

The ‘Tipping Point’ in Indian Agriculture: Understanding the Withdrawal of Indian Rural Youth

¹Amrita Sharma and ²Anik Bhaduri

¹IWMI-TATA Water Policy Program

²IWMI, New Delhi, India

“We are all, at heart, gradualists, our expectations set by the steady passage of time. But the world of tipping point is a place where the unexpected becomes expected, where radical change is more than a possibility. It is contrary to all our expectations a certainty.”

-Malcolm Gladwell, Tipping Point

Introduction

A number of recent occurrences suggest that India might very well be at the ‘tipping point’ of the (de)growth in its agricultural population and with growing urbanization, better literacy standards and greater skill attainment by rural youth it might take a steep turn downwards thus changing the nature of farming in the country drastically.

At times the ‘gradualist’ in us tells that it’s probably too early and too ambitious to make such assertions – more than 50 % of the population is currently engaged in farming; the rate of growth of nonfarm jobs is abysmal, the services sector has too little job opportunities to offer and the manufacturing sector has only been experiencing jobless growth. The transition, even if it were to happen, will take a long time. However, if one took cognizance of the surroundings and the developments therein, there are a sufficient number of reasons for us to think to the contrary. First, the farming population in several parts of India registered a decline in absolute terms for the first time in 2001 with states such as Tamil Nadu and Kerala at the forefront (Economist 2001). Notably, the rural male cultivator population has declined by 2.8 million between 1991 and 2001 (a decline of 3.6 %) changing the male-female cultivator ratio from 80:20 in 1991 to 67:33 in 2001. These are significant developments, given the impact of dropping populations have on the nature of farming practiced in an economy¹. Second, the

¹ Bicanic (1972 cited by Griggs 1982) classified countries on the basis of rate of growth of their agricultural populations as relative and absolute and identified how fall in agricultural population caused significant reorganization of farming, the most drastic changes coming when the population fell in absolute numbers - peasants move from maximizing output per unit of land to maximizing output per head (as there are more number of people to feed per farmer); farm size becomes larger and the agricultural populace is dominated by large farmers; there is acute labor shortage as young and able bodied men withdraw driving mechanization, and finally as the gap between farm and nonfarm incomes widen governments intervene to restore parity.

growth performance of the Indian economy gives sufficient grounds to expect a significant change in the employment scenario². The 6th economic census which reports that the growth in labor opportunities in the nonfarm sector is outpacing the growth in labor force gives further hope. Third, the current farm crisis in the country seems to be another dominant force causing many to quit out of desperation. The mounting number of farmer suicides and the rising disenchantment with the profession among farmers (NSSO 2005) are some subtle but disturbing indicators. Further, if we look back in time we find that in most cases withdrawal from farming took place in a very short concentrated period of time either because of growth in the nonfarm sector or farm crisis as experienced by US in 1980s. Most of the East Asian economies such as Japan, South Korea, and Taiwan which are similar to India in being land scarce and labor surplus underwent steep fall in agricultural population within a short span of less than 20 years. To support the argument further, most of them were experiencing similar economic growth rates (that India is experiencing now). Last but definitely not the least, the talks of efflux of youth from farming is increasingly gaining weight among the premier Indian academic circles. The noted agricultural scientist, Dr M S Swaminathan, pointed out recently that in the coming years one of the biggest challenges for Indian agriculture would be to retain its youth in agriculture and unless farming became both 'intellectually stimulating and economically rewarding' it would be difficult to attract or retain rural youth in farming (Swaminathan 2001).

Place of This Study in the Strategic Analyses of India's River Inter-inking Program

The river-linking proposal claims to address the water needs of India in 2050 and beyond. For that to happen it is important to understand what shape Indian agriculture (as it is the largest user of water) would take in 2050. Human capital, being one of the most important factors driving changes in structure of agriculture (Boelhje 1992; Bicanic 1972 cited by Griggs 1982), a look at the withdrawal of Indian farmer population and its drivers becomes crucial to the analysis of the proposal. It is in this regard that the paper takes an intensive look at the landed rural youth of India across 14 locations in 12 states and their association with farming, and finally tries to identify (with the help of logit models) the factors fuelling the process of their withdrawal from agriculture.³ In order to place the phenomenon in its larger context, we also review some international literature on withdrawal of farmers from agriculture.

² Bhalla and Hazell 2003 in their paper on employment growth in India had projected that with an overall economic growth rate of 9 % and with an employment elasticity of 0.1, employment in India will match the labor force by 2010 and if the employment elasticity was taken to be higher the country will reach full employment by 2004!....and by 2020 will have an excess of 68.4 jobs.

³ The rationale for focusing on landed rural youth is similar to 'prosumer' analysis that market researchers do. 'Prosumers' are the trendsetters for any particular product category. Their usage and involvement with the product defines how the product would evolve in future. Market researchers have been thus tracing the behavior of these consumers to fine tune their products. For Indian agriculture, landed youth are the 'prosumers' as they would define how Indian agriculture would evolve in future.

