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# The “Tipping Point” in Indian Agriculture: Understanding the Withdrawal of the Indian Rural Youth

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## ABSTRACT

*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 the youth in the countryside are trying to sever their links from farming. The paper attempts to identify the drivers of this process of withdrawal and assess the odds of an average farmer’s move out of agriculture. Results of the study indicate that occupational mobility tends to be higher among younger farmers and they are found to be more sensitive to income differentials between farm and non-farm occupations, farm prices, and interest rates. Further, this study finds that the availability of irrigation does not have any significant impact on the withdrawal behavior. The small and marginal farmers express a great desire to quit farming, possibly because of the low viability of smallholder agriculture. But as the land size increases, the tendency towards withdrawal gains among the large holder category as well, thus suggesting a U-shape relationship between farm size and the willingness towards withdrawal. Interestingly, all these factors seem to become more dominant and their coefficients improve for villages farther removed from towns. Thus, the importance of the proximity to urban areas for occupational choice seems to be indicated.*

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. Furthermore, given the growing urbanization, better literacy standards, and greater skill attainment by the rural youth, the proportion of the latter in the agricultural labor force could drop substantially, thus, changing drastically the nature of farming in the country.

At times, the ‘gradualist’ in us cautions us that it is probably still premature to make such assertions; after all, more than 50 percent of the population is currently engaged in farming, the services sector has too little job opportunities to offer, and there is growing unemployment in the manufacturing sector. Based on these conditions, the transition, even if it were to happen, still seems far off. However, if one takes cognizance of current developments, there are a sufficient number of reasons for us to think otherwise.

Firstly, the farming population in several parts of India, notably Tamil Nadu and Kerala, registered a decline in absolute terms for the first time in 2001 (*The Economist* 2001). Moreover, the rural male cultivator population has declined by 2.8 million between 1991 and 2001 (a decline of 3.6 percent), thereby changing the male-female cultivator ratio from 80:20 in 1991 to 67:33 in 2001. These are significant developments, given the impact that dropping

populations have on the nature of farming practiced in an economy<sup>1</sup>.

Second, the growth performance of the Indian economy gives sufficient grounds to expect a significant change in the employment scenario<sup>2</sup>. This is supported by the finding reported in the sixth economic census that the growth in labor opportunities in the non-farm sector is outpacing the growth in the labor force. 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 takes place in a very short concentrated period of time, either by way of a growth in the non-farm sector or a farm crisis, as experienced by the 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-rich— have experienced a huge drop in their agricultural population within a short span of less than 20 years. To support the argument further, most of them have achieved similar economic growth rates that are being observed in India now.

Last, but definitely not the least, talks about the efflux of the youth from farming are increasingly gaining weight among the prime

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<sup>1</sup> Bicanic (1972, cited by Griggs 1982) classifies countries on the basis of the growth rate of their agricultural populations (relative and absolute) and describes how the fall in agricultural population causes significant reorganization in farming, with the most drastic changes occurring when the population falls in absolute numbers, as evident in the following: 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 non-farm incomes widen, governments intervene to restore parity.

<sup>2</sup> Bhalla and Hazell (2003), in their paper on employment growth in India, had projected that with an overall economic growth rate of 9 percent and with an employment elasticity of 0.1, employment in India would match the labor force by 2010. They further predicted that if the employment elasticity were higher, the country would reach full employment by 2004, and by 2020 would have an excess of 68.4 jobs.

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 how to retain its youth in agriculture. He warned that unless farming became both “intellectually stimulating and economically rewarding”, it would be difficult to attract or retain the rural youth in farming (Swaminathan 2001).

