of late, rapid depletion in land and water resources appear to have aggravated the situation.

Barring a few studies, the migration literature in India has not paid much attention to the conditions prevailing in the place of origin (Banerjee, 1986; Sharma, 1997; Yadava and Yadava, 1998). While there is ample evidence of migration from dry lands, few studies carefully examine the *impact* of degradation of water and land on migration. A recent exception is a study by Chopra and Gulati (2001) that shows that land degradation has a significant positive impact on out-migration. They find moreover that better management of common property land resources through creation of property rights has a negative impact on out-migration. The present study tries to examine similar linkages.

In this study, we focus on three dryland districts in Gujarat and analyze migration data gathered from a survey of over one thousand households. Our specific objectives are: a) to ascertain the extent and intensity of, as well as rationale for, out-migration from dry land areas of Gujarat, India; b) to identify the correlates of short-term and long-

term out-migration; and c) to ascertain the extent to which environmental factors contribute to both types of migration. Gujarat is a particularly interesting region because it is characterized by adverse agro-climatic conditions with degrading land and water resources but nevertheless has a dynamic and growing economy. Our study incorporates the impact of degradation of private land, as well as common pool resources (CPRs), on migration decisions.

In this study, we hypothesize that migration decisions depend on social, physical and natural capital. The different socio-economic groups make different short-term and long-term migration decisions that can be explained through reference to their relative positioning in the socio-economic hierarchy. Wealth, access to credit, labor supply, private land quality, access to productive commons and social capital all influence migration decisions. We find, however, that access to economic, social and natural capital has different implications for short-term and long-term migration.

The next section presents a brief review of the evidence, as well as emerging perspectives, on migration in less developed countries with special reference to dry land regions in India. Section 3 presents a summary description of the households covered by the survey. This is followed by section 4 on people's motives regarding migration. Section 5 presents a conceptual framework and discusses results of the empirical models used to examine the determinants of migration. Section 6 discusses major findings while section 7 concludes with policy recommendations.

2. Migration from Dry land Regions: A Review of Evidence and Issues

Out-migration from an agrarian economy is a multifaceted phenomenon, varying across resource conditions, socio-cultural situations, and time-span. Migration-related research has frequently examined questions such as *who* migrates and *why* and how migration influences the income or well-being of the migrant vis-à-vis the non-migrant in a given situation. However, of late, scholars have begun to identify certain inadequacies in the existing body of literature (Stark, 1982; Haan and Rogaly, 2002; Srivatsava and Bhattacharya, 2002). These inadequacies stem from the fact that (a) most theoretical constructs, at least initially, emerged from the experiences of the early industrializing countries with well-developed labor markets; (b) official data in most developing economies are ill-equipped to capture the complex realities within which migration takes place and is sustained—realities which may also lead to changes of course or direction from time to time.

Households in less developed countries (LDCs) have multiple reasons for migrating. Migration may be a combination of distress and precautionary migration. Further, migration decisions are influenced by past decisions as well as potential plans for the future. Moreover, these are not "once-and–for-all" decisions. Such complexities in analyzing migration have led to refinements in the classic "push-and-pull" theories of migration. For instance, Standing (1985) refers to migration as a "safety-valve mechanism" that may help prevent a further decline in livelihood status. Similarly, the Indian National Commission on Rural Labor distinguishes between

survival and subsistence-driven migration (NCRL, 1991). Recent literature on migration focuses on labor allocation decisions made by households within their operating environment (Dejong and Gardiner, 1981; Massey, 1990). Thus, igration is viewed more as an integral part of the household's livelihood strategy within a dynamic context rather than as a one-shot decision (Haan, 1999). Migration studies in India suggest that four key transformations that have taken place over the last two decades are crucial for an understanding of migration. These are, an increase in (i) landlessness or semi-landlessness (due to division of land holdings); (ii) degradation of land and ground water resources; (iii) urbanization and scope for non-farm employment; and (iv) preference for migrant (contract) labour both in rural as well as urban areas. Prima facie, all these factors tend to increase out-migration from the rural economies. Against these, the factors that exert a negative impact on out-migration from rural areas are: increase in irrigation; availability of public works programmes; and overcrowding or hazards when it comes to living in urban settlements. The changing pattern of out-migration over time would therefore be the net impact of these two sets of factors operating across states/regions within the country. In the paragraphs below, we discuss some of the complex theories and empirical factors that make the study of migration so rich and challenging.

Land Degradation, Labor Markets and Circulatory Migration: In dry areas of India and elsewhere, difficulties in establishing property rights over groundwater result in farm households pumping out ground water at a rate faster than that of their neighbors (Shah, 2002a). Shifting to certain high risk and more remunerative crops forms a part of the same strategy that is driven primarily by a short-term perspective. The other strategy is to keep the land idle or to lease it out. All these risk-averse strategies have significant environmental implications and have a direct impact on labour markets and migration (Bilsborrow, 1992). First, it may lead to increased migration along with a rise in wage rates during periods when labour demand is high. This increase in the wage rate would remain if there is a simultaneous process of occupational diversification and industrial growth. It could also lead to in-migration of labour from regions with a higher level of degradation and from among the poorer communities such as tribals who have a lower reservation price. Together, these two somewhat contradictory processes might lead to an increased incidence in "circulatory" migration with the agricultural wage rate remaining more or less the same. Thus, strangely, dry land regions may also import, rather than just export, workers.

Risk Aversions and Lifetime Income Differential: A dominant tradition in migration studies analyzes employment decisions and migration through the risk-aversion expected-income-maximization model. In this model, a migrant household compares the risk associated with life- long income in agriculture vis-à-vis urban jobs. This has been conceptualized by Stark and Levhari (1982) who note that "*rural to urban migration is taking place in the presence of a positive urban-rural expected income differential, yet the motive may not be expected income differential per se. A strong force — aversion to risk — which prevailing explanations do not capture, may be churning below the surface*." With declining quality and quantity of land and water resources, households face a situation of increasing risk in terms of the future

flow of income from agriculture. When "on-the-farm diversification-with-technological-transformation" is insufficient or impractical, and when rural diversification options either do not exist or are positively correlated with stochastic farm production, a portfolio "investment" in urban earning activity, namely, migration of a family member, is undertaken (Stark and Levhari, 1982, 193-94). To a large extent, the dynamics of dry land farming in Gujarat and its link to migration suggest this kind of reality.

Precautionary v Development Induced Migration: Until the late eighties, it was observed that households with medium- to large-sized land holdings, with some investment in irrigation, did not have to move out of dry land regions for subsistence purposes (NIRD, 2000)[1]. Migration for such relatively wealthy households was mainly for "better prospects." This phenomenon was particularly true for a sub-set of households who grew high-valued commercial crops like oil seeds, spices, horticulture, etc. Similarly, areas with moderately good soil and ground water table could also escape "distress migration." This dual pattern of migration across landed and landless households still prevails in several parts of India (Conell, et. al., 1976).

What is relevant in the context of dry land regions is scarcity of water rather than land alone. The three consecutive droughts, in the mid-eighties, in most dry regions in India changed the above pattern. It has resulted in migration, even among the landed. The migration decision for these households arose mainly out of a precautionary motive, i.e., households chose to migrate because of uncertainty about future prospects. The departure from the earlier pattern was accentuated by two other on-going processes: (i) fragmentation of land due to increased population; and (ii) higher use of ground water due to improved technology, infrastructure, and price incentives. Consequently, an increasingly large proportion of out-migration from dry land regions is likely to be driven by precautionary motives, especially among those with access to relatively better land or a better economic base. The major force driving migration among these households is the desire to make consumption easy and maintain it at least at the pre-migration level in the face of the risks associated with uncertain rainfall.