Why Farmers Quit – Existing Wisdom

Why do farmers quit or what makes farmers quit farming en masse, the occupation they have been in all their lives? The theory of farm exit and a related yet more widely known concept - the 'farm problem' has been an issue of keen interest to scholars since a long time. Unfortunately, most of the contribution to the literature has come from work done on US farms, posing limitations to its applicability to other economies such as India. However, we believe that much of the understanding (by virtue of the basic nature of farm sector) would hold for all type of economies. In this section we put together some of the work done on answering the question –"why farmers quit?" and assemble the major hypotheses and debates in the field to serve as a foreground to our study and analyses.

The Farm Problem

There is no agreement among scholars on what exactly constitutes the 'farm problem', though a significant amount of work has been done on the issue (Gardner 1992). The nature of the problem has also been changing over time with increasing heterogeneity of the farmer population (Offutt 2000). Broadly, the term can be taken to mean economic difficulties faced by farmers as a result of low farm incomes (vis-à-vis nonfarm) and large instability and variability in the income from farming. The common response of farmers to the problem is to migrate to urban areas or to nonfarm occupations which provide higher returns to per unit of labor applied. The question that arises is - what explains the difference in farm and nonfarm incomes? Gardner 1992 attributed the difference to the factor market conditions. Johnson 1959 (Gardner 1992) also wrote that the farm problem was "as a result of the employment of more labor in agriculture than can earn as large a real income as the same labor could earn elsewhere in the economy." Further, one of the many ironies of the sector is that most of the times the aforesaid 'farm problem' arises out of success of farming itself.

"The greater the increase in farm productivity, the greater the imbalance between supply and demand of farm products which has to be corrected by an outflow of labor or by lower farm prices. Unless the outflow of labor from farming is fast enough, an increase in farm productivity leads only to lower farm prices and lower farm incomes."

(Houthakker 1967 cited by Gardner 1992)

Thus the incentives for a farmer to farm go on declining even with a good performance and many a time there is no option but to quit. Offutt 2000 in her paper on "Can the farm problem be solved?" puts it very well – "there is and always will be money to be made in farming but the question is by how many?"

Why Farmers Quit

As rational actors, while making a decision to quit farming, farmers compare the utility they derive from farming vis-à-vis that derived from quitting and taking up full-time nonfarm employment. The theory of farm exit and most of the studies done on the subject essentially

rest on this assumption. Transaction costs involved in making a shift (including relocation) is also an important determinant (Goetz and Debertin 2001). Lower the costs, higher the propensity to shift. Goetz and Debertin 2001 in a cross-county analysis of US farms conclude that in case of counties facing a net loss of farm operators, lower transaction costs led to faster rate of withdrawal from farming. These costs/utilities are either aggravated or lowered by various factors. Scholars have gone into significant depth exploring the impact of these factors which can be classified into three types - farmer associated (such as education and skill level of farmers, involvement in nonfarm activities, family size); farm-specific (size of farm, value of production) and nonfarm (such as proximity to metropolitan areas, overall GDP of the region, government interventions etc.).

Glauben et al. (2003) notes that at a broad level, farmer withdrawal studies can be classified into two types - the first type is empirical studies at the farm household level while the second type focuses on adjustment of farm labor at aggregate (sector/regional) level. While the first type help bring in more household and farm specific characters in the analyses, the second type help capture the macro-economic forces and the influence of government policies on changes in labor allocation in the farm sector. Authors have tested the impact of several farm/nonfarm, household/ regional level variables on the decision of farmers and have found both similar and divergent results. We shall first take a look at the points of dissent.

One of the most popular debates in the field is on the question whether a prior involvement in nonfarm occupation reduces or increases the chances of withdrawal from farming? A large number of farmers in developed economies today practice farming as a part-time activity. The trend is becoming increasingly in vogue and does not give conclusive evidence on whether part-time farming sets them on their way out of agriculture. Authors like Kimhi and Bollman 1999, Kimhi 2000, Goetz and Demertin 2001 in their studies on Canadian, Israeli and US farmers, respectively, conclude that nonfarm income has a stabilizing impact on the farmer's household economy. Farmers in these cases use their nonfarm income to augment their farm activities and it thus serves as a stabilizing factor rather than an avenue for exit. On the contrary, authors such as Pfeffer 1989 and Weiss 1999, see a strong link between nonfarm employment and withdrawal from agriculture. That is, growth in nonfarm employment causes people to move away from farming by providing the much needed outlet. They propose that an exposure to nonfarm occupation lowers the transaction costs (Glauben et al. 2003 have also called 'the beaten path' effect) involved in the shift making the exit decision easier.

Another point of deviation has been on the impact of government intervention and macro-economic environment. A comprehensive study done in the OECD countries (1994) concluded that farm family labor as well as hired labor is not particularly sensitive to business cycle conditions or to agricultural prices. However, Andermann and Schmidt (1995, cited by Glauben 2003) in a study on Germany have found the labor significantly responsive to macro-economic changes and agricultural prices. Government payments too have been found to have a contrasting impact. On the one hand, while income assistance in terms of price supports results in slow down of migration; on the other land diversions lead to greater migration out of farming (Barkley 1990).

Among the farm specific characteristics, it is found that an increase in average farm-size significantly reduces the tendency to close down farms (Pietola 2002; Glauben et al. 2003; Goetz and Debertin 2001). The justification being that large farm sizes make farming much more

economically viable for the farmers by enabling them to reap economies of scale and bring in use better and cost-effective technologies. There are, however, evidences to the contrary. For example, Speare 1974 in case of Taiwan found that the large landholders showed a greater tendency to withdraw. This was by virtue of their being able to gain good quality education and to move to better occupations. Large farmers could also take greater risks compared to the small and venture out more in search of greener pastures.

