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OCCUPATION CHOICE IN THE AGRICULTURAL AND NON-AGRICULTURAL SECTORS BY THE RURAL YOUTH AND FEMALES IN BHUTAN

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ABSTRACT

Using the information from the Bhutan Living Standard Surveys 2003, 2007 and 2012, and modeling occupation choice as a function of the characteristics of the sampled respondents, this study examines the agriculture and nonagricultural occupation choice in rural Bhutan, a rapidly emerging country in South Asia. Although until today the agriculture sector is the largest employer in rural Bhutan, after controlling for education and physical assets, this study shows that the rural youth and educated labor force are more inclined to work for salaries and wages rather than choosing self-employment in either the agricultural or non-agricultural sectors. Importantly, although the female labor force is in general more likely to be self-employed in the agricultural and non-agricultural sectors, the female labor force aged below 46 is less likely to be self-employed in the agricultural sector. This study demonstrates that married females in the labor force, and particularly the older females are increasingly taking over the agriculture sector from both young males and females, especially unmarried females. Policies should focus on making the agricultural sectors more attractive to the youth in Bhutan. JEL Classification: O17, O 18, D33, J24, J46

Key words: Occupation choice, youth, female, agriculture, non-agriculture, Bhutan.

INTRODUCTION

As a country develops, it is observed that the labor allocation gradually shifts from agriculture to the non-agricultural sectors, as the expenditure on food by households gradually reduces, relative to the expenditure on manufacturing and service products. As this type of economic transformation is repeatedly observed in many countries in the world, this transformation is known as Petty's law (e.g., Murata, 2008). In South Asia, Bhutan is one of the fastest-growing countries. During 2010-2015, the GDP per capita of the country increased by more than 5% per annum. In 1980, the per capita GDP of Bhutan was US$328.81, which had increased to US$ 559.82 in 1990 and finally in 2016, Bhutan's per capita GDP grew to US$2532.45, which is the second highest in South Asia after Sri Lanka (World Bank, 2016). Consequently, the country has successfully upgraded itself from a least-developed country to a lower-middle income country. With the rapid economic development, the question arises as to what has been happening in the employment sector of Bhutan. Particularly, has there been any evidence that the labor allocation in Bhutan has been shifting from agriculture to the manufacturing sector? If this is the case, who is taking over the agriculture sector?

Although the agriculture sector is still the largest employment provider in Bhutan, following Petty's law, the total employment in the agriculture sector, as well as its relative contribution to GDP in Bhutan have gradually declined over the years(Rahut, Jena, Ali, Behera, & Chhetri, 2015). For example, in 2003, nearly 80% of the total employed population of Bhutan was engaged only in the agriculture sector, which has been reduced to 56% by 2013(World Bank, 2016).A question arises as to which sectors are absorbing and attracting more of the labor force and what occupations the youth and female labor force are choosing.

The issue of occupation choice, particularly by the educated, young people and females, in all of the rapidly-growing developing countries is critically important because, in most of these countries in Asia and Africa, agriculture is the primary source of livelihood. However, recent evidence clearly shows that educated youth are less likely to take over agriculture as their occupation(Bezu and Holden, 2014; White, 2012). If, with the course of economic development, the young and educated labor force naturally shifts to the non-farm sector, the food security, as well as the overall economic development of many of the emerging economies, may face a severe threat. In that case, the major strategy would be how to make the agricultural sector attractive to the educated and young labor force. However, it is first important to examine the occupation choice of the young and educated labor force, particularly focusing on the agricultural sector as the empirical studies are few on this issue.

To fill in the gap, using information from more than 30,000 rural respondents collected under the Bhutan Living Standards Surveys (BLSS) in 2003, 2007 and 2012 by the National Statistical Bureau of Bhutan, this study examines the occupation choices in Bhutan, focusing particularly on the youth and females. Applying a multinomial choice estimation procedure, this study shows that the relatively educated and young male and female labor force is highly likely to work for salaries or wages. Rather than opting for self-employed both in the agricultural and non-agricultural sectors. This study confirms that the relatively older portion of the labor force and the married female labor force are more likely to take over the agricultural sector as self-employed operators. The findings signal the policy makers and donor agencies to come up with an action plan to transform the agricultural sector into an attractive modern sector so that the educated and youth labor force are attracted to it and consider taking over the agricultural sector as their major livelihood.

