CHAPTER VII

SUMMARY AND CONCLUSION

7.1 Introduction

In this study, an attempt has been made to examine the determinants of farm household decisions namely wages, labour supply, health and farm production and the interrelation among them.

This chapter summarises the findings of the study. The discussion in this chapter is organised as follows. Section 7.2 presents the summary of the theoretical developments and empirical analysis of the present study. The policy implications that can be drawn from the findings of the study are discussed in Section 7.3. The limitations of the study are outlined in Section 7.4.

7.2 Summary of the Study and Important Findings

The introductory chapter, Chapter I, presents the background of the study, value of the study, objectives, methodology and organisation of the rest of the thesis. The aggregate national and state level (for Tamil Nadu) data on labour force participation, and health indicators of males and females are presented. The trends in production of the most important crop namely paddy are also given. The research questions arising out of these aggregate evidence are discussed and the need for a micro level analysis is outlined. The
contribution of this study to the existing literature is indicated in the discussion on the value of the study. This study constitutes a pioneering attempt to analyse the determinants of and the interdependence between the labour supply, health status and farm production using a primary household survey data from a random sample of 284 farm households in three districts of Tamil Nadu. The section on methodology discusses the theory and econometric tools used in the thesis.

The review of relevant literature is presented in Chapter II. The study of labour supply is traced from the work of Adam Smith. The earlier theoretical developments and the simple labour-leisure choice theory are briefly discussed. The empirical studies based on this labour supply theory are also presented. The theoretical frame work of the neo-classical labour-leisure theory and the effect of changes in important determinants of labour supply namely wages and non-labour income on labour supply are also studied. The extensions of the individual and family labour supply models and the estimates of the labour supply from various first and second generation empirical studies carried out are summarised and presented.

Based on the seminal work of Becker (1965), a number of models namely the "household production models" or "new home economics" have been developed and used to study the individual and household decisions. These theoretical developments are presented and the empirical studies on labour supply and health are reviewed. The focus is on the studies for developing countries.
The theoretical and empirical literature on farm production behaviour starts with the technical representation of output and input and its explicit functional forms such as Cobb-Douglas, CES, Translog frontiers and Generalised production functions. The empirical studies based on profit functions, an alternative to production function approach, and the advantages of this over the production function approach are summarised.

The need for a micro economic household model to analyse farm and household decisions within a single consistent framework known as agricultural household model is discussed. The outline of the agricultural household model and the econometric studies using this model are presented. The estimates based on agricultural household models are compared with traditional models. The extensions of agricultural household models are also briefly reviewed.

The final section of this chapter, surveys the empirical works on labour supply, health and farm production in the Indian context in order to place the present study in its proper context. On the whole, the review of literature reveals that the available studies on these issues based on farm-household model are very scanty for India. Most of the previous studies analysed each issues namely labour supply, health and farm production, separately. The interdependence between these issues are not explored. The focus of the present study is on the joint-dependence of the household and farm decisions using an agricultural household model.
The theoretical framework of the present study described in Chapter III is based on the farm-household model developed in Singh, Squire and Strauss (1986) and Pitt and Rosenzweig (1986). In this framework, the household maximizes utility subject to a set of time, resource, health production and farm production constraints. Demand functions for leisure and health, own-farm produced and market-purchased commodities are derived. The mirror image of leisure demand functions gives the labour supply functions. The comparative static properties of the model are presented for empirical verification. The model predicts that the wage effect on labour supply is positive and on health (sick days) is negative. Non-labour income is expected to have a negative impact on both labour supply and health status of farm household members. Labour supply and health status are expected to influence each other negatively. Farm production is expected to have a negative impact on both labour supply and health. Own-farm labour and health inputs are expected to increase the farm production.