Most of the authors with exceptions such as Zhao 1999 have found that higher education and greater number of skills lead to greater propensity to migrate. Weiss 1999 found several other farmer associated characteristics to be playing a role such as gender, age, family size, succession information and attitude towards risk. Among these the trend in age has lately been a cause of worry among the developed countries. A number of policymakers and academicians have been expressing serious concerns over the 'graying of farm sector' because of (1) increased exit and (2) dropping of rates of entry into farming by the rural youth (Gale 2002). What roles do these factors –age, land size, education and skillfulness etc., play in the context of Indian farmers? We shall try and address this question in the later sections.

The Case of Labor Surplus Economies

As mentioned earlier, one of the lacunae in the literature on the theory of farm exit is that not much work has been done on labor surplus economies. This could possibly be because of their very definition- labor surplus and thus not requiring much attention on this aspect. However, there is a serious flaw in this line of thinking. Zhou 2004 critiques the work of Schultz challenging one of his assertions that low income countries saddled with traditional agriculture do not suffer from the problem of many farmers leaving agriculture for nonfarm jobs. He says that many low income countries especially from 1950 onwards have been increasingly open to high income economy... “small peasants migrate to those rural areas which have entered the high wage stage, cities and abroad to earn higher income as part-time and absent farmers, thus are up against the problem of adapting the agricultural sector to a high income country”(Zhou 2004). The changes in post World War II Japan, where the full-time farming households declined from 50 % in 1950 to 20.5 % in 1965 is a case in point (ibid) which proves that how even a labor surplus economy could undergo a steep fall in its agricultural labor force in a short period of time and defy existing wisdom.

In most of the East Asian economies, however, mass withdrawal of population from agriculture was largely a post - World War II phenomenon (Ohkawa 1961) thus, bringing into play a very different set of factors. There was also a great emphasis on industrialization and concentrated efforts were made to channelize resources, including human capital, to fuel the industry-led growth of the economy. China started experiencing mass rural-urban migration of labor during the 80s. However, much of this was the floating population. Rarely, migrants settled (or could afford to settle) in cities. Part-time farming became a popular arrangement where farmers spent most of their productive time in rural nonfarm or urban activities. In peak agricultural seasons they came back to their farms only to leave again (Zhao 1999). In India too, this has become increasingly in vogue in a large number of regions (Sharma, forthcoming). How this part-time arrangement affects farming, however, is a less understood phenomenon and needs to be studied.

In economies such as India, the 'farm problem' is probably worsened by virtue of its labor surplus nature. Dantwala and Donde 1949 wrote about the 'uneconomic cultivators' of India way back in the 1950s saying that the problem with Indian agriculture was not so much of uneconomic cultivation but of 'uneconomic cultivators' and it was this group of farmers that needed maximum policy attention. In a study of 11 villages in the then Bombay province, the authors found that 71 % of the cultivators came in the category of 'uneconomic cultivators' who continue to till land without necessary resources, living a life of insecurity and sub-marginal existence. For the 70 % of land that was cultivated as economic units, the roadblock to efficient production was fragmentation of landholdings. The authors observed that the number of fragments operated grew with the size of cultivated holding of a farmer thus "what seemed to have been gained in the size was lost in the number of fragments that comprised the unit of cultivation" (past tense added) (ibid). There was widespread leasing in and out of land to make farming units viable but taking all that into account, still, only 27 % of the cultivators operated 55 % of the land. According to the authors' estimates 50 % of the cultivator population in the region was redundant! (ibid). There were suggestions made to redistribute land - transfer from those holding more than economically viable holdings to the uneconomic cultivators. Rural industrialization was also proposed as an effective medium to promote diversification of livelihoods thus reducing the pressure on land. Unfortunately, none of the policies could be implemented effectively and the uneconomic mode of cultivation continued ruining the economics of cultivation in the subcontinent even further. Bhalla and Hazell 2003 observe that with 60 % of the labor force producing around a quarter of the GDP, the relative productivity of workers in agriculture is less than one-fourth of the nonagricultural occupations. In recent times several macro-economic changes and farm level changes have worsened the agricultural employment scenario. For example, in the post-liberalization period the employment growth in agriculture dropped from 1.49 % pa to 0.01 % pa (Bhalla and Hazell 2003). The recent trend of the over-capitalization of agriculture also influenced the employment elasticity of agriculture adversely. The employment elasticity of agriculture is approaching zero (0.01 in the post-reform period, Planning Commission report cited in Bhalla and Hazell 2003) and has been reported to be negative in some states such as AP (-0.13), Kerala (-0.92) and UP (-0.13).

