Time Allocations on Farming and Non-paid Domestic Work: The Behaviour of Farmers in Poor Areas of China

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Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Denver, Colorado, July 1-4, 2004

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Abstract

This paper analyses time allocations of a sample of farmers, from four southwest counties in China that are representative of the poor areas of the country. The allocations of time toward two different activities—farming and non-paid domestic work—are modeled as semi-logarithmic input demand models. Plowland areas and demographic variables are significant explanators of these time allocations, but this is not the case for the economic variables of prices and wage rates. The results suggest the existence of inefficiencies in the markets for products and for labour. It is concluded that sound market systems for inputs and outputs are crucial to poverty reduction and development in poor areas of China.

Keywords: farming, non-paid domestic work, market system.

1. Introduction

China is a developing country with a very large population. Farming continues to account for much employment activity and generally yields lower levels of income than other occupations. There is a considerable gap in economic development between the western

and southern areas of China. In some counties of southwest China, farmers are still very poor (Feng Guo, 1996). Poverty alleviation is crucial to improve the well-being of low income farm families.

Many farmers have limited ability to avoid poverty due to their geographic location and distribution, low level of income, lack of resources and constraints on behaviour. Most poor members of the agricultural population live in areas with a poor natural environment and few opportunities for non-farm employment. They tend to be either regionally convergent or comparatively dispersed (Yangdu, 2001) and have very low levels of income and savings. According to an investigation by the Poverty Reduction office of the State Department of China, in 1996, annual income per capita in a representative county in Sichuan Province was only 575￥, while consumption per capita was 539.74￥. Consequently, there is little capacity to accumulate savings to invest in production (Chenfan, 1998). The behaviour of poor farmers is greatly affected by their access to the market economy. Some farmers are in locations or with resources that foster their ability to be market oriented, while others are still trapped in traditional subsistence patterns of self-sufficiency.

With institutional reform and development of the rural economy of China, much agricultural labour has been dispersed to the non-agriculture sector or has swarmed into cities in search of employment. But policy obstacles established by city governments lead many farmers return to their home area after a painful and hopeless search for jobs in cities. The labor reallocation process therefore reflects policies that limit the movement of people. As the basic elements in a village economy, farmers control or own the production resources including labor force, land and other inputs, within the constraints

of national and local policies. At the same time, they are also consumers of self-produced and market-purchased goods. Thus, farmers make decisions on resource allocation, production, consumption and marketing within the constraints of the resources that are available to them and the policies that apply to them.

In this paper, we study the time allocation decisions of farmers in a poor area of China. The demand for labor in terms of the allocation of labor time to specific activities is derived from conventional household production theory. Based on data from four poor counties of southwest China, we find that input and output prices, as well as the wage rate for non-farming employment, have little effect on time allocations for farming and non-paid domestic housework. Major reasons for this are that farmers in poor areas of China are still dependent on the subsistence agriculture and have little off-farm employment. We also find that plowland area, education levels and marital status have strong impacts on farm families' time allocations for farming and non-paid domestic work. In particular, plowland area is positively related with time allocations for farming and non-paid domestic work; Education level is negatively related to time allocation for farming and non-paid domestic work; married couples tend to allocate more time to farming work.

2. Time Allocation Theory

Ignoring time allocation for the moment, the household maximizes a utility function:

(1) $$U = U(y_1, y_2, ...y_n)$$

subject to the resource constraint:

$$\sum p_i' y_i = I = W + V$$

Where yi are purchased consumer goods, $p_i^{'}$ are their prices, I is money income, W is earnings and V is other income. To this point non-working time and total time available are not included in the optimization procedure. Becker (1965) pointed out the importance of time allocation theory to the household, noting that the allocation and efficiency of non-working time might have more welfare effects than working time. Becker also analyzed the influence of non-working time on the household utility function, focusing on family decisions to combine its time endowment and inputs purchased in the market to produce commodities consumed by the family. From this analysis, the maximization of family utility is subject to three constraints—the time endowment, and market and family production. In constructing the three constraints, Becker suggested the concept of the "full income" which could be obtained by devoting the desired time and other resources of the household to earning income. (Because sleep, food, and even leisure are required for efficiency, some time would have to be spent on these activities in order to maximize money income). If full income is denoted by S, and if the total earnings forgone are denoted by L, while expenditure on market goods is I, following Becker, a full income equation, which represents a constraint on monetary purchases, can be represented as follows:

$$S = L(Z_1, Z_2, ..., Z_N) + I(Z_1, Z_2, ..., Z_N) \quad (2)$$

where Z_I is the quantity of good I. This basic resource constraint states that full income is spent either directly on market goods or indirectly through forgoing of money income.