Some of the implications of the theoretical framework, presented in Chapter III, are tested using primary household survey data from rural households of Tamil Nadu. The details about the database namely, the sampling procedure, questionnaire and survey details, are given in Chapter IV. A multistage stratified random sampling procedure is adopted. The survey covered 284 farm households in eight villages from two districts in Tamil Nadu. Some important characteristics of the sample are also presented and discussed.
Chapter V proceeds with the empirical analysis of wages, labour supply and health production functions. The determinants of wages, labour supply and health of adult males and females and farm production are specified in a simultaneous equation framework. The identifying restrictions and the estimation methods are discussed.

The human capital earnings functions for males and females are specified and estimated correcting for sample selection bias using Heckman's two-step method. The selectivity bias corrected wage estimates clearly show the importance of health status - as measured by number of sick days and body mass index - of adult male and female farm household members in determining labour productivity. An additional year of education increases the daily wage by one percent for adult males and females. The health indicators have strong effects on wages. A 10 percent increase in ill-days reduces adult male and female daily wages by 0.4 and 0.3 percent respectively. Moreover, market wage rates for individuals, which are likely to reflect the marginal productivity of labour, are also highly elastic with respect to body mass index. A 10 percent increase in the body mass index increase the adult male and female daily wages by 7 and 2 percent respectively. Education of individuals significantly increases the wages and the returns to a year of education is about one percent for both males and females.

The effects of other human capital variable namely age and labour market characteristics such as village population size, number of small scale
industries, proportion of irrigated land to total land, and distance to nearest market centre are as observed in several earlier works.

The labour supply of males and females are measured as annual days of own-farm work, wage work and total labour supply (own-farm work and wage work). These labour supply functions are estimated by Two Stage Least Squares (TSLs) and Two Stage Tobit (TSTOBIT) methods.

The health status of males and females are measured by indicators namely annual ill days and body mass index. The health status functions are estimated by Two Stage Least Squares (TSLs) and Two Stage Tobit (TSTOBIT) methods.

The positive effect of own-wage on total labour supply of males and females indicate that the total labour supply functions are upward sloping. The own-wage elasticities of total work days of men and women are 0.38 and -1.216. The female's wage significantly increases the own-farm work and reduces the wage work and total days of work of males. However, male's wage reduces the own-farm work and increases the wage-work of females significantly.

The value of asset holdings of the farm household reduces the labour supply of males and females. The elasticity estimates of labour supply with respect to assets is -0.505 for males and -1.095 for females.
The more the number of younger children (less than 7 years of age), the higher the work in own-farm and lower the wage work of females. The positive effect of children on own-farm work of females suggests the compatibility of child care and own-farm work. Presence of more elders in the farm households increases the total labour supply of males and females.

An increase in the number of small scale industries in the villages and reduction in distance to nearest market centre significantly increase the total amount of work performed by males and females.

Examining the effects of health and value of farm output and profit leads to certain interesting findings. Health status of adult males and females affect their labour supply significantly. The health status indicators ill days and body mass index respectively reduces and increases the labour supply. A 10 percent increase in ill days reduces the male and female labour supply by 0.6 percent. The same increase in body mass index of adult males and females results in 20 and 11 percent increase in labour supply respectively.

The value of own-farm production significantly reduces the wage work of females and the total labour supply of males and females. This implies that the value of farm production as a proxy to income (gross) of the farm household, captures the income effect.

The own wage of adult males reduces the ill-days and increases the body mass index significantly. Cross-wage of males also increases the body
mass index. A 10 percent increase in own wage of adult male reduces the male ill-days by 7 percent and increases the body mass index by 1 percent.

The negative effect on ill days and positive effect on body mass index of asset holdings indicate that wealthy farm households have a propensity to take precautionary measures to prevent ill-health (reducing sick days). The elasticity estimates indicate that a 10 percent increase in asset holdings of the farm household reduce the ill-days of male by 2 percent and of female by 3 percent respectively.

Household level health programs such as the water source (well) and water treatment (boiling behaviour) significantly increases the health status of males and females suggesting that better quality of water improves the health status.