Given this, much of the pessimism about the status of employment in Indian agriculture is justified. We, however, aim to add another leaf to the discussion by arguing that the drop in employment in agriculture cannot be solely attributed to the happenings on the agricultural front. There are developments on the nonfarm side which are having significant and some times greater impact.⁴ At present much of the deliberation on the withdrawal of Indian farmers seems to be pre-occupied with declaring it to be a distress phenomenon. We believe that the reality is much more complex. Indian villages are undergoing a major transformation causing perceptible changes in aspirations of the rural mass, especially the youth who are now opting out of farming. Some of these aspects have been dealt in greater detail in another of our papers (Sharma, forthcoming). The participation rates of the 5-14 and 15-29 age groups are declining

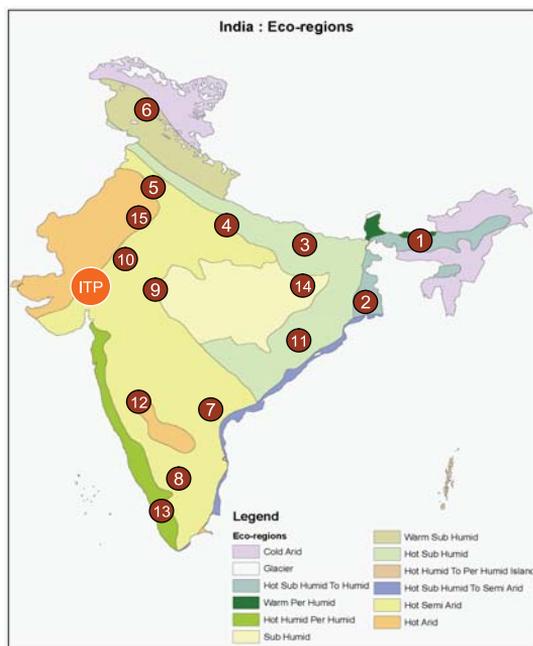
⁴ Bhalla and Hazell 2003 hypothesize that growth in secondary and tertiary sectors has a major contribution in the decline in farmer population. There has been a notable increase in labor productivity and wages in agriculture and the wages in nonagricultural sector are now significantly higher than in agriculture. This suggests that the shift from agriculture to nonagriculture is not a distress phenomenon.

as more young people stay in education (Bhalla and Hazell 2003). There is increased migration from rural to urban areas (NSSO 2003). Urbanization is also growing apace casting great influence on the suburbs and the villages in the vicinity. How these factors contribute, however, is not fully understood. In this paper we make an attempt to identify some of the factors contributing to the withdrawal of the rural youth from farming.

Data and Preliminary Observations

The data used in the study was collected through a primary survey of the rural youth across 14 locations⁵ covering 13 states of India- Kashmir, Haryana, central Uttar Pradesh, lower Assam, Jharkhand, central Orissa, north Bihar, West Bengal, Gujarat, Rajasthan (2 locations), Madhya Pradesh, north Karnataka, and coastal Andhra Pradesh (Figure 1). Data was collected on their education and skill-level, their asset-holding, social group, their association with agriculture, their perception about farming as a career alternative and their plans for future with regard to a shift to nonfarm occupation. These plans have been made the basis of our analysis. We understand that the plans to withdraw might not convert into actual withdrawal but with the

Figure 1. Study locations.



⁵A location in this context means a block of contiguous districts which have relatively similar agro-climatic and hydrological features. The locations were selected so as to represent a reasonable hydro-geographic diversity of the country.

question – ‘Do you have immediate plans to shift to another occupation’? Further supported by the mention of the job they were considering to take up, we expect to paint a reasonable picture of the withdrawal phenomenon.

We also collected data on irrigation availability and proximity to the nearest urban centre. At the beginning of the study, some pilot survey results revealed that the nature of the involvement of the youth in farming varied with respect to the degree of their association with the day to day management of the farm. Based on this, we classified the respondents into full-time and part-time farmers and those with no-involvement in farming.⁶

A significant proportion of the rural youth were found to be practicing part-time farming (35 %). The phenomenon was more pronounced in villages close to town rather than those away from town (40 % vis-à-vis 29 %). We also found a significant correlation between the degree of association with farming and per capita value of agricultural production (0.62). Lower the value of agricultural production per capita, higher the number of part time farmers/no-involvement farmers.

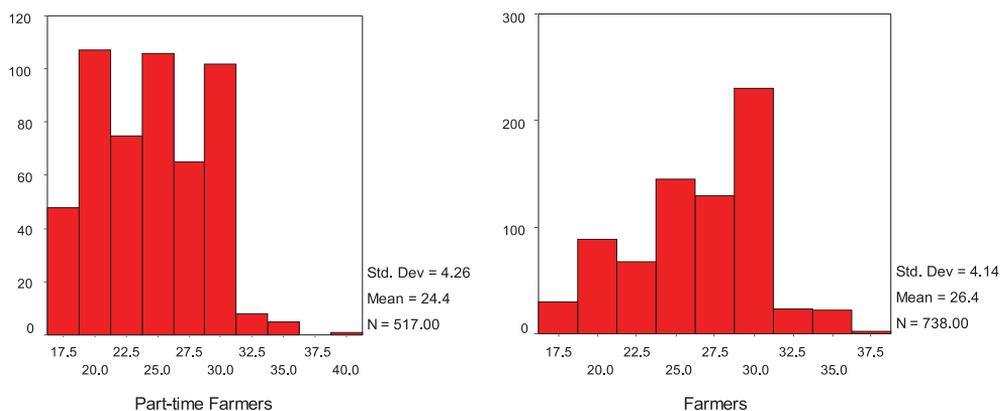
About 35 % of the youth migrated for work outside their villages and most of this migration was seasonal. A large number of youth (30 %) commuted to nearby towns/villages. Most of them worked as agricultural labor, construction workers and contractual workers at agricultural produce markets (*mandis*), factories, bus stops and railway stations. These jobs were low-paying and irregular in nature.

