

## THE “TIPPING POINT” IN INDIAN AGRICULTURE Understanding the Withdrawal of Indian Rural Youth

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Recent trends suggest that India might very well be at the "tipping point" of the transition in its agriculture dependent population. A large proportion of youth in the countryside is on their way out of agriculture. Rising disenchantment with the profession pushes them out of agriculture while opportunities in other sectors of the booming economy pull them out of agriculture. This is suggested by this study which attempts to identify the drivers of this process of withdrawal and assess the odds of an average farmers' move out of agriculture.

Undertaken as a part of strategic analysis of India's river interlinking program under way at IWMI (funded by the Challenge Program for Water and food) it was designed to understand what trajectory Indian agriculture will take in future. Data for the study came from interviews of a large number of rural male youth (sample size-1609) across 14 locations spanning 12 states of the country. The interviews focused on their aspirations and plans for shift to other occupations. A binary choice logit model was then developed to identify the important factors which influence a young person's decision-making. The assumption behind the model was that a farmer (characterized by his age, skill level, education, landholding size, irrigation and location of his farmland) seeks to maximize his welfare by making a choice about remaining in his present agricultural occupation or not.

The regression results suggest that youth who possess non-farm skills are 1.4 times more likely to move out of agriculture. Age has a significant role as the odds ratio in favor of shifting out of agriculture is high among farmers below 30 years of age. These results are supported by observations from other countries where occupational mobility was found to be higher among younger farmers and they were found to be more sensitive to income differentials between farm and non-farm occupations, farm prices, and interest rates. Further, this study found that availability of irrigation did not have any significant impact on withdrawal behavior. The small and marginal farmers expressed a great desire to quit farming possibly because of the low viability of smallholder agriculture. But, as the land size increased the tendency towards withdrawal gained among the large holder category as well thus suggesting a U-shape relationship between farm size and willingness towards withdrawal. Interestingly, all these factors seem to become more dominant and their coefficients improve for villages farther removed from towns. Thus importance of proximity to urban areas for occupational choice seems to be indicated.

The phenomenon deserves attention since it challenges the myth of persistence of overpopulated workforce in agriculture. With the current 8 percent growth rate of the Indian economy the fall in agricultural population is likely to only get steeper. This will have far-reaching implications for the way agriculture is likely to be organized in future. We foresee aging of the farmer population, increased feminization of agricultural workforce and mechanization of farms. This will put great demands on the extension agencies, technology providers and the agricultural institutions that will have to wake up and recognize the requirements of the new-age farmer. The demands will be greater on the irrigation institutions which have by far ignored the role of women as farmers and as irrigators.

Key Words: Indian Agriculture, Rural Youth, Occupational Choice Model

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*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

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 southwards thus changing the nature of farming in the country drastically.

At times the ‘gradualist’ in us tells us that it’s probably too early and too ambitious to make such assertions– more than 50 per cent of the population is currently engaged in farming; the rate of growth of non-farm jobs is abysmal, the service sector has too less 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 the contrary. First, the growth performance of the Indian economy gives us sufficient grounds to expect a significant change in the employment scenario<sup>3</sup>. The 6<sup>th</sup> economic census which reports that the growth in labor opportunities in the non-farm sector is outpacing the growth in labor force gives further hope. Second, 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 by way of growth in the non-farm 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).

*Place of this study in the Strategic Analyses of India’s river inter-linking program*

The river-linking proposal, which is kind of still in bay, claims to address the water needs of India in 2050 and beyond. For it to be able to do so it is important to understand what shape Indian agriculture (as it is the largest user of water) would take in 2050. Human capital is one of the most important factors driving changes in structure of agriculture (technology, finances, institutions and sociology being the other four) (Boehlje, 1992). If the agricultural population was to fall drastically, if the farms were to grow bigger as a result of it (one of the many impacts it is likely to have) thereby impacting the resource-

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<sup>3</sup> Bhalla and Hazell (2003) in their paper on employment growth in the India had projected that with an overall economic growth rate of 9 per cent 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 would reach full employment by 2004!....and by 2020 would have an excess of 68.4 jobs.

use efficiency of crop inputs (especially water, with better utilization of tube-well power in large farms), looking 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, 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.<sup>4</sup> In order to place the phenomenon in its larger context, we also review some international literature on withdrawal of farmers from agriculture.