Socio-Cultural Context: A number of socio-cultural issues impinge upon migration decisions. The migration literature vividly describes culturally contextualized decisions when it comes to migration (Taylor, 1969). While most studies focus on age, sex, and marital status of migrating individuals, location-related factors and information also play an equally significant role. Migration decisions are often influenced by what the households and their kin think of the potential migrants' place of relocation and the labor market (Haan and Rogaly, 2002, 7). It is argued that the social world of the migrant's place of origin influences and in turn is influenced by migration.

Social capital works as an economic insurance for new migrants at the destination point. In fact, one observes a phenomenon of "chain migration" where the initial migrant

[1] A typical weather cycle of five years, with two droughts, one average year, and two good rainfall years, was sufficient to economically sustain a land holding of about 5 hectares.

works as a catalyst to pull kith and kin from the same community. The study region is endowed with good "social capital", which may help overcome some of the risks and costs of migration. The concentration of migrants in specific locations and the ability to exploit kinship linkages reduces the financial cost of migration. But, this can work only up to a point, beyond which overcrowding occurs. At this juncture, a process of return migration and plowing back of savings into the rural economy may start.[2] What is also important is to recognize that migrants tend to seek social acceptability or respectability in the place of migration where they hardly have any identity other than as "outsiders," and " "pavement dwellers" or in the worst case, as ` "non-people" (Dasgupta, 1993). Seeking and ensuring social acceptability are particularly important among those who adopt a strategy of "precautionary" migration.

Remittances and On-Farm Investment: Besides helping with consumption over the seasons and years, remittances from migrants generally also enhance on-farm investment (Oberai and Singh, 1980). This phenomenon has been observed in the case of dry land regions in India (Walker and Ryan, 1990; Mosse, et.al., 2002; Shah, 2002c). A significant part of ground water irrigation seems to be financed through such migration, directly or indirectly, via servicing the debt incurred for such investments. However, remittance-related investments in soil and water conservation measures tend to be sub-optimal because of the public good nature of ground water and soils.[3]

More recently, the state has taken to investing in watershed programs with the objective of reducing risks of crop failure in the short run, and reversing land degradation and improving productivity of land in the long run. While the impacts of these public investments will take some time to result in productivity changes, they seem to have triggered *collective* private investments to a remarkable degree[4]. While charity for drinking water, and at times for other amenities, has always been a part of the cultural norms of the migrant population, collective and institutionalized response to the investment in soil-water conservation measures or water harvesting structures is somewhat uncommon and new. This is quite important as it helps avoid the problems of jointness of investment and benefits across households. Hence, if sustained, it could lead to some kind of a "technological insurance" against uncertainty in dry land farming[5].

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[2] In numerous villages in Saurashtra migrants have begun investing in small-scale diamond units, irrigation facilities, and water-harvesting structures. Mukta (2002) paints a vivid picture of how social networking in Surat, a heartland of the diamond industry and a panacea for migrants from the dry land in Gujarat, has eventually created a major impact on the socio-economic fabric at the point of departure.

[3] The issues of remittance and on-farm investment can be more complex than merely sharing earnings by migrating members with the rest of the family at the place of origin. Often, the flow of resources is both ways.

[4] It has been recently observed that "sons of the soil" from dry land regions, settled in the wetter parts of the state and/or abroad, are remitting part of their accumulated earnings to finance water-harvesting structures.

[5] The driving force for a collective and organized response appears to be a desire to reduce distress migration and thereby check crowding and creation of "human jungles" at urban locations. To an extent, this phenomenon could be considered as remittance with a lag, as it takes place via migrants who left their villages long ago (say 20 years back). What is noteworthy is that these efforts are geared towards helping the community, rather than enhancing personal gains.

3. The Study Region and Migration

This study is based mainly on primary data collected from six villages in three districts of Saurashtra, a dry land region in Gujarat. The districts are Surendranagar, Amreli and Jamnagar which represent some of the most drought-prone regions in the state, characterized by low-level of rainfall (< 500 mm per year) and a high proportion of wasteland relative to total geographical area (GIDE, 2002). In each district, two *talukas* (sub-districts) were selected, representing relatively high and low levels of land degradation. The selection was based on both the extent as well as the severity of degradation in terms of soil nutrients as well as depth and salinity influencing productivity in agriculture. Severity was captured mainly through qualitative information obtained from informed persons at *taluka* as well as village level. Subsequently, one village representing each *taluka* was selected for carrying out primary surveys. The village selection was based on multiple criteria: soil type, extent of irrigation, village size, distance from a large urban or industrial center, and presence of reasonably successful watershed programs. Broadly, the six sample villages can be grouped into three categories of land degradation: moderate, high, and very high.

Collection of primary data was undertaken in two stages. The first stage involved a complete listing of the 1227 households with a total population of 6,631 that currently inhabited the study villages. A household survey was undertaken to obtain information about important variables such as land size and extent of degraded land; labor force and occupational diversification; migration during different years and duration; distance, type of work, remuneration; other assets, types of crop grown and income; and on-farm investment and direct benefits from watershed programs. Data was also collected about households from which occupants had migrated out, partially or completely. In the following paragraphs we summarize and discuss land holding, land degradation and migration patterns in our study villages.

3.1 Land Degradation, Irrigation and Incidence of Migration

There are no systematic time-series data measuring land degradation and changes over time in the study villages. Nevertheless, discussions with informed farmers in the villages as well as soil scientists in the region suggest increased land degradation in the recent past, especially over the past two decades. The survey villages represent different types of land degradation: coastal salinity in Jamnagar district, aridity in Surendranagar district, and shallow soil in Amreli district.

Table 1 shows that land degradation on *private* land is a serious problem in the region. Households in our sample report that between 9 to 43 percent of their land (or 2000 acres of privately owned land belonging to nearly 60 percent of landed households), to be degraded. On average, 26 percent of the total private land owned in our study area can be considered degraded.

Twenty three percent of cropped area in the study region is irrigated. Thirty-eight percent of landed households irrigated at least part of their land. Irrigation is a major

mediating factor that counters the effect of *private* land degradation. This notion emerged clearly during our discussion with the village community, that is, irrigated private land is not perceived as degraded even if the land is saline or eroded. While the estimates of degradation of private land in Table 1 do not take into consideration its irrigation status, these kinds of perceptions highlight the critical importance of irrigation as a countervailing factor to land degradation.

Table 1: Degradation of Private and Common Lands in Sample Villages

Degradation	Village	Private Land					Village Commons
		Land with Salinity (acres)	Other Waste land (acres)	Total Degraded Land (acres)	Degraded Land (% to total land)	Gross Irrigated to Gross Cropped Areas	Degraded CPLRs (%)*
Moderate	Dudhai	163	390	554	26.3	31.7	18.1
	Dudhia	17	103	120	8.9	40.6	12.3
High	Veraval	84	167	251	20.5	20.7	27.7
	Vaghania	23	88	111	19.2	2.9	39.3
Very High	Susiya	130	337	467	43.5	7.4	64.4
	Liliya	50	77	127	26.1	2.3	47.2
	All Villages	566	1359	1925	26.1	23.1	32.3

* Based on village level information about common property land resources (CPLRs), including pastures. If CPLRs have ceased to be used as important sources of fodder or fuel because of the declining quality, such land has been considered as degraded. The percentages refer to egraded area to total CPLRs.