Granau (1977) extended Becker's analysis, pointing out that this did not really deal with household production in the common meaning of the term. Mincer (1962) had first suggested that at least in the case of women working in a household, one should

distinguish between work and leisure, but this distinction disappeared in Becker's general formulation which depicted family members as having the same utility function. Granau established the distinction between work at home and leisure as an integral part of the theory of the allocation of time and household production. This distinction was a prerequisite for the further investigation of time-use patterns and was highly useful in analyses of fertility, marriage, child-care programs, labor force participation, and the evaluation of the output of the non-market sector. But as Granau noted, the assumption that work at home involves same marginal utility as work in market or income-generating occupations is likely to be incorrect and psychic income may be an important factor determining the investment of human capital, career choices and supply of labor. Granau also noted a second point of criticism of his analysis as the neglect of joint production and consumption but argued that his model was no worse than the household production model.

Kimhi (1995) researched farming and non-farming work in Israeli farms, finding different behavior of farmers with large families from those in small family situations. Kimhi (1994) also developed a model of time allocations, based on the theory of Becker and Gromau, assuming that a farm family's utility is a function of consumption (c), and the time vector of each member in family (T) (including family working time and leisure). The family working time of each family member is allocated to farming time (T_f), market labor time(T_m) and house work time (T_h). Consequently, the constraint of time is expressed in vector form:

(3) $$T_f + T_m + T_h \leq T \text{ Where } {}^{T_f} \geq 0;\ {}^{T_m} \geqslant 0.$$

From the relationship between consumption and family income, the budget constraint of a family can be expressed by:

(4) $$C \le Y_f(T_f, : Z_f) + \sum_i Y_{mi}(T_{mi} : Z_{mi}) + Y_o$$

where the agricultural income Y_f is a function of farming labor time. The total of non-agricultural income is Y_m and other income is Y_o. The participation equations are a subset of the Kuhn-Tucker conditions, which are the first order conditions for maximizing the function:

(5)
$$U(C, T_{h,} Z_u) + \lambda[Y_f(T_f : Z_f) + \sum_i Y_{mi}(T_{mi} : Z_{mi}) + Y_o - C] + \mu[T - T_f - T_m - T_h] + \mu_f T_f + \mu_m T_m$$
over (C, T_f, T_m, T_h) and minimizing it over $(\lambda, \mu, \mu_f, \mu_m)$. The participation conditions are:

(6) $$\frac{\partial Y_f}{\partial T_f} \le \frac{\mu_t}{\lambda}$$

(7) $$\frac{\partial Y_m}{\partial T_{fm}} \le \frac{\mu_t}{\lambda}$$

where $$\mu_t = \frac{\partial U}{\partial T_h}; \quad \lambda = \frac{\partial U}{\partial C}$$

If an interior solution exists, then the endogenous variables $\{C, T_f, T_m, T_h, \lambda, \mu_{t,} \mu_{m,} \mu_f\}$, expressed as the function of all exogeneous variables Z_u, Z_f, Z_m, Y_o, T have an explicit solution, enabling determination of the optimum employment situation.

From his analysis, Kimhi concluded that couples with children or families with brothers or sisters spent more time in farming work than in non-farming work. Farmers with parents spent less time in both farming work and non-farming work. Kimhi also noted differences in behaviour patterns of different ethnic groups in Israel and ascribed these to differences in institutions, culture and other factors. Further, Kimhi found that

the higher the education level, the higher the rate of employment, especially in non-farming jobs. Larger families could reduce the numbers of family members in farming employment, and had surplus labor relative to farming needs. Non-farming employment was needed to supplement income to maintain family members. The rate of non-farming employment was highly correlated with the distance between the residence of farmers and the town, reflecting the availability of off-farm employment.

Florkowski et.al (1999) applied consumer survey data collected in Bulgaria in 1997 to measure the effect of household income on the amount of time allocated to meal preparation after controlling the effects of demographic, socio-economic and other characteristics of households. The household maximizes utility subject to three constraints: household production technology, budget and time available in a given period as shown below.