## **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 non-farm) and great instability and variability in the income from farming. The common response of farmers to the problem is to migrate to urban areas or to non-farm occupations which provide higher returns to per unit of labor applied. The question that arises now is - what explains the difference in farm and non-farm incomes? Gardner (1992) attributed the difference to the factor market conditions. Johnson (1959) 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*

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<sup>4</sup> The rationale for focusing on landed rural youth is similar to 'prosumer' analysis that market researchers do. 'Prosumers' are the trend-setters 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.

*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 times 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 non-farm 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 Demertin, 1999). Lower the costs, higher the propensity to shift. Goetz and Demertin (1999) 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 non-farm activities, family size); farm-specific (size of farm, value of production) and non-farm (such as proximity to metropolitan areas, overall GDP of the region, government interventions etc.).

Glauben (2003) notes that at a broad level farmer withdrawal studies can be classified into two types - the first type are empirical studies at the farm household level while the second type focus 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 influence of government policies on changes in labor allocation in the farm sector. Authors have tested the impact of several farm/non-farm, 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 non-farm 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 Canada, Israel and US farmers respectively, conclude that non-farm income has a stabilizing impact on the farmer’s household economy. Farmers in these cases use their non-farm income to augment their farm activities and it thus serves as a stabilizing factor rather than an avenue for exit. On the contrary authors like Pfeffer

(1989), Weiss (1999) and Roe (1985) see a strong link between non-farm employment and withdrawal from agriculture. That is, growth in non-farm employment causes people to move away from farming by providing the much needed outlet. They propose that an exposure to non-farm occupation lowers the transaction costs (what 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 on 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 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 which say the opposite. 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. Further, in our paper we shall try and answer this question in the Indian context.

Most of the authors have found higher education and greater number of skills to lead to greater propensity to migrate with exceptions such as Zhao (1999). 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 policy makers and academicians have been expressing serious concerns over the “graying of farm sector” because of - [1] increased exit and [2] dropping rates of entry into farming by the rural youth (Gale, 2002).

### **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 non-farm 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 accounting 50 per cent of total farm households in 1950 to 20.5 per cent in 1965 is a case in point 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 (reference) 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 started spending most of their productive time in rural non-farm or urban activities. In peak agricultural seasons they would come back to their farms only to leave again (Zhao, 1999). In India too, this has become increasingly in vogue in large number of regions (Sharma, 2006). How this part-time arrangement affects farming, however, is a less understood phenomenon.

In economies such as India, the ‘farm problem’ is probably worsened by virtue of its labor surplus nature. Bhalla and Hazell (2003) observe that with 60 percent of the labor force producing around quarter of the GDP, the relative productivity of workers in agriculture is less than one-fourth of the non-agricultural 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 per cent pa to 0.01 per cent pa (Bhalla and Hazell, 2003). The recent trend of over-capitalization of agriculture also affected 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 by Joshi, 2004) 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. However, we believe that the drop in employment in agriculture cannot be solely attributed to the happenings on the agricultural front. There are developments on the non-farm side which are having significant and some times greater impact.<sup>5</sup>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

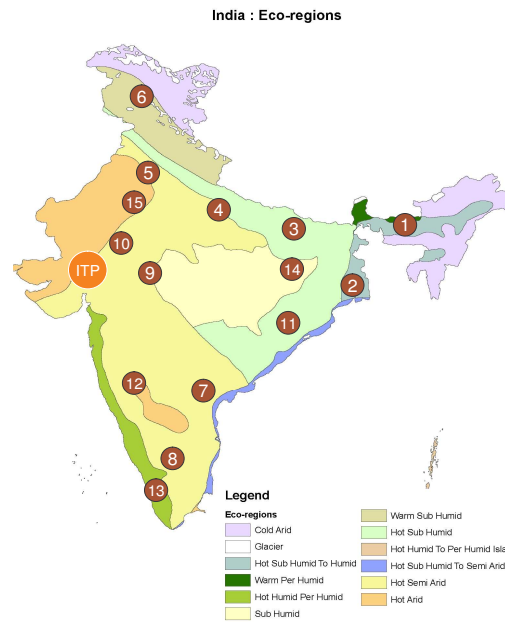
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<sup>5</sup>Bhalla and Hazell (2003) hypothesize that growth in secondary and tertiary sectors has a major contribution in the decline in farmer population. There has been a notable increase in labor productivity and wages in agriculture and the wages in non-agricultural sector are now significantly higher than in agriculture. This suggests that the shift from agriculture to non-agriculture is not a distress phenomenon.