#### WHY FARMERS QUIT: THE EXISTING WISDOM

Why do farmers quit, or what makes farmers, in large numbers, leave the occupation they have held 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 for 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 types of economy. 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, along with the increasing heterogeneity of the farmer population (Offutt 2000). Broadly, the term can be taken to mean the economic difficulties faced by farmers as a result of low farm incomes (vis-à-vis non-farm), and the

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 non-farm occupations which provide higher returns per unit of labor applied. The question that arises is: what explains the difference in farm and non-farm incomes? Gardner (1992) attributes the difference to the factor market conditions. Johnson (1959, as cited in Gardener 1992) also holds that the farm problem is “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 time, the aforesaid ‘farm problem’ arises out of the 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 farmers to farm continue to decline, even with a good performance, thereby leaving them with no other option but to quit. Offutt (2000), in her paper tackling the question, “Can the farm problem be solved?”, makes this interesting observation: “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, farmers who decide to quit farming compare the utility they derive from farming vis-à-vis they 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) are also an important determinant (Goetz and Debertin 2001); the lower the costs, the higher the propensity to shift. Goetz and Debertin (2001), in a cross-county analysis of US farms, conclude that for counties which experience a net loss of farm operators, lower transaction costs lead to the 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, namely: (1) farmer-associated (such as the education and skill level of farmers, involvement in non-farm activities, and family size); (2) farm-specific (size of farm, value of production); and (3) non-farm (such as proximity to metropolitan areas, overall GDP of the region, government interventions, etc.).

Glauben et al. (2003) note that at a broad level, farmer withdrawal studies can be classified into two types. The first type consists of empirical studies at the farm household level, while the second type focuses on the adjustment of farm labor at the aggregate (sector/regional) level. While the first type helps bring in more household- and farm-specific characters in the analyses, the second type helps capture the macroeconomic forces and the 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 centers is 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), and Goetz and Debertin (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 thus serves as a stabilizing factor rather than an avenue for exit.

On the other hand, authors such as Pfeffer (1989) and Weiss (1999) 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 — what Glauben et al. (2003) have also called "the beaten path" effect — lowers the transaction costs involved in the shift, thus making the exit decision easier.

Another point of deviation is on the impact of government intervention and the macroeconomic environment. A comprehensive study done in the OECD countries (1994) concludes 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 find labor significantly responsive to macroeconomic changes and agricultural prices. Government payments too are found to have contrasting impact. On the one hand, income assistance in terms of price supports results in the slowdown of migration; but diversions lead to greater migration out of farming (Barkley 1990).

Researchers found that among the farm-specific characteristics, an increase in average

farm size significantly reduces the tendency to close down farms (Pietola 2003, Glauben et al. 2003, Goetz and Debertin 2001). The justification for this is that large farm sizes make farming much more economically viable for the farmers by enabling them to reap the economies of scale and avail of better and more cost-effective technologies. There are, however, evidences which say the opposite. For example, Speare (1974) in the case of Taiwan finds that the large landholders show a greater tendency to withdraw. This is attributed to their being able to gain good quality education and to move to better occupations. Large farmers can also take greater risks compared to the small farmers and venture out more in search of greener pastures.

Most of the authors find higher education and greater number of skills to lead to greater propensity to migrate. However, there are exceptions, such as those identified by Zhao (1999) and Weiss (1999), which include 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 the farm sector” because of (1) the increased exit and (2) the dropping rates of entry into farming by the rural youth (Gale 2002). What role 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 traceable to the lack of work done on labor-surplus economies. This could possibly be because labor surplus is not regarded as a problem and thus does not attract as much attention. However, there is a serious flaw in

this line of thinking. Zhou (2004) critiques the work of Schultz, challenging one of the latter’s 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 the high-income economy as evidenced by the observation that “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 experience of post-World War II Japan—where the proportion of full-time farming households declined from 50 percent of total farm households in 1950 to 20.5 percent in 1965—is a case in point (Zhou 2004); this proves that 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, the mass withdrawal of the population from agriculture is largely a post-World War II phenomenon (Ohkawa 1961); thus, bringing into play a very different set of factors. There is also a great emphasis on industrialization, with efforts concentrated towards channeling resources, including human capital, to fuel the industry-led growth of the economy. China started experiencing mass rural-urban migration of labor during the 1980s.