(8) $$\text{Maximize: } U = U(M, H, L)$$

subject to:

(9) $$H = H(T_h, X)$$

(10) $$P_M M + P_X X = WT_M + V = I$$

(11) $$T_M + T_H + L = T_0$$

Equation (8) is the household utility function where M indicates market goods, H represents non-market goods produced in the household, and L is leisure; Equation (9) is the household production function where T_H is time allocated to non-market activity and X is a vector of market inputs used in the process. Equation (10) is a budget constraint where W denotes market wage rate, TM is the time spent on wage-earning work, V represents other sources of income and P_M and P_X are the prices of market goods (M) and

inputs (X), respectively. Equation (11) represents a time constraint, where T_0 is the total time available in a given period. To account for differences in demographic and socio-economic characteristics between households, Florkowski et al modified the household production technology to be conditional on a vector of demographic and socio-economic characteristics (D), yielding

(12) $$H = H(T_H, X; Z)$$

The vector (D) includes gender, education, age, regions, household size and employment status. Maximizing the utility function subject to the three constraints yields optimal allocation of time and optimal levels for market goods (M*), non-market goods (H*) and leisure (L*).

In the model of Florkowski et al, the family consumes all household products. In practice, in the regions of China that are the focus of our study, farmers either consume their own products or sell them in the market. So the optimization model is revised for application in this study as follows:

(13) $$U = U(M, H_1, L)$$

(14) $$H = \sum_{i=1}^{2} H_i(T_h, X)$$

(15) $$P_M M + P_X X = WT_M + P_s H_2 + V = I$$

(16) $$T_M + T_h + L = T_0$$

where: H_2 are household products sold in the market; H_1 are household products consumed by the family; and Ps is the selling price for the household's products. Thus output supply functions derived from utility maximization for the two household products can be expressed as:

(17) $$H_i^* = H_i^*(P_X, P_M, P_S, W, V, T_0; Z)$$
$$i = 1, 2$$

(18) $$L^* = L^*(P_X, P_M, P_S, W, V, T_0; Z)$$

Given the optimal level of non-market goods (H*), following the procedure of Florkowski et al, the next step is to choose technology minimizing the cost of producing H*. Minimizing the cost of producing H* subject to household production technology, $H = H(T_H, X; Z)$, yields the optimal cost function:

(19) $$C^* = C^*(P_X, W, H^*; Z)$$

Application of the envelope theorem (Sheppard's lemma) with respect to W and P_X in Equation (19) yields demand functions for time allocations (T_H) and market inputs (X) as follows:

(20) $$T^*_{H_i} = T^*_{H_i}(W, P_X, H_i^*, Z)$$

(21) $$X^* = X^*(W, P_X, H^*, Z)$$

3. Time allocations by rural households in poor areas of China

There are few studies of labor time allocation for China. Yang Du (2000) analyzed the labor supply of farmers in terms of the shadow wage rate and farm income levels. It was found that the labor supply in poor areas increased when farming income increased. Shi Li (2001) noted that in China's rural economy, the type of work carried out by men and women was influenced by a tradition of 'Occupational Discrimination and Income Discrimination for women'. The time spent by women on family work in rural areas of China was 2.32 times that for men. In terms of the summation of market time and family working time, in rural areas of China women spent 1.13 times more time working than

men. Simple logit models were assessed in which total working days, farming days and non-farming days were dependent variables; gender was the independent variable and a dummy variable for age was included. Based on this model, Shi Li found that in addition to attending to market activities, women also played a dominant role in family work. These two activities were strong substitutes. It also appeared that the larger the family size, the less the opportunity for the women in the family to be employed in non-agricultural work. Chuzhu Zhu et al (1995) observed that when women began employment outside the home, their time allocation changed from spending all working time on family work to allocating some time in working at home and some to earning income. Consequently, women with more children took more time for family work and lost some opportunities for other work, decreasing their income.

Xiangzhi Kong (1998) suggested that the labor force was the core factor that determined income of farmers. Usually, the land owned by a farmer was positively related to size of the family. Families with more members but with a lower work force (ie those with elderly parents or very young children) in poor areas were typically confined to farming work alone to maintain the necessities for family members, losing the opportunity for outside employment, which is in any event very limited in poor areas.