Village pastures and other common property land resources (CPLRs) are important assets, particularly for the landless. We find that on average 32 percent of CPLRs are degraded. As Table 1 shows CPLR degradation varies from 12 to 64 percent among the study villages. Our data suggests that CPLR degradation is far higher than private land degradation. We identify as degraded CPLRs those lands that were previously used as a source of fodder but are currently not due to over-depletion. Village-level degradation is estimated by calculating the proportion of degraded land in the village to total CPLRs in the village.

3.2 Land and Livestock

Table 2 shows that a significant 34 per cent of households in the study villages are landless. The percent of landless households is somewhat low in the moderately degraded villages relative to the medium and high degradation villages. Among those with land, the average land holding is 8.4 acres.

Approximately, 40 percent of landed households have access to irrigation. Sixty-seven percent of landed households grow high valued commercial crops like cotton, groundnut, and spices. What is surprising is that the proportion of households growing commercial crops is significantly high in the villages in Amreli where irrigation is fairly

low. Most of the farmers grow un-irrigated groundnut during the Kharif (i.e., monsoons) despite erratic rainfall. In contrast, the proportion of farmers growing commercial crops in Dudhai village in Surendranagar district is relatively low despite considerable access to irrigation.

The type of crop choice can partly be explained by how important livestock is to agricultural households. Traditional herder communities tend to choose crops such as bajri, which has a high fodder value. Approximately, 65% of all households own livestock. However, livestock ownership is largely confined to the landed; the majority of the landless (some 65%) have no livestock. The landless who own cattle own 1 unit of livestock (in terms of adult cattle unit). The landed with no or limited irrigation own two units of livestock and the richer landed on average own 3.

Table 2: Asset Base among Sample Households

		Asset Base							
Degradation	Villages	% of land-less hhs	Avg land-holding size	Avg house-hold size	% of area irrigated	% of hhs covered with irri-gation*	Avg No. of milch animals	% of hhs without livestock	% of landed hhs growing comme-rcial crops
Moderate	Dudhai	17.1	9.1	5.3	31.7	46.2	2.1	25.4	34.5
	Dudhiya	22.6	7.6	5.8	40.6	46.3	1.4	17.7	100.0
High	Veraval	36.2	11.8	4.7	20.7	42.3	0.8	49.7	82.7
	Vaghaniya	42.1	8.8	6.1	2.9	5.7	0.5	51.8	87.9
Very High	Sushiya	44.2	6.2	5.4	7.4	15.5	2.1	34.5	55.5
	Liliya	55.2	8.1	5.2	2.3	14.1	0.9	53.0	83.3
	All	34.0	8.4	5.4	23.1	38.3	1.5	35.0	67.2

* For those with land

3.3 Incidence of Migration

Table 3 presents the incidence of migration in the study villages. Roughly one-third of all households reported migration of at least one person from the household. This includes both short-term (i.e., seasonal or circulatory migration during the reference year) as well as long-term (i.e., in the last 10 years but remaining a part of the household's economic base as well as decision-making**).**[6] While there are no readily available estimates of household level out-migration for Gujarat state, evidence from micro-level studies in dry land regions suggest a somewhat similar proportion of households reporting at least one person going out for economic reasons (Deshingkar and Start, 2003). Migration appears to be higher in the medium and highly degraded villages relative to villages with moderate land degradation. Our data suggests that both long-

[6] This percentage does not include those who commute daily for work outside the village.

term and short-term migration is prevalent nearly to the same degree in the sampled households.

Table 3: Incidence of Migration among Households in the Study Villages

Degradation	Villages	Type of Migration		All Migrants	% of all HHs
		During reference year	Long duration*		
Moderate	Dudhai	28	19	47	16.8
	Dudhia	11	23	34	15.0
High	Veraval	15	43	58	35.6
	Vaghania	16	21	37	32.4
Very High	Susiya	107	15	122	39.4
	Liliya	16	27	43	32.1
	All	193	148	341	27.8
		[56.5]	[43.5]	[100]	

* Include 6 hhs which also have other member/s who have migrated during the reference year. Refers to the households having at least a member (son or brother) who migrated during the past 10-15 years but continues to remain part of the household as they share both income as well as expenditure with the family. The information was obtained by asking how many years it has been since the person migrated.

3.4 Migration among Landless and Landed

In order to assess whether the rich and poor had different patterns of migration, we studied migration among the landed and landless (See Table 4). Approximately 23 percent of the landless and 30 percent of landed households count a migrant among their household. Among landed households, the proportion of migrants is slightly higher in the case of those with more than 10 per cent irrigation (32.9%) as compared to those with no or less than 10 per cent irrigation (29.7%). Thus, if we look at the overall pattern of migration, there is some, but not a big, difference between the rich, the middle-income and the poor.

However, our data shows that the rich and poor participate in different forms of migration. While nearly 58 percent of all households with migration undertake short-term migration (Table 4),[7] a significant 73 percent of landless households with migration reported that they participate in short-term migration. This is in contrast with 28 percent of landed households with irrigation that undertake short-term migration. The average duration of short-term migration (during the reference year) was about 6 months. This ranges from 6 months in the case of middle-range households, 5.5 months among the landless and 4 months among the landed with better irrigation facilities.

When it comes to migrant destinations, a large proportion of migrants (82 % in fact) go out of the district. However, if we consider long-distance migration to industrially-

[7] This includes six households reporting both short-term as well as long-term migration (See Table 3).

developed cities such as Surat, Mumbai, Ahmedabad and Rajkot, the proportion is about 60 per cent.

Table 4: Distance and Duration of Migration

Distribution of Migrant Households/ Workers	Household Categories			
	Landless	Landed with upto10% irri.	Landed with >10% irri.	All
Households with short-term migration (as % of migrant households)	73.4	55.0	28.0	58.3
Average number of short-term migrant workers per HHs with migration	1.5	1.1	1.0	2.0
Average time (months) spent per short-term migrant worker	5.54	6.06	4.0	5.86
Migration* outside the district (all migrants)	88.0	80.0	76.0	82.0
Migration* to industrial centers	62.2	57.8	75.8	60.0

***** Refers to migrant workers within the households. It is possible that if there is more than one migrant worker in a household, they may have different destinations.

Conversely, forty-three percent of the households that record migration showed evidence of long-term migration, with at least one household member living outside the village for a long period of time during the last 10 years. The proportion is 26.5 percent in the case of landless households, and increases to 45 percent among the middle-category (the landed with up to 10% irrigation) of households. Migration from almost all the households with better irrigation (i.e., >10%) is, when it comes to duration, long-term. Thus, wealth appears to facilitate long-term relocation.[8] These members visit their families especially during festivals and other social functions, and also have some kind of arrangements for sharing income from and expenditure on different activities.[9]

3.5 Occupations among Migrants

Table 5 presents information on the main occupation of migrant workers. It is observed that while 42 percent of the households are engaged in activities related to agriculture and livestock at the destination point, the rest find opportunities in the non-farm sector, in areas such as industry, trade, service, etc. More than one-fourth of the migrant workers are found to be engaged in industry, especially, diamond-cutting and polishing, which has more or less played the function of a coping mechanism during the frequent

[8] Short duration migration generally culminates in settlement in the place of destination. The chances of this happening are higher among the landed as compared to the landless households.

[9] Apart from the migrants from households in the study villages, a large number of households were reported to have shifted out of the village on a permanent basis. We collected the information from village leaders about such households. Some 196 households (approximately 15% of the total number of households) were reported to have shifted out with no one staying back in the village. Most of these households owned land, which was at times kept fallow and eventually sold.

droughts that plague the region. Another 14 percent have started their own businesses/ own account enterprises. Only about six percent have found salaried jobs. The proportion of households engaged in these non-farm activities, however, is significantly higher among the landed households with better irrigation facility. For instance, the proportion of migrant workers engaged in industry is 55 percent in the case of these better-off households as compared to only 11 percent in the case of landless households. Since the proportion of long duration migration is higher among the landed as compared to the landless households, this implies a relatively better outcome from migration among the landed households. A similar pattern is observed in the case of business and service.