The rest of the study is organized as follows: The next section presents a view of the literature; Section 3 summarizes the materials and methods and general findings. Section 4 specify the econometric model, and presents major findings. Section 4 presents the conclusion and policy implications.

Literature review on occupation choice: Although a growing body of literature on occupation choice in the form of rural livelihoods has addressed this choice by rural households in developing countries(Barrett, Clark, Clay, & Reardon, 2005; De Janvry & Sadoulet, 2001; Ellis, 1998; J. O. Lanjouw & Lanjouw, 2001a; Rahut *et al*., 2015; T. Reardon, Berdegué, & Escobar, 2001), few studies focus particularly on the occupation choice by youth and females (Barberis, 1968; Bezu & Holden, 2014; White, 2012).

Most of the existing studies claimed that with the presence of widespread and deep-rooted poverty, rural households in developing countries are forced to diversify their labor to non-agricultural sectors(Haggblade, Hazell, & Reardon, 2009; Janvry & Sadoulet, 2001; J. O. Lanjouw & Lanjouw, 2001b; Micevska & Rahut, 2008; T. Reardon *et al*., 2001).Recent literature on rural occupation choice attests that rural households usually can have multiple income sources(Barrett, Reardon, & Webb, 2001; Dercon, 1996; Ellis, 1998) and the major reasons of income source diversification are to cope with the shock in agriculture (Alderman &Paxson, 1992); (Collier & Gunning, 1999)and to maximize the return on assets (Rahut & Micevska Scharf, 2012a).

The literature on the determinants of labor allocation diversification at the household level demonstrates that formal education is one of the most significant driving forces in choosing occupations outside the agricultural sector. Using case studies from 11 Latin American countries, education was found to be the dominant factor determining participation and success in rural non-farm occupations (T. Reardon *et al*., 2001).Better-educated males in rural Pakistan earned higher non-farm incomes and were more likely to undertake non-farm work(Fafchamps & Quisumbing, 1999, 2003).Education improves the allocation of household resources between agricultural and non-agricultural activities in rural China(Yang & An, 2002).An inquiry into the participation in non-farm activities in the hills of Darjeeling and Sikkim in India revealed that education plays a major role in assessing remunerative non-farm activities(Micevska, 2008).

In addition to formal education, studies tried to find a correlation of physical assets and household composition with the choice of occupation in the agricultural and non-agricultural sectors. The role of physical assets in non-agriculture occupation choice is ambiguous:a negative correlation between landholdings and the choice of occupation in the non-agriculture sector was found in Thailand (Rief and Cochrane, 1990) and Vietnam(Van de Walle and Cratty, 2004), while a positive correlation has been found in Burkina Faso (T. Reardon, Delgado, C., and Matlon, P., 1992)and India (P. Lanjouw and Shariff, 2004).

The household composition and numbers of adult male and female members can also influence labor force diversification and therefore the occupation choice. Larger households are able to meet the demand for subsistence agriculture and can supply their surplus labor to non-agricultural activities(Fafchamps and Quisumbing, 2003; T. Reardon, 1997);(Rahutand Micevska Scharf, 2012b).

The literature on the role of gender in determining occupation choice demonstrates mixed findings. A few studies find that males usually dominate non-agricultural activities (Fafchamps and Quisumbing, 2003); some studies show that, in certain types of non-agricultural occupation, women are more heavily involved than their male counterparts (Corral and Reardon, 2001);(Elbers and Lanjouw, 2001). Female-headed households in Cambodia, engage more in all types of non-agricultural activities(Rahutand Micevska Scharf, 2012b). Thus the mixed findings of the role of gender on occupation choice vary across countries depending on the social norms and the status of female members in the household and society.

In general, although the literature on occupation choice under livelihood diversification strategy by rural households is abundant, few empirical studies focused on the role of youth on occupation choice(Barberis, 1968; Bezu and Holden, 2014; White, 2012)

Recent evidence suggests that youth are increasingly less interested in agriculture(Bezu and Holden, 2014; White, 2012).A recent study demonstrates

that only 9% of young Ethiopians choose agriculture as their future livelihoods, and pointed out that the lack of access to land is the major force that pushes youth away from agriculture(Bezu and Holden, 2014). In Italy, the proportion of individuals under 25 years of age participating in the agricultural sector declined from 34.8% in 1931 to 32.1% in 1951 and to 19.2% in 1961, while those above 45 years increased from 33.3% in 1931 to 42.6% in 1961 (Barberis, 1968).