4. Empirical Analysis

Based on the household model expressed in equations 8 to 21, we hypothesize that the demand for non-market working time is affected by W, P_x, P_M, P_s, T_0 ,V, Z (these variables are defined as in equations 8 to 21). However, the precise influence of these factors on the demand for labour is not clear. Specifically, in the transforming economy of China, the labor market is far from mature and may be incomplete in poor areas. To

analyze the influence of the hypothesized factors on non-marketing working time and assess the characteristics of T_H, we postulate a general semi-logarithmic functional form as follows

(22)

$$LnT_H = a_0 + a_1 LnW + a_2 Lnp_{ci} + a_3 Lnp_{li} + a_4 Lnp_{cm} + a_5 Lnp_{LM} + a_6 Average + a_7 Average^2 + a_8 averedu + a_9 population + a_{10} plowlandacre + \sum_{i=1}^{4} \beta_i D_i + \gamma Gender + \sum_{j=1}^{3} \eta_j Marriage_j + \mu$$

where: W is the non-farm wage rate;

p_{ci} represents the average input cost of crop production, expressed as the cost per kilogram of output;

p_{li} represents the average input cost of livestock production, expressed as the cost per head;

p_{cm} is the average selling price of crop per kilogram of output;

p_{lm} is the average selling price of livestock per head;

averAge represents the average age of the family labor force;

averAge^2 is the squared average age of the family labor force;

averEdu represents the average years of education of the labor force in each family;

population represents the size of a family;

plowlandacre is the plowland area held by the family;

D_i is a dummy variable to capture the influence of different locations;

Gender is a dummy variable which equals one for male; and zero otherwise.

$Marriage_j$ is a dummy variable to describe the marriage status;

$$marriage_1 = \begin{matrix} 1, & Married \\ 0, & Otherwise \end{matrix} \quad , \quad marriage_2 = \begin{matrix} 1, & Divorced \quad or \quad widow(widower) \\ 0, & Otherwise \end{matrix},$$

$$marriage_3 = \begin{matrix} 1, & Single \\ 0, & Otherwise \end{matrix}$$

We assume that other income (V) is equal to zero and exclude this from the time demand functions because in the poor areas of China, farmers have few savings and very limited ways to generate other income. Total time available ($T_{0)}$ is also excluded from the time demand function as this does not vary between different farmers. The initial model focuses on total time allocation model for farming and non-paid domestic work (FNDW) does not include marriage and gender variables because initially the family is considered as a single unit.

5. Data

This analysis is based on a large data set on farmer households, which comes from an investigation on 'Poverty in rural areas of China' (second half) funded by the Ford Foundation. The data were collected in January 2001. The sampled households are from four poor counties that include Qu County in Sichuan province, Xiannin County in Guizhou province, Tongwei County in Gansu province and Shangzhou County in Shanxi province. This investigation involved forty villages and 582 farmer families. The survey content is comprehensive and relates to the composition, education levels, health conditions, living status, agricultural production, family consumption, allocation of labor time, loans and other situations of households. Sampled households were randomly selected with 15 families selected in each village. The investigation used questionnaires

and involved a final total of 582 households. The information collected covers family members at home for more than 6 months and those that had left home for more than 6 months in 2000. The data from the survey that is used in the study reported here are the labor time allocations for family members at home more than 6 months in 2000.

6. Results

6.1. Total time allocation models for farming and non-paid domestic work

The family is taken as a household unit to analyze household demand for the aggregate of time spent on farming and non-paid domestic work (FNDW) based on the previous theoretical outline. The GLS (Generalised Least Squares) estimation method is applied, using Stata. The initial estimation results are presented in Table 1.

Table 1 Results of Initial Model of Total Time Allocation to Farming and Non-Paid Domestic Work

Model	Coefficients	Std. Error	T Statistics	Significance
(Constant)	7.3342957	0.508645599	14.41927	***
P_{ci} (￥ per kilo.)	0.0160651	0.067982277	0.236314	
P_{li} (￥ per capita)	0.0612485	0.035229036	1.738581	*
P_{cm} (￥ per kilo.)	0.0075273	0.124082874	0.060664	
P_{lm} (￥ per capita)	0.1289753	0.050164909	2.571026	**
Average	-0.004716	0.003555673	-1.32645	
$Average^2$	2.636E-06	3.44218E-06	0.765834	

Averedu	-0.032329	0.013619478	-2.37376	**
Population	0.0491513	0.018477754	2.660027	***
Plowland acre	0.0092296	0.002844165	3.245103	***
D_1	-0.116733	0.120128215	-0.97174	
D_2	0.2312596	0.160100988	1.444461	
D_3	0.4340779	0.203635986	2.131636	**
W (￥ per year)	-0.019693	0.051001365	-0.38613	
R-squared	0.25			
F	4.12			

Note: The dependent variable is total time for farming and non-paid domestic work.

The crop and livestock input prices do not include labor input.