Compared to these, the landless seem to have resorted to casual labor in the various non-farm activities, which may include work in construction, and other manual work in the service sector such as tea-shops, transportation, etc. Moreover, 16 percent of the landless migrant workers are also engaged in petty trade or own account enterprises. This suggests that migration may be an income enhancing strategy even among the landless. Interestingly enough, a recent national study shows that landless households may be economically better off as compared to the households with very small land holdings [Shah, and Yagnik, 2004]. The study shows that in 1993-94, the proportion of poor among rural landless households was about 36 percent, which was lower than that of those having less than 1 acre of land, where the proportion of poor was found to be nearly 39 percent. Prima facie, this suggests the limited economic options available to the households trapped in the middle range of the socio-economic strata, with very limited land base. These households may face further constraints in terms of social taboos against accepting casual labour on the one hand and relatively limited social capital for getting into own business on the other. Hence, although these households too may be forced to go out in search of work, they may continue to face limited job options at the place of migration as compared to their counterparts among the landless and those with a better asset base partly because of inhibitions having to do with taking up low-status jobs near their villages.

Table 5: Occupations among Migrant Workers

Main Occupation in place of migration	Household Categories			
	Landless	Landed with upto10% irri.	Landed with >10% irri.	All
Agricultural labour	26.2	23.2	-	23.0
Livestock	27.3	16.8	3.4	19.4
Other Labour	13.9	10.1	6.9	11.1
Business/Own account Enterprise	16.0	12.9	20.7	14.3
Industry	11.8	31.3	55.2	26.4
Salaried job	4.8	5.7	13.8	5.8
All	100	100	100	100

Nearly three-fourths of the landed migrants engage in occupations such as the following: diamond industry, trading and service. This highlights the differential paths taken by migrants from the landed and landless households when it comes to occupations.

4. Motivations and Perceptions Related to Migration and Staying-Put

As part of our data collection efforts, we interviewed a sub-set of 168 households about their motivations for migration. Of these, about 68 percent had land and 23 per cent had reported out-migration. We focused on questions such as why people migrate or do not migrate. To what extent does perceived non-viability of dry land agriculture affect migration decisions? And what kind of support mechanism is expected to improve the livelihood strategy of a household which includes migration? The answers to these questions are discussed below.

4.1 Sustenance of Livelihood Base

A household's migration decisions are determined largely by its conjectures about the long-term viability of farming in the region. This aspect was examined through questions about the long-term sustainability (10 years) of their present standard of living, i.e., the income/consumption level (Table 6). A large number of households looked to migration as a coping strategy for sustaining their livelihood base (89 %). This was closely followed by land-leasing to sustain the flow of income. Among the landed households, measures for soil-water conservation in order to improve land (83%) were the most important strategy. Interestingly enough, only 61 percent of those with land preferred the development of irrigation resources. To a large extent, this is because most of these farmers have nearly exhausted their sources of ground water.

Table 6: Strategies to Sustain the Present Status of Livelihood*

Measures	% of Households**
Migration	89.2
Leasing land	35.5
Increase in livestock	31.7
Mobilizing resources to act job/setting up business for son	32.2
Land improvement***	82.9
Irrigation***	60.9
Selling land***	7.2

* based on data from a sub-set of 168 households

** % of 122 households which reported negative perceptions about the sustainability of livelihood base in the next 10 years

*** % of 82 households with land who entertained a negative perception

4.2 Rationale for Migration

Seventy-five percent of households with migration reported the ability to sustain at least the present level of income over a long period of time as the prime motive for migration as compared to employment *per se* (50%). Moreover, roughly 72 percent of the households reported that they would prefer to reduce intensity of migration, if the migrating members could find work in a nearby area even at lower earnings. Households were willing to take a cut of about 35 percent of the income per year that they would earn from a job that would require them to stay outside the village (Table 7) in order to be able to commute to work from home. The desire to stay with family and the ability

to help in the family farm (in the case of landed households) when necessary were given as the main reasons.

Table 7: Households' Response to Changes in Income from Migration

Changes in the Present Level of Income from Migration	Responses in Terms of Migration Decision (% of Households)*		
	Reduce migration	Stop migration	No change
Decline by 20%	78.4	-	21.6
Decline by 35%	72.0	-	28
Increase by 20%	-	100	-

* % of 38 sample households with migration

Further, we tried to verify the impact of some factors that are generally responsible for either inducing or preventing migration. In most cases, household responses confirmed the expected pattern. Among the responses were the following: (a) increased labor force (which would encourage migration); (b) availability of additional employment in non-farm activities (which would reduce migration); and (c) improvement in land quality (which would in turn reduce migration). Interestingly enough, increased availability of credit and irrigation were not perceived as being key determinants of migration in the present situation.

Most poor households have limited credit worthiness due to inadequate land or lack of access to irrigation. Their income, even in a normal agricultural year, falls far short of basic requirements. The situation only worsens in times of drought. Under such circumstances, households are forced to borrow from private money-lenders or other private sources on highly unfavourable terms. This kind of credit-support is unlikely to work as a substitute for migration; instead, it might become a cause for migration, especially among heavily indebted households. Such households are unlikely to perceive credit as a viable option for promoting their income on a sustainable basis.

Similarly, improving irrigation facilities does not appear to be a feasible solution either as over- depletion of ground water is a common problem in the study villages. The information collected at village level indicated that the water table in most villages had declined by nearly 100 per cent. Most villages have, in fact, reached a level where further depletion of ground water is not only undesirable but may also not be practical as it worsens the problem of salinity.

4.3 Decisions to Stay-Put

Given the fact that a large proportion of the households (i.e., 72 %) in the study villages do not have any member migrating out, understanding the reasons for non-migration too is very important. This was done by seeking responses from the households that did not report migration. The most important reason among those cited (cited by as many as 97%) was the following: that they "still manage to survive." Of the total non-migrant households, about 42 percent reported that they have sufficient income to

maintain their present level of living. This reason was followed by apprehension about the hazards of urban life, not having any surplus labour suitable for out-migration, and difficulty in finding work.

Fifty per cent of the households reported that insufficient income-generating work in the home village alone would not make them send out a member of their household unless certain conditions regarding income and non-income benefits were also fulfilled. But the other 50 percent, consisting of less privileged households, did indicate distress migration if conditions with respect to on-farm activities did not improve. Improvements in the management of community pasture-land however did not emerge as an important reason for reducing migration. This is probably because of the decline in the livestock economy over the years. For instance, 58 percent of the landless (who would be the most dependent on the commons) do not own any livestock. This could be the reason why improvements in pastures may not motivate households to stay put.

4.4 Investment in Soil Water Conservation

Sixty per cent of the landed households in the sample reported that they had undertaken some measures for the improvement of land and/or water resources. These include applying gypsum, spreading fertile soil on top, field bunding, land leveling, building check dams and farm ponds, repairing drainage lines, etc. A large part of this investment has come from the state-financed watershed projects. Compared to this, 36 per cent of the households reported having invested in irrigation wells during the last 10 years. While this proportion is smaller than that for watershed-related measures, it is still significant because (a) this investment is mainly from private sources; and (b) it is in addition to a large number of wells that already exist in the study villages though nearly one-fourth of them are now non-functional. The willingness of people to invest significantly high sums, roughly Rs 100,000, in a high-risk venture to create irrigation facilities is an indication of their long-term interest in farming. Precautionary migration, which enables them to diversify, appears to be their safeguard against the failure of this high-risk investment.