Most of the people interviewed had education up to secondary level (37 %), followed by primary education (32 %). 16 % of the youth interviewed were illiterate and a negligible 1 % had professional education from technical training institutions such as Industrial Training Institutes (ITIs). A very small number of youth (24 %) possessed some kind of nonfarm skills, reflecting the poor skill-set of India’s rural youth. This prevented them from gaining entry into remunerative occupations. The most common skills found among the youth were driving, electrical and mechanical repair work, and masonry. A small percentage possessed knowledge in computer applications as reported.

There was a visible sign of aging of the farmer population. Along with the details of the youth being interviewed we also took some relevant family details. The average age of a person farming was found to be 36 (for an effective sample of 8,500 plus in the working age group). Among the youth, also there was a difference in age of the part-time and the full-involvement farmers (Figure 2). Though the mean age is not much different, it shows that the proportion of full-time farmers is relatively skewed towards the higher age group.

⁶ The classification was done based on the following criteria. The ‘high involvement’ category included the youth who were actively involved in management and supervision of their farms. One can term it ‘full-time farming’. The ‘medium involvement’ category included the youth who contributed labor on their farms when they were free from their main activity. One can term it ‘part-time farming’. The ‘no involvement’ category included youth who had almost no involvement in the management of their farms.

Figure 2. Age distribution of part time and high involvement farmers.



Source: Primary Survey, 2005

Another interesting phenomenon we observed on the field was that both the small and large farmers were on their way out. Reverse tenancy has been talked about much where small and marginal farmers, because of the nonviability of their small parcels of land are handing it to large or middle farmers. Recent studies of Jodhka 2006 also shed light on this phenomenon in Punjab agriculture where he says that the phenomenon of withdrawal is much stronger in small and marginal farmers. However, in our field work we saw several instances of large farmers following their land and moving out of rural life.

Finally, one of the key questions we wanted to look into was the impact of irrigation on withdrawal behavior. It is generally believed that irrigation has a significant impact on employment generation. Thus, if the national river interlinking program was to get functional and provide irrigation to newer areas it should ideally contribute to reducing rural-urban migration by generating employment. We shall test for all these hypotheses by using some occupational choice models in the next section.

Occupational Choice Models

Based on these preliminary observations we postulate that a farmer, characterized by his age, skill level, education, landholding size, irrigation facilities and location of his farmland, seeks to maximize his welfare by making a choice regarding his present agricultural occupation. In this section, using a suitable regression model we attempt to address the question why youth are planning to shift to other nonagricultural activities, and assess the odds of an average rural youth moving out of agriculture.

Here the behavioural response of the youth involves a discrete binary choice of either shifting to other nonagricultural activities or staying in agriculture. We consider the farmer's willingness to shift as a dependent variable and code it as 1 for his plan to shift to nonagricultural activities and 0 for otherwise. The independent variables explaining the dependent variable include skills (S), education (E), age of the farmers (A), land holding size of the farm (AVL) and irrigation (I). The variables are described in more detail in Table 1.

Methodology and Estimation

When the dependent variable is binary, application of the linear regression model is more complex as the dependent variables can only take values of 0 and 1. However, from knowledge of relevant independent variables, what we want to predict is not a precise numerical value of a dependent variable, but rather the probability (p) that a farmer will move out of agriculture is 1 rather than 0. But there are problems in using the probability as the dependent variable in an ordinary regression as numerical regressors such as average land holding may be unlimited in range. If we expressed p as a linear function of skills, education, and average landholding size and so on, we might then find ourselves predicting that p is greater than 1 (which cannot be true, as probabilities can only take values between 0 and 1).

To overcome such complexities, we use a logit framework, where the dependent variable represents the log of the odds ratio of farmer's plan to shift out of agriculture. The odd is defined here as the ratio of probability that farmers will make a choice to shift out of agriculture to that he remains in agriculture. As the number of farmers in the sample is 900 and 555 farmers are planning to shift out of agriculture, the probability (p) that a farmer is willing to move out of agriculture can be computed as:

$$p = \frac{555}{900} = 0.62$$

The probability that a farmer is willing to remain in agriculture is $1 - p = 0.38$. Given p , the odd ratio (O) can be derived as;

$$O = \frac{p}{1 - p} = \frac{0.6}{0.4} = 1.5$$

it means if two farmers choose to remain in agriculture, then three farmers would be willing to move out of agriculture. The logit model estimates the natural logarithm of such odd ratio, O that involves fitting to the data an equation of the following form:

$$\text{LOGIT} \left(\frac{p}{1 - p} \right) = \alpha_0 + \alpha_1 (S) + \alpha_2 (E) + \alpha_4 (I) + \alpha_5 (A) + \alpha_6 (AVL)^2 \quad (1)$$

where p = probability (p) of a farmer willing to move out of agriculture, and

$$O = \frac{p}{1 - p}$$

represents the odd ratio of farmers moving out of agriculture. Table 1 presents the regression results.