*, **, *** represent significance levels of 0.1, 0.05, and 0.01 respectively

Although the signs are as expected, the estimated coefficients are not significant for the crop price and wage rate. Years of education, plowland area, family size and one regional dummy variable are significant. A stepwise method is used to exclude insignificant variables, leading to the results in Table 2.

Table 2 Results of Second Model of Total Time Allocation to Farming and Non-Paid Domestic Work

Model	Coefficients	Std. Error	T Statistics	Significance.
(Constant)	7.491716	0.12256	61.12673	***
Plowland acre	0.01024	0.002509	4.081229	***
Population	0.051735	0.016963	3.049793	***
Average	-0.00227	0.000914	-2.48831	***
Averedu	-0.02811	0.012305	-2.28442	**

R squared	0.23
F	3.87

In this model price and wage factors are excluded, due to their insignificance, as is the square of age. The influence of land area, family size, average age and average years of education are four factors that significantly affect this time allocation. Plowland area and family size each positively influence time spent on farming and household work, indicating that larger size families and those with larger land areas allocate more time to farming and household work.. Average age of household working members and average years of education are negatively associated with farming and household work time for the sample of household from poor areas of China. The relationship between average labor age and time allocated to farming and household work seems counter-intuitive but can be explained by the character of age in the sample, as described in Table 3.

Table 3 Descriptives of ages of the family labor force

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Age	582	75.5	6.5	82	38.46649	12.89686	166.328

From Table 3 it is observed that the average age of sampled respondents is around 38 years. This exceeds the optimum age (normally around 20-25 in China) for farming work in China (Yu Li, 2003), as the ability to undertake heavy farm work decreases with age.

6.2 Farming time allocation model

We continue to use the model specified in the preceding section but regard each member within the family as a discrete unit to enable more detailed analysis. To evaluate

the effect of gender and marriage on farming time, we incorporate dummy variables for these characteristics into the model. Prices and wage rate variables continue to be excluded due to lack of significance. The regional dummy variables and two marriage variables are not significant and are also excluded from the results reported below in Table 4. The estimation results are as follows.

Table 4 Results of Model of Time Allocation to Farming

Model	Coefficient	T Statistics	Significance
Constant	-6.65	-2.32	***
Average	-0.0445	5.43	**
Averedu	-0.01853	-2.89	***
Gender (man=1, woman=0)	-1.66	-0.03	
Population	0.0457	0.26	***
plowland acre	0.0478	7	***
Marriage1(married=1, else=0)	1.79	1.2	**
R squared	0.22		
F	4.14		

From the results reported in Table 4, it is seen that average age, average years of education, gender, family size, plowland acre and marital status all affect farming time. Average age and average years of education are negatively related to farming time allocation; with increases in age and education, the time allocated to farming is decreased. Women always spend more time in farming work, reflected by the negative coefficient on the gender variable. Family size and plowland areas are positively related

to farming time. The larger are the family size and plowland area of any family, the more time is spent on farming. From the coefficient on marital status, married couples tend to spend more time farming.

6.3 Model of non-paid domestic work time

The model for housework time allocation is the same as the farming time model. Following initial estimation, the prices and wage variables are excluded due to non-significance. Results are given in Table 5.

Table 5 Results of Model of Time Allocation to Non-paid Domestic Work

Model	Coefficient	T Statistics	Significance
Constant	3.05	3.41	***
Average	-0.01	2.66	***
Averedu	-0.03	-1.51	*
Gender(man=1, woman=0)	-1.97	-15.20	***
Population	-0.14	-2.90	***
Plowland acre	-0.04	-0.90	**
Marriage1(married=1, else=0)	-0.51	-1.27	
Marriage3(single=1,else=0)	-1.23	-2.74	***
R squared	0.26		
F	3.52		

From Table 5, it is seen that when average age increased, respondents tended to do less domestic work. From the negative coefficient on the gender variable it is also seen that men always do less domestic work than women. The negative coefficients on education, family size and land area per capita also indicate that with increases in education levels, land per capita and family size, farmers spend less time in domestic work. Marital status also influence non-paid domestic work as couples and single people tend to spend less time on domestic work.

7. Discussion

7.1 Why are prices and wage rate not significant in farmers' FNDW time decisions?

To explore this issue, descriptive statistics are assessed for household-produced goods and goods purchased from or sold to the market in 2000. The results are in Table 6.