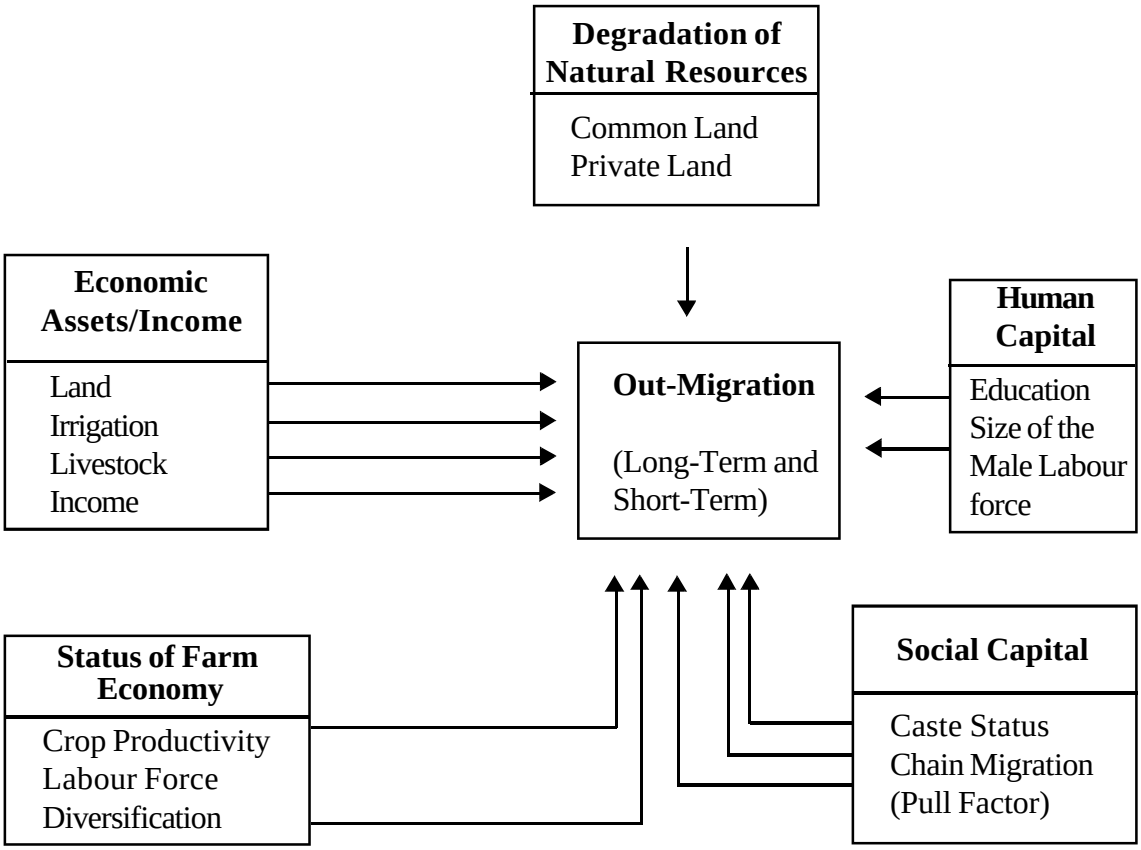
5. Determinants of Migration

In the dry land regions of Gujarat, migration decisions are part of the labor allocation decisions made by households to maintain a certain consumption basket and to improve their living standards. In general, our review of literature and understanding of ground reality suggest that five major sets of factors influence out-migration from rural households. As depicted in Chart 1, these are: asset base, status of farm economy, degradation of land, human as well as social capital, and various pull factors. The impact of these variables may, however, vary across the types of out-migration, i.e., precautionary (long-term) and distress (short-term) migration.[10] The impact of each of these variables will also depend on other socio-economic factors such as nature of education, presence of specific caste groups, indebtedness, etc.

[10] It may be noted that the two types of migration are not strictly exclusive. There are 6 households that have both types of migration. These have been treated as part of the sub-set of long-term migration as noted in Table 3.

Chart I

Factors Influencing Out-Migration from a Dry Land Region



Impact on Migration

We postulate that rural households maximize their long-term income by adopting a diversified portfolio of production and labour allocation decisions, which includes migration. The decision to migrate is depicted in equation 1.

$$Mi = f(LSi, Di, WLi, IRi, LFi, ALFi, CUi, CMi, Si, AD1i, AD2i) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where Mi is defined as the existence of at least one migrant in household i. We estimate equation 1 first for all households with migration, then for households with only short-term migrants, and finally for households with only long-term migrants. Estimates have been generated for each category of migrant households versus rest of the households. Short-term migration (MIGST) is defined as a household with at least one person migrating outside the village for work during the reference year. Long-term migration (OUTMIG) refers to those households with at least one person migrating out for work for ore than a year during the past 10 years (See Table 3). Since the dependent variable is measured in qualitative terms, we use a binomial logit model to estimate

equation 1 for three sets of households reporting migration.[11] The variables that are hypothesized to influence migration are presented in Table 8. All the explanatory variables are household-level variables except for Dj, which refers to degradation of village common lands in village j.

Table 8: Dependent and Independent Variables in Estimating Migration and its Determinants

S. No.	Variables	Description	Direction of Marginal Effects		
		Dependent Variables			
01	MIGRAT(MIi)	Households with out-migration			
02	MIGST	Households with short-term migration during reference year			
03	OUTMIG	Households with long-term migration during the 10 years			
		Independent Variables	*All Migration*	*Short-term*	*Long-term*
LSi	LSTOCK	Ownership adult cattle units (ACU), treating 5 sheep/goats = 1 ACU. (No.)	+	+	+
Di	DEGRATOT	Degraded land (degraded pastures and other uncultivable land) as proportion to total CPLRs of the village (%)	+	+	+
WLi	WLAND	Per capita degraded private land (acres)	+	+	+
IRi	IRRI	Access to irrigation (with irrigation =1; else = 0)	(-)	(-)	(-)
LFI	LFM	Male labour force (No.)	+	+	+
ALFi	AGMAIN	Proportion of main workers in agriculture and animal husbandry (excluding migrating member) (%)			
CUi	UPCASTE	Upper caste dummy (Brahmin, Bania, Darbar, Patel =1; else 0)	?	(-)	+
CMi	MIDCASTE	Middle level caste dummy (Koli, Rabari, and Miscellaneous [like Goldsmith, Blacksmith, Prajapati, Carpenter, Pujari, etc.] castes =1; else=0)	?	(-)	+
Si	EDU	Highest level of education attained by members of the household (No. of years)	?	(-)	+
AD1i	ASSETPOOR	Land dummy (Landless =1; else 0)	?	+	(-)
AD2i	ASSETRICH	Landed dummy (land with > 10% of net sown area with irrigation=1; else 0).	?	(-)	+

We hypothesize that livestock (LSTOCK) is an asset that may be used to support long-term migration. Ownership of livestock is also likely to contribute to seasonal short-term migration for access to better pastures. Degradation of land both under private (WLAND) as well as public ownership (DEGRATOT) is expected to induce migration because of the perceived non-sustainability in the long run. On the other

[11] We estimated the same equations assuming that the household made its migration decision based on a choice set that contained three simultaneous options: short-term migration, long-term migration or no migration. We estimated a multinominal logit model with the determinants of short-term and long-term migration and using no migration as the default option. The results we obtained were very similar to the binomial logit results that we present.

hand, irrigation (IRRI), which improves land quality, is likely to decrease the probability of migration.