However, much of this was the floating population. Migrants rarely 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 non-farm 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 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) write about the "uneconomic cultivators" of India way back in the 1950s, saying that the problem with Indian agriculture is not so much of uneconomic cultivation, but that of "uneconomic cultivators"; and it is this group of farmers that needs maximum policy attention. In a study of 11 villages in the then Bombay province, the authors find that 71 percent of the cultivators come under 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 percent of land that is cultivated as economic units, the roadblock to efficient production is the fragmentation of landholdings. The authors observe that the number of fragments operated grows 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" (Dantwala and Donde 1949).

During the time of the study conducted by Dantwala and Donde, there was widespread leasing in and out of land to make farming units viable; but taking all that into account, still, only 27 percent of the cultivators operated 55 percent of the land. According to the authors' estimates, 50 percent of the cultivator population in the region was redundant. There were suggestions made to redistribute land, that is, transfer land from those holding more than economically

viable holdings to the uneconomic cultivators. Rural industrialization was also proposed as an effective medium to promote the 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 percent 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 non-agricultural occupations. In recent times, several macroeconomic changes and farm-level changes have worsened the agricultural employment scenario. For example, in the post-liberalization period the employment growth in agriculture has dropped from 1.49 percent to 0.01 per cent per annum (Bhalla and Hazell 2003). The recent trend of the over-capitalization of agriculture has also adversely affected the employment elasticity of agriculture. The employment elasticity of agriculture, which stood at 0.01 in the post-reform period, is approaching zero (Planning Commission, as cited in Bhalla and Hazell 2003) and has been reported to be negative in some states such as Andhra Pradesh (-0.13), Kerala (-0.92), and Uttar Pradesh (-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 non-farm side which are having significant and

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<sup>3</sup> Bhalla and Hazell (2003) hypothesize that the growth in the secondary and the 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 the 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.

sometimes greater impact.<sup>3</sup> At present much of the deliberation on the withdrawal of Indian farmers seems to be preoccupied with declaring it to be a distress phenomenon. We believe that the reality is much more complex. Indian villages are undergoing a major transformation that has been causing perceptible changes in the aspirations of the rural mass, especially the youth who are now opting out of farming.<sup>4</sup> The participation rates of the 5–14 and 15–29 age groups are 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 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 were collected through a primary survey of rural youth across 14 locations<sup>5</sup> covering 13 states of India, namely: Kashmir, Haryana, central Uttar Pradesh, Lower Assam, Jharkhand, Central Orissa, North Bihar, West Bengal, Gujarat, Rajasthan (two locations), Madhya Pradesh, North Karnataka, and coastal Andhra Pradesh. Data were gathered 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 future plans with regard to a shift to non-farm occupation. These plans have been made the basis of our analysis.

We had recognized that the plans to withdraw might not convert into actual withdrawal. To resolve this uncertainty, we posed the question: “Do you have immediate plans to shift to another occupation?” Using their response to this question, further supported by the mention of the job they were considering to take up, we expected to paint a reasonable picture of the withdrawal phenomenon. We also collected data on irrigation availability and the proximity to the nearest urban center.

At the beginning of the study, some pilot survey results revealed that the nature of 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 farmers, part-time farmers, and those with no-involvement in farming.<sup>6</sup>

A significant proportion of the rural youth are found to be practicing part-time farming (35 percent). The phenomenon is more pronounced in villages close to town (40 percent vis-à-vis 29 percent). We also find a significant correlation between the degree of association with farming and the per capita value of agricultural production (0.62). The lower the value of agricultural production per capita, the higher the number of part-time farmers/no-involvement farmers.

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<sup>4</sup> Some of these aspects have been discussed in greater detail in another of our papers (Sharma, forthcoming).

<sup>5</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 closely reflect the hydro-geographic diversity of the country.

<sup>6</sup> The classification was based on the following criteria:

The “high involvement” category included youth who were actively involved in the 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.



Thirty-five percent 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 laborers, construction workers, and contractual workers in agricultural produce markets (*mandis*), factories, bus stops and railway stations. These jobs were low-paying and irregular in nature.