The regression results show the effects of different factors that influence the farmer's decision to shift. As per the results, the odd of moving out of agriculture is 1.50 for the farmers who possess nonfarm skills. Possession of skills increases the marketability of a person. The returns to migration are much higher if a person possessed certain skills. In Gujarat, we have observed that there was a huge differential between the wages received by a trained mason and other regular laborers. The mason would earn to the tune of Rs. 150-200 per day while the rest could only earn up to Rs.75-80. Further, while skills increase the odds of migrating, migration and the exposure thereof also lead to attainment of skills by the youth. Part-time farmers all-over were found to possess greater number of skills.

Table 1. Estimated regression results.

Variables	Coefficient	Odd ratio	Z	P>z	Definition of variable
Skills	0.41	1.50	2.21	0.03	S=1 if the person possesses skills, =0 otherwise
Education	0.34	1.40	1.91	0.06	E=1 if the person is educated, 0=otherwise
Irrigation	0.23	1.26	1.47	0.14	I=1, if irrigated region, 0=otherwise
Land holding	- 0.23	0.79	-3.25	0.00	AVL=Average landholding
Landholding -square	0.01	1.01	2.47	0.01	
Age	0.50	1.64	3.33	0.00	A=1 if age less than 30 years, 0=otherwise
Constant	-0.09	0.92	-0.39	0.70	
Number of observations		892			
Log likelihood		-574.5			
LRchi ² (6)		34.5			
Prob > chi ²		0			

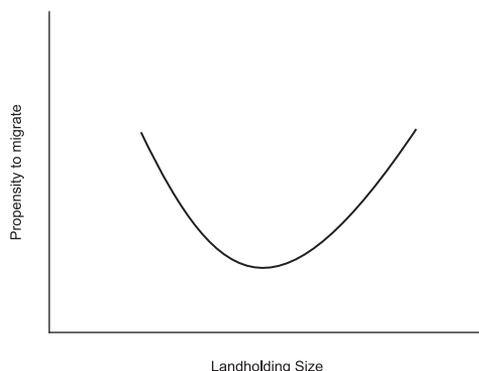
Similarly, education has a positive effect on the farmer's propensity to shift out of agriculture. The odd ratio of moving out of agriculture is 1.40 for education. The results, however, are not significant at 5 % level. The possible explanation could be the inability of other sectors to absorb rural youth. For a large number of educated youth in the countryside, higher education does not immediately translate into employment (Ghosh et al. 2006). In our sample, youth with vocational education are significantly low in percentage, but that too has not been found to increase employability by any significant degree (Ghosh et al. 2006).

Age too is an important factor. The odd ratio in favor of shifting out of agriculture is high among farmers of age less than 30 years. The possible explanation of this could be that younger farmers are more open to opportunities, can take the risks of moving out and experimenting with newer jobs and unfamiliar surroundings. They also command higher wages because of their faster learning ability and greater adaptability. In case of some US farms, Gale 2002 found that occupational mobility was generally higher among younger farmers and they were more sensitive to farm nonfarm earning differentials, farm prices, and interest rates compared with the old farmers. Another explanation of the graying of the farm sector could be what Molho 1995 calls 'cumulative inertia' whereby individuals form attachments to area, friends, jobs etc, which grow over time. The cumulative inertia in older farmers would be higher reducing the propensity to migrate.

Results show that lower average size of land holdings is one of the most important factors explaining the farmer's higher propensity to migrate for other nonagricultural activities. This corroborates the widely held understanding on how small farm size pushes people out of farming. Year after year, the land holding is reducing, due to the division of property or, in many cases, accessions by the private users against loans. Farmers are finding it untenable to farm lower holding size land, and the sale of land and migration to urban areas has become rampant (Jayati Ghosh 2003). In some cases, farmers also migrate to repay their loans leaving the responsibility of agriculture on other members of the family.

In the field, however, we observed that alongside this distress phenomenon was another reality where large farmers too were making their way out of farming. To check for this we introduced another variable 'landholding-square'. The positive coefficient of the square of the average landholding size in the quadratic relationship suggests a strictly convex or U shaped (Figure 3) relationship between farmer's willingness to move out of agriculture and average land holding size.

Figure 3.



Policymakers often cite that irrigation is one of the key factors that may reduce the propensity to migrate. Our results, however, indicate an insignificant role of irrigation relative to other factors in influencing farmer's decision to shift to other activities.

Finally, many policymakers argue that in the villages close to town, farmers are more likely to shift out of agriculture (Lucas 2000). It is an illustration of the bandwagon effect. People are attracted towards the better standard of living and the facilities available in towns. Also there is no dearth of literature suggesting why longer distance migrations may be less common. In a survey of migration in the developed countries, Greenwood 1997 identifies that moves over longer distances impose higher costs of foregone, intervening opportunities. Although in the Indian context much of migration is intra district and the internal travel cost is not too high, the general proposition that distance deters migration, seems to be consistent (Lucas 2000). For farmers far away from urban centers alternate occupational opportunities are also limited. Distance does not allow him to operate as a part-time farmer i.e., be partially involved in agriculture and work in town during the lull periods in agriculture. Our sample data also suggests strong positive correlation between distance and full time involvement of farmers in agriculture, which means that a farmer located far away from a town is more likely to be fully employed in agriculture. What factors would be driving migration from such areas then? We expect that factors affecting farmers' willingness to shift out of agriculture would be stronger in terms of the odd ratio and statistical significance if he is far away from the town. We attempt to test our hypothesis by restricting the sample only to the case where the distance of the farms from the nearest town is above 14km. The distance of 14 km as a point of reference is taken based on the median value of the sample distance. Table 2 presents the regression results.