This study, using a nationally representative dataset investigates the occupation choice of the rural Bhutanese providing particular attention to the age group of 15 years and above, females and married females in the labor force. Globally, there is a concern that the youth are abandoning agriculture, and are looking to occupations in the non-agricultural sector. Hence the empirical examination of occupation choice by rural youth will put further light on this burning issue. The novelty of this studies lies with the fact that it investigates the hypothesis that youth are abandoning agriculture in rural Bhutan to take lucrative wage employment in the non-agriculture sectors.Against the backdrop of the rapid structural transformation of Bhutanese economy in recent decades, this study examines the occupation choice of the rural youth and females in Bhutan. Finally, a number of countries in Asia and Africa are experiencing rapid economic transition due to rapid economic growth similar to Bhutan. The similarity in rapid economic transition across developing countries, including Bhutan, with the high GDP growth rate, indicates the wider policy relevance of the study beyond the Bhutanese case.

MATERIALS AND METHODS

This study is based on information collected under Bhutan Living Standards Surveys (BLSS) administered by the National Statistical Bureau, Bhutan in 2003, 2007 and 2012. These nationally representative and comprehensive surveys use multi-stage stratified random sampling techniques, covering about 4120 households in 2003, 9798 households in 2007, and 9998 households in 2012. The selection of the sampled households was based on two mutually- exclusive sampling frames for rural and urban areas. First, the primary sampling units (PSUs) were selected systematically with probability proportional to size, with size expressed as the number of the households. Within the selected PSUs, a fixed number of 10 households were randomly selected from each of the selected villages. While the BLSSs (2003, 2007 and 2012) gathered data from the sampled households for the year preceding the interview through a comprehensive household questionnaire covering consumption, expenditure, assets, housing, education, health, fertility, and prices, BLSS collected individual-level information on the years of schooling, occupation status, age, sex and the marital status of the members of a household sampled. With an average 5.12 family members in 2003, BLSS2003 collected individual-level information from 21095 members from 4120 households. In BLSS 2007, such information is available for 49185 members of 9798 households. Finally, in BLSS2012 individual level information was available for 44991 members from 9998 households.

As this study is particularly intended to examine the occupation choice of the rural youth and females in Bhutan, this study only considered the sampled rural respondents who were above 15 years old and were employed during the period sampled. Consequently, this study is based on the information provided by 30,245 sampled respondents collected in 2003, 2007 and 2012.

Basic information of the respondents: Table 1 presents the background information of the sampled respondents. On average, a respondent was 39 years old with 1.38 years of schooling, of whom 49% were female, and 73% of the total were married. Among the female respondents, 34% were married. The age distribution of the respondents shows that more than 24% and 23% of the sampled respondents belonged to the age groups 15-25 and 26-35, respectively. Nearly 18% of the sampled respondents belonged to 46-55 year-old age group.

Table 1 shows that out of 30,245 sampled respondents, a total of 25,286 of them were engaged in the agricultural sector as self-employed operators, which was 83% of the total sample. On the other hand, nearly 11% of the sampled respondents worked as salaried workers, and only 6% of the sampled respondents were engaged as self-employed entrepreneurs in the non-farm sector. Table 1 shows that female respondents were, in general, married and female respondents, in particular, were more likely to be self-employed in the agriculture sector. On the other hand, relatively young and educated respondents were more likely to be engaged as salaried or wage workers. For example, nearly 26% of the total respondents belonging to the 15-25 age group and 37% of the total respondents belonging to the 26-35 age group were engaged as salaried workers over the sampled period, whereas only 21% of the total respondents belonging to the 15-25 age group and 25% of the total respondents belonging to the 26-35 age group were engaged as a self-employed in the non-farm sector.In contrast, although only 12% of the total respondents belonging to the 46-55 age group were engaged as salaried workers, 18% of the sampled respondents from this group were engaged as self-employed operators either in agriculture or non-agricultural sectors.