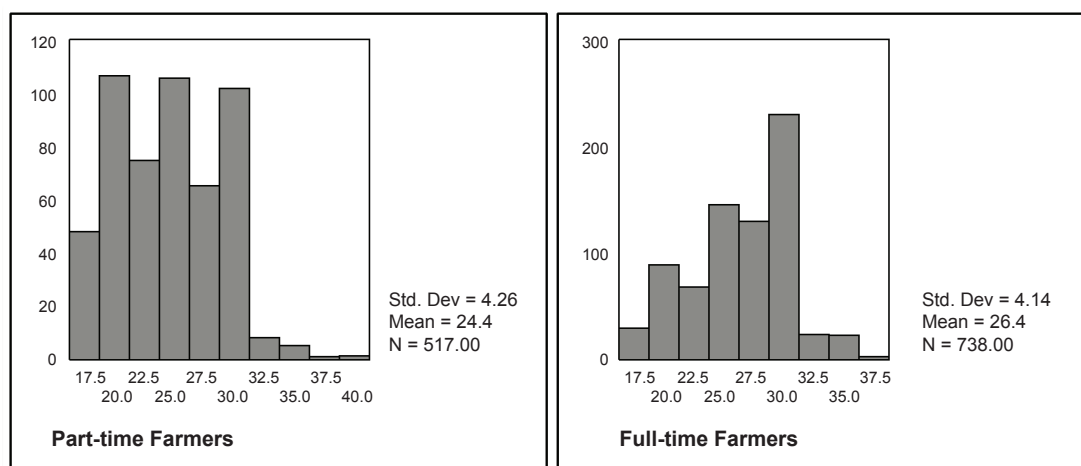
Most of the people interviewed had education up to secondary level (37 percent), followed by primary education (32 percent). Some 16 percent of the youth interviewed were illiterate and a negligible one percent had professional education from technical training institutions such as Industrial Training Institutes (ITIs). A very small number of youth (24 percent) 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.

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 part-time and full-time farmers (Figure 1). 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.

Another interesting phenomenon we observed on the field was that both the small and large farmers were on their way out. There has been increasing discussion on "reverse tenancy" where small and marginal farmers, because of the non-viability of their property, are handing over their small parcels of land 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 also saw several instances of large farmers letting their land lie fallow and moving out of rural life.

Finally, one of the key questions we wanted to look into was the impact of irrigation on



Source: Primary Survey, 2005

Figure 1. Age distribution of part-time and high involvement farmers

withdrawal behavior. It is generally believed that irrigation has a significant impact on employment generation. Thus, if the national river interlinking program were 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 the 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 behavioral response of the youth involves a discrete binary choice of either shifting to other non-agricultural 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 non-agricultural activities and 0, otherwise. The independent variables explaining the dependent variable include skills ( $S$ ), education ( $E$ ), age of the farmers ( $A$ ), landholding 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, the application of the linear regression model is more complex as the dependent variables can only take values of 0 and 1. However, from

our knowledge of the 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 since numerical regressors such as average landholding may be unlimited in range. If we express  $p$  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 a farmer's plan to shift out of agriculture. The odds ratio here is defined as the ratio of the probability that farmers will choose to shift out of agriculture rather than to remain 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 ( $1 - p$ ) that a farmer is willing to remain in agriculture is  $1 - p = 0.38$ . Given  $p$ , the odds ratio ( $O$ ) can be derived as

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

this means that 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 odds ratio,  $O$ , that involves fitting to the data an equation of the following form:

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

where  $p$  is the probability that a farmer is willing to move out of agriculture, and

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

represents the odds 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.

*Skill Level.* As to the effect of the skill level, we find that the odds 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 are much higher if a person possesses certain skills. In Gujarat, we observe that there is a huge differential between the wages received by a trained mason and other regular laborers. The mason would earn to the tune of Rs150–

200 per day, while the rest could only earn up to Rs75–80. 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 are found to possess a greater number of skills.