Table 2. Estimation results for sample >14 km away from urban centers.

Variables	Coefficient	Odd ratio	Z	P>z	Definition of variable
Skills	0.83	2.30	2.75	0.01	S=1 if the person possesses skills, = 0 otherwise
Education	0.86	2.37	3.46	0.00	E=1 if the person is educated, 0=otherwise
Irrigation	-0.38	0.69	-1.58	0.10	I=1, if the region is irrigated, 0 = otherwise
Land holding	- 0.23	0.79	-2.58	0.01	AVL=Average landholding
Landholding - square	0.01	1.01	2.03	0.04	
Age	0.58	1.79	2.70	0.01	A=1 if age is less than 30 years, 0=otherwise
Constant	-0.03	0.97	-0.10	0.92	
Number of observations		456			
Log likelihood		-277.9			
LRchi ² (6)		39.8			
Prob > chi ²		0			

Comparing tables 1 and 2, we find that all the factors explaining the farmer's willingness to shift out of agriculture are far more significant if the farmer is located at least 14 km away from a town. Striking is the improvement in the significance of the factors like skill and education. This implies that being skilled and educated becomes an important precondition. It is important to justify a drastic step such as leaving agriculture and working in some far away place. Our fieldwork shows that the unskilled category of youth could only get low-paying jobs such as loading-unloading of goods which did not fetch enough to sustain them in cities. In villages located far away from urban areas we find many cases of reverse migration where a number of youths had come back to the farm after some time because they were not able to sustain themselves in towns on the meager salaries they earned. Further, contrary to the results presented earlier, lack of irrigation, here has a positive impact on farmer's willingness to migrate, and was significant at 10 % level. This implies that the distance from urban centers accentuate the negative impacts of water scarcity rendering out-migration from farming as the only option available to distressed farmers.

To conclude, five important points emerge from the analysis. Possession of skill seems to be an important factor in determining out-migration from agriculture. The odds of a farmer moving out of farming increase with skill attainment. Education too lends a positive push to migration but is not significant at 5 % level. Most of the out-migration is visible in the lower age group making age another critical variable. Among the farm level factors, farm size has an impact but the relationship manifests itself differently in the smallholder group and among the large farmers. Both appear to be withdrawing but for different reasons. Irrigation has no significant impact on the withdrawal behavior. Finally, proximity to towns is found to be a critical determinant fuelling out-migration decisions of farmers.

Policy Implications

What would be the face of Indian agriculture say 20-30 years hence? This paper is a deliberate attempt to add a new dimension to the present discourse which presupposes the persistence of overpopulated workforce in agriculture. We propose that the livelihood decisions of the rural youth would be the key to the future of Indian agriculture and there is a need to understand the various processes affecting it fully. This paper attempts to identify some of those and tries to check/validate some widely held notions through the use of statistical models. We, however, accept that the model is far from comprehensive. The blame may go little on the primary nature of the data which makes analysis difficult and more on our inability to quantify certain imponderables such as the changing aspirations of the rural youth and its impact on withdrawal.

Based on the present analysis, two kinds of implications, however, emerge – one for the short term and the other aimed towards long term changes in policies and institutions. In the short term we need to recognize that the current withdrawal from agriculture by the youth is not only inevitable but it is, to some extent, good for the economy. It would reduce the burden on agriculture and raise effective income for the residual population. But the situation as of now is troubling. The study shows that while a large mass of youth is trying to make its way out of farming few have the necessary skills to be able to move out of farming profitably. The result is poor quality migration, creating problems for urban habitations while not necessarily reducing the burden on rural areas. In the short term, skill building of the rural youth could be treated as a priority area. This would not only increase the pay-off to migration but facilitate withdrawal from farming as well.

Further, in the face of the withdrawal of the youth from farming we expect drastic changes in the agricultural demography. The low quality migration suggests that farming households would still need to depend on farming to meet a part of their requirements as the remittances will not be enough. In this case, farms would be left to manage on either old men or women. In several areas such as Bihar, Orissa, Kashmir, the farmer population is already showing signs of aging. Male farmer withdrawal is also leading to more number of women farmers in several parts of the country (Krishnaraj and Shah 2003). This raises important issues about the preparedness of the agricultural institutions and extension agencies to cater to the needs of women and old men as farmers. The 10th plan recognized the rights of women as farmers and there have been regular attempts to sensitize agricultural extension to the growing dominance of female farmers, however, on the ground the efforts are far from making a difference. There is a need for a fresh look at the changes in rural labor markets and changes in the roles played by men and women on the farms.