Table 6 Descriptive Statistics Unit: ¥

Variable	Range	Minimum	Maximum	Sum	Mean
Value of Household produced and consumed goods	80870	0	80870	978924	1682
Value of goods bought from market	21641	0	21641	146664	252

It is seen that household-produced goods account for a very large part of family consumption. The goods purchased from the market only account for about 10% of the

value of total family consumption. This reflects that in poor areas of China, farmers largely depend on a subsistence production system. Overall, the influence of market forces on time allocation decisions is insignificant. Another important reason for this phenomenon is that Non-FNDW employment of farmers is small (the average income from Non-FNDW employment only accounts for 5% of the total average income for the sampled households). Most workers in poor areas only have access to farming and non-domestic work, leading the wage rate to have little effect on time allocations.

7.2 Is there a surplus labor force in poor areas of China? If so, why cannot this be absorbed by market employment?

A surplus labor force exists in rural areas of China (Census Office of China, 2000). Scholars have suggested different ways to measure the extent of the labor force surplus. Currently, four different methods may be used: 1. Measuring latent unemployment or surplus labor force from the marginal product of labor. 2.Basing measures of the surplus labor force in terms of the productivity of labor, from expected and actual working times for farmers. 3. Based on expected income, from assuming a standard income level for farmers and comparing (for a certain type of plowland) the labor force necessary to achieve that income with the actual labor force input. 4. As an input measure, by assuming a standard input and comparing this with data on actual inputs. Data available from the survey enable the use of the second method, applied as follows.

(23) The ratio of surplus labor force= 1-(the actually working time of each labourer / the expected working time of each labourer)

We assume that expected working time, in rural areas of China, for each labourer is 270 days to 300 days per year, for a work period of 8 hours per day. The surplus labor ratio is computed in Table 7:

Table 7 Estimation of surplus labor, in hours

Variable	hour
Actual working time per laborer	1342.6
Expected working time per laborer (270 days, 8 hours per day)	2160
Expected working time per laborer (300 days, 8 hours per day)	2160
Surplus labor ratio(270 days, 8 hours per day)	0.61
Surplus labor ratio(300 days, 8 hours per day)	0.56

From the survey data, the surplus labor ratio for the sampled households in the selected poor areas of China is between 56% and 61%. These estimates are slightly higher than estimates by the Labor Department of China (55%, for 1994) by the Agricultural Department of China (43.68%, for 1998). The discrepancies may be due to the differences in methods and the time of observation and perhaps to immigration back to their home areas of some farmers.

The factors limiting surplus labor movements are very complex although incomplete labor and land markets appear to be major factors. Factor markets in China have greatly developed in recent years but this development has not occurred to the same

extent in all regions. Labor and land market lag in rural areas. Farmers that leave their village to seek jobs in cities have difficulty finding employment. Thousands of farmers do swarm into cities but find no occupation, making this a high risk decision, and potentially jeopardising the timely cultivation of their land. The incomplete market system for land limits their ability to rent land to others. Further, the level of education of farmers determines that their choices for employment are very limited. Thirdly, regional governments apply rules to prevent farmers from moving to cities and taking up occupations of city residents. Finally, traditions in poor areas of China also encourage farmers to stay in their ancestral villages.

8. Conclusions and policy implications

Prices and the wage rate do not influence time allocations in poor areas of China. There seem to be several reasons for this.

1. The allocation of FNDW time in poor areas of China is negatively related to education levels. The higher the education level, the lower the time spent on farming and unpaid domestic work. Education levels have a significant effect on farming time allocations. Most farmers have only attended primary school and this level of schooling may not be complete. This is a restriction on the ability to do non-agricultural work.
2. Marital status also affects labor time allocations. Married couples and single people do less non-paid domestic work than those who are divorced or are widows (widowers).

3. The time spent in farming and non-paid housework is higher for women than for men. Women in poor areas work for longer hours than men both in farming and in family work.
4. Plowland area is positively related with farming time. The level of technology in farming is very low in the poor areas. Agriculture in these areas follows traditional methods. The input of labor is increased with larger areas of plowland.

From the analysis of time allocations and associated data that indicates a surplus labor force for the sampled farm households, we conclude that extension of market systems for products and inputs (including land and labor) is crucial for farmers in poor areas of China. Market exchange potentially enables escape from subsistence modes of production; improved factor markets could allow farmers to sell their labor hours and cultivate their plowland more efficiently. Government measures to relieve obstacles for surplus labor transfers are also needed to improve farmers' income levels, lessen poverty in poor areas of China, .and enhance the development of non-agricultural sector. The environment for labor transfer could be improved by better infrastructure and rural education in poor areas, enabling more opportunity for labour transfer.

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