*Education.* Similarly, education has a positive effect on the farmer's propensity to shift out of agriculture. The odds ratio of moving out of agriculture is 1.40 for education. The results, however, are not significant at the 5 percent level. The possible explanation could be the inability of other sectors to absorb the 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, the 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).

**Table 1. Estimation results.**

Variables	Coefficient	Odd Ratio	Z	P>z	Definition of Variable <sup>1</sup>
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			

<sup>7</sup> We could have regarded the variables, education, skill and irrigation, as ordinal variables as there are different degrees of skills and education. Given the analytical complexity of the ordinal variables in interpreting the coefficient, we assumed simple dummy variables for education, skill and irrigation. This can be regarded as a limitation of this work.

*Age.* Age too is an important factor. The odds ratio in favor of shifting out of agriculture is high among farmers less than 30 years of age. The possible explanation of this could be that younger farmers are more open to opportunities, and 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 the case of some US farms, Gale (2002) finds that occupational mobility is generally higher among younger farmers and they are more sensitive to farm/non-farm earning differentials, farm prices, and interest rates compared to the old farmers. Another explanation for the graying of the farm sector could be what Molho (1995) calls the “cumulative inertia”—whereby individuals form attachments to areas, friends, jobs, etc.—which grow over time. The cumulative inertia in older farmers would be higher, thereby reducing their propensity to migrate.

*Land Size.* Results show that the lower average size of the landholding is one of the most important factors explaining the farmer’s higher propensity to migrate toward other non-agricultural activities. This corroborates the widely-held understanding on how a small farm size pushes people out of farming. Year after year, the landholding size decreases, either due to the division of property, or in many cases, their acquisition by the private usurers against unpaid loans. With farmers finding it untenable to farm smaller lands, the sale of land and the subsequent migration to urban areas have become rampant (Ghosh 2003). In some cases, farmers also migrate to repay their loans, thus leaving the responsibility of agriculture to other members of the family.

*Landholding-Square.* In the field, however, we observe that alongside this distress phenomenon is another reality where large farmers too are making their way out of farming. To check for this we introduced another

variable, namely, ‘landholding-square’. The positive coefficient of the square of the average landholding size in the quadratic relationship suggests a strictly convex or U-shaped relationship between farmer’s willingness to move out of agriculture and average landholding size.

*Proximity to Urban Cities.* Finally, many policymakers argue that in the villages close to town farmers are more likely to shift out of agriculture (Lucas 2000). This is supposed to be 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 true, as well (Lucas 2000).

For farmers far away from urban centers, alternate occupational opportunities are also limited. Distance does not allow them to operate as part-time farmers, i.e., be partially involved in agriculture and work in town during the lull periods in agriculture. Our sample data also suggest a strong positive correlation between distance and the 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 could then be driving migration from such areas? We expect that factors affecting farmers’ willingness to shift out of agriculture would be stronger in terms of the odds ratio and statistical significance if they are 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 14 km. 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.

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 become important preconditions. It is important to justify a drastic step such as leaving agriculture and working in some faraway place. Our fieldwork shows that the unskilled category youth could only get low-paying jobs such as the loading-unloading of goods which does 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 youth come back to farm after some time because they are not able to sustain themselves in towns on the meager salaries they earn. We find that the lack of irrigation has a positive impact on farmer's willingness

to migrate, and is significant at the 10 percent level of significance. This says that the distance from urban centers accentuates the negative impacts of water scarcity; thereby, 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 the 5 percent 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 the out-migration decisions of farmers.

**Table 2: Estimation results for farmers in areas more than 14 km from urban centers.**

Variables	Coefficient	Odds 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			

## 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 an 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 fall less 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 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; it is, to some extent, good for the economy. It would reduce the burden on agriculture and raise the 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, the skill building of the rural youth could be treated as a priority area. This would not only increase the payoff to migration but facilitate the 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, the elderly population would be left to manage the farms. In several areas such as Bihar, Orissa, and Kashmir, the farming 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 agricultural institutions and extension agencies to cater to the needs of women and old men as farmers. The Tenth plan has 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.



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