References

- Barkley, A. P. 1990. The determinants of the migration of labor out of agriculture in the United States-1940-85. *American Journal of Agricultural Economics*, Vol. 72 No. 3.
- Bhalla, G. S.; Hazell, P. 2003. Rural Employment and Poverty: Strategies to Eliminate Rural Poverty within a Generation. *Economic and Political Weekly*, Vol. 38, No. 33.
- Boelhje, M. 1992. Alternative models of structural change in agriculture and related industries. AGRIS Centre, NAL/USDA, Vol. 8 No. 3, p. 219-231.
- Dantwala, M. L.; Donde, W. B. 1949. The Uneconomic Cultivator. *Indian Journal of Agricultural Economics*, 4 (1).
- Economist 2001. Grim Reapers, May 31st, 2001.
- Gale, F. 2002. The Graying farm sector: Legacy of Off-farm Migration. *Rural America*, Vol. 17, Issue 3.
- Gardner, B.L. 1992. Changing Economic Perspectives on Farm Problem. *Journal of Economic Literature*, Vol. 30, No. 1.
- Ghosh, J.; Chandrashekhar, C. P.; Roychowdhury, A. 2006. The 'Demographic dividend' and Young India's Economic Future. *Economic and Political Weekly*, Vol. 41, No. 49.
- Ghosh, J.; Chandrasekhar, C. P. 2003. Why is Agricultural Employment Generation Falling? www.macroskan.org, April 22.
- GOI. 2006. <http://www.censusindia.gov.in>.
- Gladwell, M. 2000. The Tipping Point: How Little Things Can Make a Big Difference. Back Bay Publishing.
- Glauben, T.; Tietje, H.; Weiss, C 2003. *Agriculture on the move: Exploring regional differences in farm exit rates*. Working Paper EWP 0308, Department of Food Economics and Consumption Studies, University of Kiel.
- Goetz, S. J.; Debertin, D. L. 2001. Why Farmers Quit: A country level Analysis. *American Journal of Agricultural Economics*, Vol. 83 Issue 4.
- Griggs, D. 1982. Dynamics of Agricultural Change, Hutchinson and Co. (Publishers) Ltd.
- Greenwood, M. J. 1997. Internal Migration in Developed Countries. In *Handbook of Population and Family Economics*, eds. M. R. Rosenzweig; O. Stark. Elsevier, Edition 1, Vol. 1, No. 1.
- Houthakker, H. S. 1967. Economic Policy for the Farm Sector. American Enterprise Institute for Public Policy Research.
- Jodhka, S. S. 2006. Beyond 'Crises': Rethinking Contemporary Punjab Agriculture. *Economic and Political Weekly*, April 22, Vol. 41, No. 16.
- Kimhi, A.; Bollman, R. 1999. Family farm dynamics in Canada and Israel: The case of farm exits. *Agricultural Economics*, Vol. 21, No. 1.
- Kimhi, A. 2000. Is part-time farming really a way out of agriculture? *American Journal of Agricultural Economics*, Volume 82, No. 1.
- Krishnaraj, M.; Shah, A. 2003. Women Farmers in India, State of Indian Farmer: A Millennium Study, Vol. 25. Academic Foundation, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India.
- Lucas, Robert R. E. B. 2000. The Effects of Proximity and Transportation on Developing Country Population Migrations. Boston University.
- Molho, I. 1995. Migrant inertia, accessibility and local unemployment. *Economica*, 62, February: 123-132.
- NSSO, 55th round 2003. Migration in India, (July 1999 to June 2000). National Sample Survey Organization, Ministry of Statistics & Programme Implementation, Government of India.

- NSSO, 59th Round 2005. Situation Assessment Survey of Farmers: Some Aspects of Farming (January–December 2003). National Sample Survey Organization, Ministry of Statistics and Programme Implementation Government of India.
- Offutt, S.; 2003. Can the farm problem be solved? M. E. John Lecture, Pennsylvania State University. <http://www.aers.psu.edu/announce/aeSeminar/offutt.pdf>
- Ohkawa, K. 1961. Significant changes in Japanese Agriculture since 1945. *Journal of Farm Economics*, Volume 43, No: 5.
- Oshima, H. T. 1986. The Transition from an Agricultural to an Industrial Economy in East Asia. *Economic Development and Cultural Change*, Vol. 34, No. 4.
- Pfeffer, J. M. 1989. Part-time Farming and the Stability of family-farms in the Federal Republic of Germany. *European Review of Agricultural Economics*, 425-44, p.16
- Pietola, K.; Vare, M. 2003. Timing and Type of Exit from Farming: Farmer's Early Retirement Programmes in Finland. *European Review of Agricultural Economics*, Vol 30 [1], pp. 90-116.
- Sharma, A. 2007. The Changing Agricultural Demography of India: Evidences from a Rural Youth Perception Survey. *International Journal of Rural Management*, Vol. 3 Issue 1.
- Speare, A. 1974. Urbanization and Migration in Taiwan. *Economic Development and Cultural Change*, 22-302.
- Swaminathan, M. S. 2001. Shaping our agricultural future. *The Hindu*, Thursday, January 11, 2001.
- Weiss, C. R. 1997. Farm Growth and Survival: Econometric Evidence for Individual Farms in Upper Austria. *American Journal of Agricultural Economics*, 81 (1), pp. 103-116.
- Zhao, Y. 1999. Labor Migration and Earnings Differences: The Case of Rural China. *Economic Development and Cultural Change*, Vol. 47, No. 4, 767-782.
- Zhou, J. 2004. The Irrational Land Use in Japan and Other Parts of the World - The Root of Agricultural Protectionism Ignored by Nobel Laureate Schultz and Nominee Hirschman. Paper for the Japan Economic Policy Association Third International Conference 'Policy Implementation and Its Consequences: What Good Does Economics Do?' at Meiji University, Tokyo, Japan. November 13-14, 2004.