Figure 1 (Panel a) graphically shows that the female respondents who were working for salaries were relatively young and had a high level of education with an average age of 28.93 years and an average of 6.63 years of schooling. In contrast, the female group that was

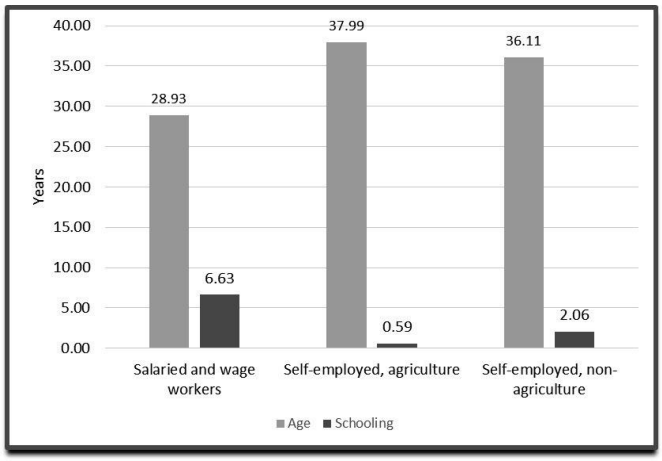
engaged in agriculture was the oldest and with the lowest level of schooling. Figure 1, Panel b shows the similar pattern in the case of male respondents: men engaged as salaried workers on average were young with a high level of education, whereas the relatively old with the lowest average level of education were self-employed in the agricultural sector. Probably lucrative salaries as well as higher marginal returns as salaried workers attracted the young and educated workforce to work for salaries. The next section specifies and estimates the econometric model to quantify the role of age, sex, and education on occupation choice.

Table 1. Basic background information of the sampled respondents by their occupation and the years sampled.

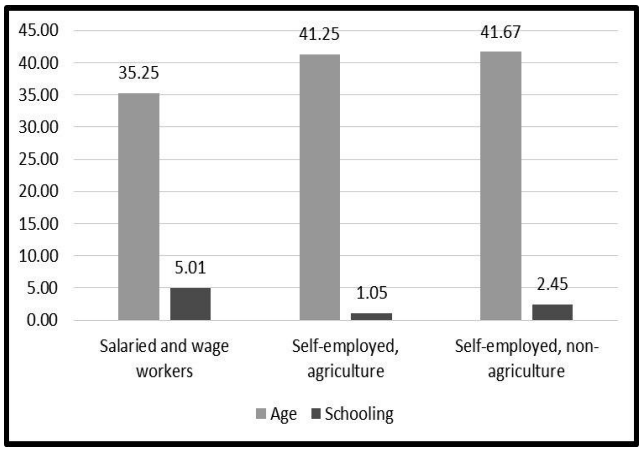
Occupation type			Self-employed	
Sector	**All**	**Wage worker**	**Farm sector**	**Non-farm sector**
No. of respondents	30,425	3,268	25,286	1,871
% Female	49.25 (50.00)	19.25 (39.43)	53.57 (49.87)	43.29 (49.56)
% Married and female	34.11 (47.41)	12.21 (32.74)	37.30 (48.36)	29.18 (45.47)
Age	38.90 (15.09)	34.03 (11.61)	39.50 (15.40)	39.26 (14.81)
% Married	72.73 (44.54)	75.76 (42.86)	72.24 (44.78)	74.02 (43.86)
Years of schooling	1.38 (3.14)	5.32 (5.35)	0.81 (2.16)	2.28 (3.82)
% Age group 15-25	23.60 (42.46)	25.43 (43.55)	23.58 (42.45)	20.63 (40.48)
% Age group 26-35	22.76 (41.93)	36.87 (48.25)	20.75 (40.55)	25.28 (43.47)
% Age group 36-45	19.92 (39.94)	20.69 (40.51)	19.76 (39.82)	20.68 (40.51)
% Age group 46-55	17.69 (38.16)	11.66 (32.10)	18.47 (38.81)	17.64 (38.12)

Values in parentheses are standard deviations.

1. Wage worker group includes workers including casual workers in any sector based on daily or monthly wage.
2. Farm sector included persons self-employed in the farm sector.
3. Non-farm sector includes self-employed in the non-farm sector.



Panel (a)



Panel (b)

Sources: BLSS 2003, 2007 and 2012.

Figure 1: Distribution of age and years of schooling of the sampled respondents by their occupation and sex: Panel (a) female; Panel (b), male.