complex. Indian villages are undergoing major transformation causing perceptible changes in aspirations of the rural mass, especially the youth. These aspects, however, have been dealt in greater detail in another of our papers (Sharma, 2006). The participation rates of the 5-14 and 15-29 age groups is declining 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 sub-urbs and the villages in 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 withdrawal of rural youth from farming.

## DATA AND PRELIMINARY OBSERVATIONS

The data used in the study was collected through a primary survey of rural youth across 14 locations<sup>6</sup> 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 (Map 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 non-farm occupation. We also collected data on irrigation availability and proximity to nearest urban centre. At the beginning of the study some pilot survey results revealed that the nature of involvement of 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, part-time farmers and those with no-involvement in farming.<sup>7</sup>



**Map 1: Study Locations**

A significant proportion of the people were found to be practicing part-time farming (35 per cent). The phenomenon was more pronounced in villages close to town (40 percent

<sup>6</sup>A 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.

<sup>7</sup> The classification was done based on the following criteria

The “high involvement” category included youth who were actively involved in management and supervision of their farms. One can term it “full-time farming”.

The “medium involvement” category included 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 management of their farms.

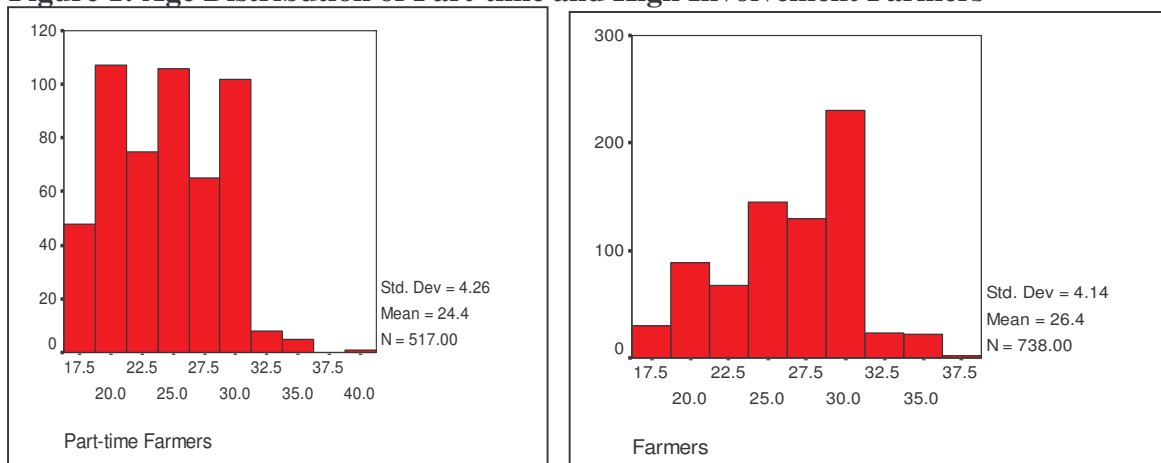
vis-à-vis 29 percent). We also found a significant correlation between degree of association with farming and per capita value of agricultural production (0.62). Lower the value of agricultural production per capita, higher the number of part time farmers/no-involvement farmers.

35 per cent of the youth migrated for work outside their villages and most of this migration was seasonal. A large number of youth (30 percent) 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 per cent), followed by primary education (32 per cent). 16 per cent of the youth interviewed were illiterate and a negligible one per cent had professional education from technical training institutions such as Industrial Training Institutes (ITIs). A very small number of youth (24 per cent) possessed any kind of non-farm 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 8500 plus in the working age group). Among the youth also there was a difference in age of part-time and full-involvement farmers (Figure 1). Though the mean age is not much different, it clearly shows that the age of the full-time farmers is skewed towards the higher age group.