A large male labour force (LFM) may also induce migration owing to the greater likelihood of surplus labour that could be dispensed with without losing income from the households' economic activities in the village. The greater the proportion of workers in agriculture and animal husbandry (AGMAIN), the greater the household is invested in rural activities and hence less likely to migrate.

Human capital and social capital are represented by education and caste. Educated (EDU) and higher caste households (UPCASTE) are expected to engage in long-term migration because of their superior skills and access to new opportunities. Short-term migration, which generally requires low skills, is mainly undertaken by the less educated.

To estimate the impact of wealth on migration we created two dummy variables, ASSETPOOR and ASSETRICH, which are compared with their reference variable ASSETMED. ASSETPOOR are those who do not have land. ASSETRICH are those who possess land and more than 10 percent of their net cultivated land is irrigated. The rest are considered as ASSETMED – these households possess land with no or less than 10 percent irrigation. Combining irrigation with land is particularly relevant in light of the fact that land *per se* matters little in a region where frequent droughts have become the norm in the past two decades. Here water or irrigation is the primary constraining factor. For wealthier households with irrigated land, long-term migration for superior jobs or precautionary migration is an attractive option. We also hypothesize that the landless are more likely to migrate relative to the landed without access to irrigation. Frequent droughts and low demand for farm labour are likely to motivate their migration.

Table 9 presents summary statistics on the variables. It is observed that some important variables such as area of degraded land, ownership of livestock, and educational attainment vary significantly across households. Similarly, the number of the male labour force per household also varies substantially between zero and three. The proportion of main workers in agriculture also has a significant variation with a mean of 67 percent and a standard deviation of 39.4.

Table 9: Summary Statistics for the Dependent and Independent Variables

Variables	N	Min.	Max.	Mean	S.D.
MIGRAT (No.)	341	0.00	1:00	0.28	0.45
OUTMIG (No.)	148	0.00	1:00	0.12	0.33
MIGST (No.)	193	0.00	1:00	0.16	0.36
LSTOCK (No.)	766	0.20	40.00	2.83	3.98
DEGRATOT (%.)	6	12.30	64.6	39.30	24.77
WLAND (%.)	382	0.04	4.00	0.60	0.60
IRRI (Dummy)	310	0.00	1.00	0.48	0.50
LFM (No.)	1227	0.00	3.00	1.52	.73
AGMAIN (%.)	1227	0.00	100.00	66.94	39.84
UPCASTE (Dummy)	271	0.00	1.00	0.22	0.41
MIDCASTE (Dummy)	558	0.00	1.00	0.45	0.49
EDU (Years)	1227	0.00	17.00	5.82	4.13
ASSETPOOR (Dummy)	417	0.00	1.00	0.34	0.47
ASSETRICH (Dummy)	76	0.00	1.00	0.06	0.24

6. Main Results

Table 10 to 12 present results of the binomial logit analysis, predicting incidence of migration among households in the study villages. The model has been applied to three sets of migration data - all migration combined, short-term, and long-term. A multinomial logit model of long and short-term migration options resulted in similar results. We report only the results of the binomial logit model.

6.1 All Migrants

The factors exerting a significant influence on migration (short- or long-term) are irrigation (IRRI), proportion of main workers in agriculture (AGMAIN), caste (CASTE), education (EDU), and households' asset base (ASSETPOOR and ASSETRICH). Whereas IRRI, AGMAIN and EDU have a negative impact on migration, CASTE reflecting the higher castes' access to greater social capital exerts a positive impact on migration. Evidently, households' asset base has significant impact though the direction varies between ASSETPOOR and ASSETRICH. The results in Table 10 suggest that probability of migration among ASSETPOOR (i.e., landless) households is lower as compared to the reference category, i.e., ASSETMED. The ASSETRICH have a higher probability of migration as compared to the ASSETMED.

It is important to note that degradation of community land at village level and private land degradation have no significant impact on overall migration. This picture, however, becomes much clearer when we analyze short-term and long-term migration separately.

Table 10: Bionomial Logit Estimates of the Determinants of Migration

	B	S.E	Wald	Marginal Effect
LSTOCK	0.55**	0.02	6.67	0.0104
DEGRATOT	0.01*	0.00	33.19	0.0033
WLAND	-0.00	0.00	0.94	0.0005
IRRI	-1.04*	0.19	28.97	-0.1978
LFM	0.06	0.10	0.3745	0.0118
AGMAIN	-0.22**	0.09	5.59	-0.0422
MIDCASTE	0.32***	0.18	2.93	0.0612
UPCASTE	0.91*	0.21	18.71	0.1735
EDU	-0.03**	0.01	4.00	-0.0072
ASSETPOOR	-1.90*	0.31	35.54	-0.3610
ASSETRICH	0.88*	0.29	8.86	0.1672
Constant	-0.188	0.40	0.22	

Level of significance: * = 1%; ** = 5%; *** = 10%. Chi-Square : 129.7*

6.2 Short-Term Migration

Table 11 presents estimates for short-term migration. The size of livestock emerges as an important positive influence on short-term migration. (This variable, we note, was not significant in the case of all migrants.) Similarly, village-level degradation (DEGRATOT) turns out to be a significant variable exerting a positive impact on short-term migration. Thus, our results suggest that short-term circulatory migration reflects households seeking less-degraded pastures for their herds.

Irrigation continues to have a negative impact on short-term migration. However, the pattern is different in the case of LFM. Large families with surplus labour migrate out for short durations.

The results suggest that probability of short-term migration is significantly lower among the ASSETRICH as well as among the ASSETPOOR as compared to ASSETMED households. This suggests that for the rich the benefits of short-term migration are not sufficient to motivate them to migrate; however, for the middle income, there maybe an economic compulsion to undertake short-duration migration. The very poor, on the other hand, are unlikely to have the minimal assets, skills and knowledge for even short-term migration. Further, this result, seen in conjunction with the significant negative impact of irrigation, confirms that it is irrigation rather than ownership of land per se that has a critical influence on migration decisions.

Table 11: Binomial Logit Estimates of the Determinants of Short-Term Migration

	B	S.E	Wald	Marginal Effect
LSTOCK	0.11*	0.02	18.09	0.0104
DEGRATOT	0.02*	0.00	46.61	0.0024
WLAND	0.00	0.00	0.30	0.0001
IRRI	-1.06*	0.25	17.01	-0.1004
LFM	0.64*	0.13	24.46	0.0609
AGMAIN	-0.07	0.12	0.36	-0.0068
MIDCASTE	-0.15	0.22	0.44	-0.0142
UPCASTE	-0.22	0.28	0.61	-0.0211
EDU	-0.02	0.02	1.33	-0.0026
ASSETPOOR	-1.45*	0.41	12.25	-0.1369
ASSETRICH	-1.82***	1.02	3.14	-0.1714
Constant	-2.39	0.53	19.98	

Level of significance: * = 1%; ** = 5%; *** = 10%. Chi –Square: 200.5*

6.3 Long-Term Migration

The pattern of long-term migration presents a fairly different picture (Table 12). Unlike in the case of short-term migration, the size of livestock exerts a significant and negative impact on long-term migration. On the other hand, village-level degradation of land does not exert any significant impact on long-term migration. Irrigation continues to be an important variable exerting significant negative impact on long-term migration. Both LFM and AGMAIN exert a negative influence on long-term migration. This is very important. It suggests that if a household has a larger proportion of the labor force engaged (productively) in agriculture, such a household may not wish to send out a member of the family for long-term migration.