Econometrics model and result

Model specification: Table 1 shows that the sampled respondents' major occupation choice was broadly classified into three categories: salaried worker, or self-employed in agriculture, or self-employed in the non-agriculture sector. The major occupation choice of a respondent is mutually exclusive as the same respondents cannot have two major occupations at the same time. Considering that fact, the occupation choice of the sampled respondents is modeled as follows:

$$ln\left(\frac{P(Occuption = self - farm)}{P(Occupation = Wage\ worker)}\right) = b_{10} + b_{11}(Land\ size)_i + b_{12}(Female\ dummy)_i + b_{13}(Married\ dumy)_i + b_{14}(Married\ dummy\ X\ Female\ dummy)_i + b_{15}(Age)_i + b_{16}(Years\ of\ schooling)_i + \sum_{j=1}^{4}\gamma_j(Age\ group\ dummies)_j + \sum_{k=1}^{4}\alpha_k(Age\ group\ dummies\ X\ Female\ dummy)_k + \sum_{m=1}^{2}\delta_m(Year\ dummies)_m + \varepsilon_i$$

$$ln\left(\frac{P(Occuption=self-non\ farm)}{P(Occupation=Wage\ worker)}\right) = b_{20} + b_{21}(Land\ size)_i + b_{22}(Female\ dummy)_i + b_{23}(Married\ dumy)_i + b_{24}(Married\ dummy\ X\ Female\ dummy)_i + b_{25}(Age)_i + b_{26}(Years\ of\ schooling)_i + \sum_{j=1}^{4}\gamma_j(Age\ group\ dummies)_j + \sum_{k=1}^{4}\alpha_k(Age\ group\ dummies\ X\ Female\ dummy)_k + \sum_{m=1}^{2}\delta_m(Year\ dummies)_m + \varepsilon_i \quad -(1)$$

As specified in the model, this study examines the factors that influence the probability of the choice as a self-employed worker on-farm as well as a self-employed worker in the non-farm sector, compared to the choice of occupation as a salaried worker.The model is estimated by applying multinomial logit estimation procedure setting wage workers as the base occupation category.

Major findings: Table 2 presents the estimated functions explaining occupation choice of the sampled respondents estimated applying a multinomial logit estimation procedure, in which working as salaried workers is the base occupation category (salaried worker=0). The left segment of Table 2presents the estimated functions that considered full samples, whereas in the right segment of Table 2 is the sensitivity analysis of the results from the estimated functions in which only 75% of the sample respondents were considered. Table 2 shows that land-rich and females are more likely to be self-employed in both agriculture and non-agriculture. The married respondents, in general, were more likely to be self-employed in the agriculture sector; marriage has no impact on the choice of occupation as self-employed in the non-farm sector. Similarly, married females were also indifferent as to the choice of their occupations which were considered in this study.

Alarmingly, Table 2 clearly shows that the young and educated labor force was less likely to work as self-employed in the agriculture and non-agriculture sectors compared to working as salaried workers. Econometric results confirmed that the young labor force, aged from 15 to 55 years, is less likely to work as self-employed in both the agricultural and non-agricultural sectors, compared to working as salaried workers. Young females aged 15 to 35 years preferred less often to accept self-employment in the agriculture sector as an occupation. Finally, Table 2 shows that over the years, occupation in the agricultural sector and non-agricultural sectors as self-employed has been less preferred by the labor force in Bhutan. Econometric results show that in 2007, compared to the base years 2003, the odds of working as self-employed in agriculture and the non-agriculture sector was 0.89 and 0.95, respectively ($p<0.00$). Similarly in 2012, compared to the base year 2003, the odds for choosing self-employment in agriculture and the non-agriculture sector is 1.08 and 0.92, respectively. It shows that overall in Bhutan the agriculture sector has been losing its labor force to non-agricultural sectors over the years. The results from the sensitivity test (right-hand side of Table 2) also supports the findings that over the period sampled, the agricultural sector has failed to attract more of the labor force in Bhutan.

Table 2. Estimated functions applying a multinomial logit estimation procedure explaining occupational choice by the sampled rural respondents in Bhutan in 2003, 2007 and 2012 (base choice category: wage worker).