**Figure 1: 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 non-viability of their small parcels of their



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 supposed 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 non-agricultural 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 non-agricultural activities or stay 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 non-agricultural activities and 0 for otherwise. The independent variables explaining the dependent variable include skills (S), education (E), age of the farmers (A), average land holding size of the farm (AVL), 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 odds here is defined as the ratio of probability that farmers will make a choice to shift out of

agriculture to that he remains in agriculture. As 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 (1-p) 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:

$$\text{LOGIT}\left(\frac{p}{1-p}\right) = \alpha_0 + \alpha_1(S) + \alpha_2(E) + \alpha_4(I) + \alpha_5(A) + \alpha_6(\text{AVL}) + \alpha_7(\text{AVL})^2 \quad (1)$$

where p- probability (p) of a farmer is 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.

**TABLE 1: Estimation 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	-574.576				
LRchi <sup>2</sup> (6)	34.59				
Prob > chi <sup>2</sup>	0				

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

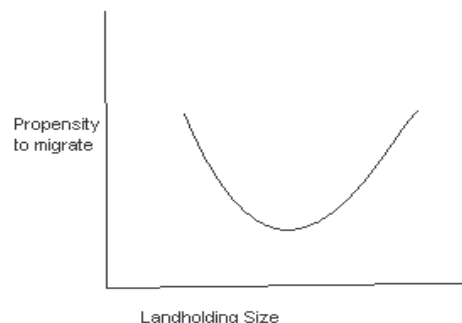
farmers who possess non-farm skills. Possession of skills increases the marketability of a person. The returns to migration were much higher if a person possessed certain skills. In Gujarat, we observed that there was a huge differential between the wages received by a trained mason and other regular laborers. The mason would earn to the tune of 150-200 Rs. per day while the rest could only earn up to Rs.75-80. Further, while skills increased the odds of migrating, migration and the exposure thereof also led to attainment of skills by the youth. Part-time farmers all-over were found to possess greater number of skills.

Similarly, education has a positive effect on the farmer's propensity to shift out of agriculture. The odd ratio of moving out of agriculture was 1.40 for education. The results, however, were not significant at 5 per cent 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 was an important factor. The odd ratio in favor of shifting out of agriculture was high among farmers for 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 non-farm earning differentials, farm prices, and interest rates compared to 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, job etc, which grows over time. The cumulative inertia in older farmers would be higher reducing the propensity to migrate.

Results show that lower average size of land holding is one of the most important factors explaining the farmer's higher propensity to migrate for other non-agricultural 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 division of property or, in many cases, accessions by the private usurers against loans. Farmers are finding it untenable to farm lower holding size land, and 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 suggested a strictly convex or U shaped relationship between farmer's willingness to move out of agriculture and average land holding size. Results indicate that in the case of average landholding size less than 17 Ha, farmers would prefer less to move out of agriculture if average landholding increases. While for average landholding size more than that, farmers would be more willing to shift to other non agricultural activities if average landholding size increases.

Policy makers often cite that irrigation is one of key factor 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 policy makers 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 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 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 14 km as a point of reference is taken based on the median value of the sample distance. Table 2 produces 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 irrigated region, 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 less than 30 years, 0=otherwise
Constant	-0.03	0.97	-0.10	0.92	
Number of Observations	456				
Log Likelihood	-277.95				
LRchi <sup>2</sup> (6)	39.82				
Prob > chi <sup>2</sup>	0				

Comparing Table 1 and 2 we found 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 migrating and working in some far way place. The unskilled category 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 found many cases of reverse migration where a number of youth had come back to 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 before, lack of irrigation, here has a positive impact on farmer's willingness to migrate, and was significant at 10% level of significance. This says that distance from urban centers accentuates the negative impacts of water scarcity rendering migration as the only option available to distressed farmers.

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 per cent 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 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 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 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 rural youth and its impact on withdrawal.

Based on the present analysis two kinds of implications, however, emerge – one for the short term and 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 youth is not only inevitable 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 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 face of withdrawal of 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, extension agencies to cater to the needs of women and old men as farmers. The 10<sup>th</sup> 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 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.



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