Social capital becomes an important factor facilitating the households' long-term decisions for out-migration. This is evidenced by the fact that caste has a positive influence on long-term migration while it has no effect on short-term migration. Both upper- and mid-level caste households are more likely to have a long-term migrant in the household relative to lower-caste households.

In the same vein, a better asset base also works as a facilitator for long-term migration. The results clearly suggest that ASSETRICH households are more likely to migrate and the ASSETPOOR (the landless) are less likely to migrate as compared to ASSETMED. Thus, while the landless seek to find casual work within and in proximity to their villages and the landed, with some irrigation, choose to undertake short-term migration to supplement their income, the richer households opt for long-term migration, where their greater social and human capital and economic assets may help them increase their income.

Table 12: Binomial Logit Estimates of the Determinants of Long-Term Migration

	B	S.E	Wald	Marginal
LSTOCK	-0.25*	0.07	10.61	-0.0160
DEGRATOT	-0.00	0.00	0.17	-0.0001
WLAND	-0.00	0.00	2.32	-0.0004
IRRI	-0.67**	0.27	6.16	-0.0416
LFM	-0.60*	0.15	15.30	-0.0376
AGMAIN	-0.31**	0.13	5.20	-0.0192
MIDCASTE	1.36*	0.35	14.86	0.0534
UPCASTE	2.18*	0.35	36.88	0.0870
EDU	-0.02	0.03	0.73	-0.0013
ASSTPOOR	-2.03*	0.45	20.38	-0.1255
ASSTRICH	1.87*	0.35	28.17	0.1159
Constant	-0.42	0.60	0.50	

Level of significance: * = 1%; ** = 5%. Chi-square: 183.0*

The above findings thus suggest a divergent scenario, which is fairly consistent with the hypothesized relationships. The important observations from the three sets of estimation can be synthesized as follows:

a) The demographic factors, such as the size of the male labor force, exert a positive impact on short-term migration whereas it exerts a negative impact on long-term migration.

b) Degradation of land, especially private land, does not influence out-migration. This may imply that the landed households treat irrigation as a substitute for land quality. Irrigation has an unequivocal impact on migration. Whether it is short-term or long-term migration, irrigation has a significant negative influence on migration.

c) Ownership of land is an important factor influencing the migration decision, but it has differing impacts on short- and long-duration migration. Landed households with some access to irrigation are more likely to participate in short-term migration relative to the asset-rich and the asset-poor. Landed households with greater access to irrigation, i.e., the richest class of household in the study villages, are more likely to participate in long-term migration relative to the middle-income. Landless households are least likely to migrate.

d) CPLRs, which are primarily used for livestock activity, influence short–term migration. Thus, migration of short duration appears to be an important labour allocation strategy for herder communities and other middle-income households. Such households may be willing to take on jobs outside their social milieu but in proximity to their village.

d) Social capital is another important factor influencing migration. The pattern, however, varies across short- and long-term migration. Whereas households belonging to a higher caste status have a lower probability of short-term migration, the probability of long-term

migration is higher as compared to those belonging to a lower caste-status. This, once again, confirms the commonly observed phenomenon of chain migration, confined mainly to the enterprising peasant community (called the *patels*), in some of the rapidly industrializing urban centers such as Surat, Jamnagar and Rajkot within the state of Gujarat.

7. Policy Implications

This analysis provides some interesting insights into the nexus between land degradation, migration and economic assets in a dry land region in India. While many of these findings are not entirely new, they provide additional insights on the extent, motives, and form of migration, on the one hand, and their implications for natural resource management on the other. One of the important features of the study is that it has incorporated land degradation as a cause of migration.

Our most important finding is that economic assets have a differential impact on migration decisions. The rich tend to partake in long-term, precautionary migration. Their assets, skills and social capital allow them to migrate out perhaps permanently. The poorest rural households in dry land regions stay put, i.e., they are least likely to migrate. Thus, any employment creation in rural dryland regions is likely to help the poorest who have limited options outside their immediate vicinity.

Middle-income households partake in short-term migration; there is an element of distress involved in their decisions. These households may face social taboos that do not allow them to take up the option of accepting casual work in the vicinity of the village. Further, they may not have sufficient economic as well as social capital to go for precautionary migration. They end up therefore as short-term migrants.

An important insight from our study is that village-level degradation affects short-term migration while it has no effect on long-term migration. This tells us something about how village commons are perceived and used. They are an important economic asset in the short-run, but are less important in how households make long-term decisions. Village commons in our study area are mainly used as pastures; these pastures form a significant asset for middle-income livestock herder families. Regeneration of CPLRs, thus, would contribute to the economic well-being of these households.

Another interesting result is that private land degradation does not influence migration. Irrigation, however, unequivocally has a negative effect. Thus, we conclude that households that can use irrigation to increase land productivity are less likely to migrate. However, development of irrigation, mostly through ground water, is not likely to be sustained in the long run due to already high rates of water withdrawals in the region.

Our discussions with villagers suggest that migration is not a preferred choice. But a large proportion of the households envisage this as the only recourse for the future, i.e., in the next 10 years from now. Investments in irrigation and land quality are most likely to have a negative influence on migration. It is clear from our analyses that it is not land ownership

per se, rather it is access to irrigation that is most likely to deter migration. Thus, policy changes need to be oriented towards development of water resources. Policies, of late, have already recognized this by bringing watershed-development to the center stage of livelihood security and enhancement among rural households. These watershed-development programs in dry regions have, by and large, focused on water harvesting and increased irrigation. However, several studies caution that these important measures that promote irrigation need to be made more equitable and sustainable (See, Shah, 2002b).

Our study shows that social capital has a significant positive impact on long-term migration. Dry land regions in Saurashtra and Kachchh in Gujarat are well-known for the contributions of out-migrants (Shah, 2004). However, there is a need to motivate these ex-residents to shift their focus from the present mode of charity and philanthropy to development and sustainability. One possibility is to link state-supported initiatives for watershed development with private initiatives undertaken by long-term, out-of-state migrants. This may involve building public-private partnerships in watershed development.

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Appendix 1
Schedule for House Listing

Gujarat Institute of Development Research
Nr. Gota Char Rasta, Gota, Ahmedabad

(Ref. Year 2000 – 01)

1. Village: _____ 2. Taluka: _____ 3.District:_____

4. Name of the Head of Household: _____ 5.Caste: _____

6. Name of the Respondent:_____

7. Total Number of Members in Household: _____

8. Type of Owned Land (Area in Acre)

S. No.	Land by Level of Quality	Area under Crop
01	Good	
02	Medium	
03	Low	
04	Uncultivated (Fallow)	
05	Total Owned Land	

Leased-in Land: _____ Leased-out Land: _____

9. Sources of Irrigation: _____

10. Area under Irrigation (2001-2002): Kharif ..... Rabi (expected) .....

11. Area under Main Crop by Season and Irrigation Status: (2000 - 01)

Kharif (I / UI) _____ Rabi (I / UI)_____ Summer (I / UI)_____

12. Yield of the Main Crop (for 2000 – 01) Mund (20 kg)/Acre_____

13. Yield of the Main Crop in Normal Year Mund (20 kg)/Acre _____

14. Main Sources of Income:_____ _____ _____

15. Estimated Income (2000-01) (Worked out on a separate sheet): _____

16. Demographic Information:

Name	Sex	Age	Educ-ation	Occupation		Whether Migrated For work Yes / No	If Yes then,				Every Year Yes / No	During Drought Yes /No	Nor. Year Yes / No
				Main	Sub		Place Of Migration	Dura-tion	Type of Work	Income			