The health indicator estimates evidence that the labour supply of males and females significantly reduces the ill days [Pitt and Rosenzweig (1986)] and increases the body mass index. In other words, the more the labour supply, the higher the earnings which in turn increases the health status of farm household members.

The positive effect of own-farm production on health status of male and female members of the farm household implies that farm output of the farm households captures the income effect. As farm output does, farm profit also increases the male and female health status.
Chapter VI is devoted to study the determinants of and the impact of the labour inputs and health status of farm operators on farm (paddy) production using the farm production function and its dual function known as farm profit function.

The own-farm labour of male and female increases the farm output (paddy) significantly. The elasticity of paddy production with respect to own-farm labour of males is 0.001. The health status indicators namely number of ill days and body mass index of adult men and women are included as inputs with the conventional variable and fixed inputs. The number of sick days of males and females reduces the farm output significantly indicating that ill days affects the labour productivity and hence the farm production. The elasticity estimates of farm production with respect to ill days is -0.036 and -0.022 respectively for males and females. A 10 percent reduction in ill days of male and female increase the farm output by 0.4 and 0.2 percent respectively. The body mass index, representing the better health status increases the farm production and the production elasticities with respect to body mass index for males is 0.489 and 0.305 for females. The production elasticities indicate that a 10 percent increase in body mass index of adult males and females increase the farm output by 5 and 3 percent respectively.

Most of the variable and fixed inputs increase the farm production significantly. The variable inputs namely value of seeds, value of fertilizers, bullock labour and hired labour and fixed input namely land have a positive and significant effect on paddy production. Farm operators’ experience (age),
education and non-formal education (extension services) also increase the farm output significantly. The effects of variable and fixed inputs and human capital variables on farm production are in line with the results observed by earlier production literature.

As health status indicators affect the farm output, health status of males and females also increases the farm profit significantly. The profit elasticities with respect to ill days of males and females are -0.093 and -0.108 respectively. Similarly, the fixed input land and prices of variable inputs such as seeds, fertilizers, human labour, and bullock labour have negative effect on farm profit. The extension services availed of by farm operators also increase the farm profit.

The profit elasticities of adult male and female with respect to body mass index are 0.769 and 1.629 indicate that a 10 percent increase in their body mass index would increase the farm profit by 8 and 16 percent respectively. In general, the effect of body mass index of male and female on farm production are bigger than that of ill-days.

7.3 Policy Implications

Certain policy implications can be drawn based on the results obtained in this study.

It is interesting to mention that the health status of adult males and females increase their wages, labour supply and farm production. This
indicates that investment in health programs and policies will improve the 
productive capacity of rural farm workers which in turn promote the welfare 
or income of the rural population. Returns to health status of female workers 
is lower than that for male workers. This suggests that the health policies 
should aim at improving the health status of females than done heretofore.

An another interesting conclusion is that the household health 
infrastructure such as source of water and water treatment increase the health 
status of rural household members. This suggests that the policies at a 
provision of such household level health infrastructure to all the population in 
rural areas may improve the health status.

7.4 Limitations of the Study

The empirical findings of the study, are the outcome of appropriate 
econometric procedures. However, these are to be tempered in view of certain 
inherent limitation in the study's design and scope.

This study is restricted to farm households. This restriction in general, 
precludes a comprehensive comparison of labour supply behaviour and health 
status of all males and females in rural areas.

Without accounting the potential endogeneity of the variables namely 
fertility and value of assets, they have been included as exogenous variables 
in the labour supply and health functions due to data limitations. The 
endogeneity of these variables needs to be considered in the future work in this 
area.
Due to time constraint, this study is restricted to analysis of only two household issues namely labour supply, and health and a farm production decisions. This can be extended to include other household issues namely, fertility, nutrition, saving, borrowing etc., with farm production decision using the agricultural household models as the available econometric works on these issues are very scanty.

The study does not make any attempt to analyse the household decisions namely labour supply and health of the farm household children as the sample size on them is small.