Observation	Full sample		75% of the observations	
Sector (base: wage worker)	Self- farm	Self- non-farm	Self- farm	Self- non-farm
Total land owned by the households	0.13***	0.077***	0.13***	0.081***
	(0.01)	(0.01)	(0.01)	(0.02)
Female dummy (yes=1)	1.75***	1.28***	1.92***	1.44***
	(0.30)	(0.34)	(0.38)	(0.42)
Married dummy (yes=1)	0.34***	0.11	0.41***	0.15
	(0.12)	(0.16)	(0.13)	(0.18)
Married X female	0.0012	0.012	-0.00034	0.010
	(0.01)	(0.01)	(0.01)	(0.01)
Age of the respondent	-0.29***	-0.18*	-0.30***	-0.15
	(0.07)	(0.10)	(0.08)	(0.12)
Years of schooling of the	-0.28***	-0.11***	-0.28***	-0.11***
respondent	(0.01)	(0.01)	(0.01)	(0.01)
Age group 15-25 years dummy	-0.58*	-0.63	-0.65*	-0.64
	(0.31)	(0.41)	(0.36)	(0.47)
Age group 26-35 years dummy	-1.06***	-0.78**	-1.11***	-0.73*
	(0.25)	(0.33)	(0.29)	(0.38)
Age group 36-45 years dummy	-0.98***	-0.89***	-0.93***	-0.77***
	(0.19)	(0.25)	(0.22)	(0.29)
Age group 46-55 years dummy	-0.71***	-0.53***	-0.74***	-0.51**
	(0.14)	(0.18)	(0.16)	(0.21)
Age group 15-25 years dummy X	-0.71**	-0.32	-0.95**	-0.58
Female dummy	(0.31)	(0.35)	(0.38)	(0.43)
Age group 26-35 years dummy X	-0.62**	-0.27	-0.82**	-0.42
Female dummy	(0.30)	(0.34)	(0.38)	(0.42)
Age group 36-45 years dummy X	-0.12	0.46	-0.40	0.24
Female dummy	(0.32)	(0.36)	(0.40)	(0.44)
Age group 46-55 years dummy X	0.39	0.45	0.30	0.45
Female dummy	(0.36)	(0.40)	(0.45)	(0.49)
Year 2007 dummy	-0.89***	-0.95***	-0.85***	-0.94***
	(0.08)	(0.11)	(0.09)	(0.12)
Year 2012 dummy	-1.08***	-0.92***	-1.04***	-0.90***
	(0.09)	(0.11)	(0.10)	(0.13)
Constant	3.64***	0.50	3.69***	0.45
	(0.46)	(0.60)	(0.52)	(0.68)
No. of observations	30,425		22,883	
Wald chi2(32)	4297.90		3191.58	
Prob> chi^2	0.00		0.00	
Pseudo R^2	0.18		0.18	
Log pseudolikelihood	-14015.45		-10566.47	

Numbers in parentheses are robust standard errors *Significant at the 10% level, ** Significant at the 5% level and ***Significant at the 1% level.

Conclusion and policy implications: Although it is a natural process that over the development trajectory of a country, the labor force in general shifts primarily from the agriculture sector to non-agriculture sectors, it can be a major concern in rapidly-growing developing countries, where the contribution of agriculture is a major source of economic growth. In extreme cases, an abrupt abandonment of the agriculture sector by the young and educated labor force can substantially reduce agricultural productivity as well as the economic growth in the long run. This study econometrically shows that, in Bhutan, the young and educated labor force is less likely to be self-employed in either the agricultural or the non-agricultural sector. Over the years, the tendency of not joining in either the agricultural or non-agricultural sectors in Bhutan has been increasing. However, Bhutan has able to maintain its economic growth rate as one of the fastest-growing economies in Asia. Thus, Bhutan's

economic transition is following the natural economic development process as stated by Petty's law. Nonetheless, as the young and educated labor force is moving out of the agricultural sector leaving the older and less-educated generation, the government should expand the agricultural extension support system to protect the productivity of the agricultural sector. Particularly, the government can provide the necessary training on the new technology and market information to the older and less-educated labor force who are engaged in the agricultural sector. Importantly, to retain the agricultural productivity of Bhutan, the government can develop, modify and employ farm machinery making suitable for easy operation by the older and less-educated labor force. The related manuals of the existing farm machinery should be deciphered in an easier way so that even less-educated persons can understand the operation manual easily.

Finally, in the long run, in all developing countries the agricultural sector should be transformed from subsistence agriculture to commercial agriculture, by which more salaried jobs can be created for the young and educated generations. Continuous introduction of new technology, efficient agricultural extension services and the provision of market information to farmers can ultimately contribute to the commercialization of the agricultural sector in developing countries. The government of Bhutan with the support of international donor agencies can play an important role in commercialization of the agriculture sector in developing countries.

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