17. Has any one of your family members migrated and settled elsewhere during the last 10 years? Yes/No_____

If Yes, since when: _____ Where: _____ Nature of Employment: _____

18. Average amount of remittance received per year during the last five years:
Cash _____ Kind _____

19. Have you undertaken any of the following measures regarding agriculture in the last 10 years?

Measures	Yes/No	If Yes, Details
Purchased Agricultural Land		
Sale of Agricultural Land		
Measures for Irrigation		
Field Bunding / Farm Pond		
Land Leveling		
Putting Silt on Top Soil		
Use of Gypsum, etc.		
Any Other		

20. Ownership of Livestock (No.):
Cow_____ Buffalo_____ Bullock _____

Sheep/Goat _____ Any Other _____ Total Livestock _____

21. Is your village covered under any of the watershed schemes? Yes / No_____

Give Details: _____

22. Did you get any benefit from the scheme? Yes / No_____

If yes, Give Details:

a. Name of the Scheme:_____

b. Implementing Agency:_____

c. Benefits Received:_____

23. Have you received benefits from any other schemes for water harvesting structures? Yes / No_____

24. Do you use any of the following CPRs in your village? Give details.

CPR's	Yes/No	Use				
		Fodder	Fuel	Grazing	Water Drinking / Irri.	Others
Pasture Land						
Other Wasteland						
Village Pond						
Check Dam						
Other						

25. Do you face any difficulty due to migration of any of the member of your household? Discuss.

_____

_____

26. What is the impact (or outcome) of migration on your household economic status?

_____

_____

Remarks: _____

Investigator's Name:_____ Date: _____

Appendix 2
Detail Schedule

Gujarat Institute of Development Research
Nr. Gota Char Rasta, Gota, Ahmedabad

(REFRENCE YEAR 2000-2001)

Head of the HHS:_____ House Listing No._____

(01) Village: _____ (02) Taluka: _____ (03) District: _____

(04) Caste:_____ (05) Type of Migration : _____

(06) Total Land Owned: _____ (07) Total Income: _____

(08) Income 1: _____ (09) Income 2: _____ (10) Income 3: _____

(11) Income 4: _____ (12) Income 5: _____

About Credit Facility:

(13) Details About Credit Obtained during the Last 5 Years:

S.No.	Sources of Credit	Yes/ No	Year	Amount(Rs.) Amount	Outstanding	Purpose for Borrowing
01	Co-op Bank					
02	Co-op Society					
03	Friends /Relatives					
04	Money Lenders					
05	Farmer					
06	Other					

(14) Would you like to obtain credit at present? Yes/No _____

If Yes, give details: _____

_____

(15) What kind of difficulties do you anticipate in obtaining credit?

_____

(16) Do you wish to undertake any measures for soil water conservation (SWC)?

Yes/No/ Not Applicable _____

If Yes, give details (including estimated expenditure) _____

(16.1) Did you invest in an irrigation well in the last 10 yrs.? Y/N _____

If Yes, how did you mobilize finances for that? Give details.

_____

(17) Details about Crops:

Name of the Crop	Season	Area	I/UI	Produ -ction	Expenditure						
					Ferti-lizer	Pesti-cide	Irri. Pump	Fuel	Wages For Hired labor	Any Other	Total
	R										
	R										
	W										
	W										
	S										

(18) Benefits Obtained from Different CPRs

No.	CPR	Benefits (Q/Year)			
		Fodder	Fuel	Water	Other
01	Pasture				
02	Other Wasteland				
03	Village Pond				
04	Checkdam				
05	Other				

(19) Would you make any changes in your migration decisions under the following conditions?

No.	Changes in Operating Environment		Changes in Migration Decisions
01	Quality of Land	Improve	
		Deteriorate	
02	Area of Crop	Increase	
		Decrease	
03	Irrigation Facility	Increase	
		Decrease	
04	Pasture Management	Improve	
		Deteriorate	

No.	Changes in Operating Environment		Changes in Migration Decisions
05	Improved Access To Credit	For Production	
		For Consumption	
		Other	
06	Indebtedness	Increase	
		Decrease	
07	Alternative Avenues For Empl.	Within Village	
		Nearby Village	
08	Size of hhs. Labour force	Increase	
		Decrease	
09	Dependency Ratio	Increase	
		Decrease	
10	Any Other		
11	Any Other		

(Only for HHS Reporting Migration During Reference Year):

(20) Please explain whether increased empl. opp. within the village would influence your migration decisions or not.

1. Gross Income from Migration: _____
2. Expenditure during Migration: _____
3. Net income from Migration: _____
4. Remittances (Cash / Kind) _____
5. What kind of difficulties do you face during migration?

_____

_____

6. Other benefits (such as new contracts, information, new lifestyle, etc.) due to migration.

_____

_____

(21) You said that there is additional income and other benefits from migration such as _____. Against these, there would be certain expenditures / difficulties. Would you reduce/ stop migration if you get additional income within (around) village to the tune of :

No.	Particulars	Migration		Details
		Reduce	Stop	
1	Same or 20% less than the present income from Migration			
2	35% less than the present income from Migration			
3	20% more than the present income from Migration			

(Only for HHS Not Reporting Migration During Reference Year)

(22) Please give reasons for non-migration (and rank).

(A) Cannot spare a family member who is able to go out

(B) The basic (subsistence) needs are already met

(C) We have sufficient income to sustain our livelihood

(D) Life in the city is too hazardous

(D) Had tried earlier but it didn't work

(E) Can't go out due to old people/ sick people / children in the family.

(F) Don't have any contacts at the place of destination.

(23) What is the minimum amount of income you expect for having to give up a member of your family as migrant?

Rs. / Year: _____

_____

(24) You said that at present there is no migration from your family. Assume that by having a member migrate, the family may not benefit substantially. In such a scenario, would you still like to send out a family member who may not be employed gainfully at home because you prefer some form of productive employment to idleness? Yes / No _____

Discuss: _____

(For all HHS)

(25) Do you think that you can sustain the present level of living in the next 5 or 10 years?
(No change-1, Decrease-2, Increase-3)

In the next 5 years _____ In the next 10 years _____

(25.1) If you anticipate decrease in the level, what kind of measures would you take?

No.	Measures	Yes/No	Give Details
01	Out-migration		
02	Measures for SWC		
03	Irrigation		
04	Buying New Land		
05	Leasing-in Land		
06	Buying More Livestock		
07	Selling off the land and starting business		
08	Mobilizing finances for getting job/ business for sons		
09	Any Other 1		
10	Any Other 2		

(26) Would you choose migration in order to increase income/ empl. opportunities in future?

(Yes / No)

Increase in Income: _____ Increase inempl.opportunities:_____

(26.1) If yes, please give details.

_____

_____

(27) Would you choose between casual work in (or around) the village or somewhatbetter opportunities at a distant place?

_____

Give Details: _____

(28) Agriculture has become more risky and irrigation is also becoming scarce. In these circumstances, would you like to allocate a part of your land for supporting livestock?

Yes / No _____

(28.1) If Yes, then give details.

_____

(28.2) If No, why not?

_____

(29) Would you like to lease out land and go for causal work?

_____

_____

Male	Sex	Age	Educa-tion	Occupation		Whether Migrated For work	If yes then,			Every Year	During Draft	No. Year	No. of Days		Do you Collect Fodder, Water, etc.	Income-from Migration		Work days In agri.		
				Main	Sub	Yes/ No	Place Of migration	Dura-tion	Type of work				Main Occu.	Sub. Occu.	Yes/ No	Total	Remi-ttance	Rain	Winter	Summer

Appendix 3: Map of the Study Area