ECONOMIC DECISION MAKING OF VEGETABLE PEASANT HOUSEHOLD

Nuhfil Hanani AR and Yonekura

ABSTRACT

This research is aimed to study peasant household decision making in production, consumption as well as labor allocation in Ngebrong Tawangsari Village Pujon District Regency Malang East Java Indonesia. Sample in this research was taken in Stratified Random Sampling Methods. Data collected was analyzed by using Barnum Squire model after enhancing it in simultaneous equation which consists of farm management, consumption, and labor aspects. Interrelation between farm management and production then will be evaluated in simulation analysis.

It was found that peasant household consumption expenditure significantly effected peasant household decision-making process. Simulation analysis exposed that peasant household income was likely to be effected more by consumption expenditure than other input variables. It could be happened since farmer tend to reallocate his household consumption funds if he needs more capital input to his farm. For this finding, it is suggested that the government take not only input subsidy policy but also food as well as non-food consumption subsidy policies in altering peasant household income.

Key word : peasant, economic household model

INTRODUCTION

Agriculture sector is still the main source of most Indonesian household income. Data showed that in Year 2000 there was about 44 percent of household in Indonesia works in agriculture sector. Unfortunately, those farmer averagely cultivated very small farm area (0,30 Ha per household) and supported by low formal education level, 82 percent of them was only graduated from junior high school or less. Due to this peasant household limited resources, most of them are helpless and remain under impoverished welfare. Ellis (1989) said that 'Peasant' (means small size farmer) usually run their farm in limited input that they could not effort to get higher return even to pay his own labor. Furthermore, Sing *et al* (1986)

argued that such small scale farmer tend to run his own farm in semi-commercial manner that the farmer acted double role both as producer who supply his own labor and consumer who consume his own production in the same time. In such condition, farmer usually fails to separate the farm business activities from household needs fulfilling.

Double role, both as producer and consumer in the same time, played by peasant leads to a unique decision making in peasant household daily activities. The unique decision making pattern, in its term, makes the neoclassic profit maximizing theory became invalid to explain the peasant household behavior in undertaking his farm business. This phenomenon is widely found in vegetables household farmer in Indonesia. Here, it could commonly be found a kind of cross allocation farmer resources between production needs and consumption fulfilling. Unwisely recognizing this condition make most of the government policy intended to increase farm productivity which was formulated based on the on-farm consideration such as innovation and new technology dissemination, credit, input subsidy, commodity price, and marketing failed to reach the target. On peasant economy, on farm decision making most of the time is closely related to off farm as well as household daily life activities. On the other word it can be said that there is no a significant split between production and consumption activities for vegetable peasant house hold in Indonesia. For this unique phenomenon, this research is intended to study how peasant household make his decision up in allocating their limited resources or how they could access those limited input into facilitate both their need as a producer and consumer on the same time.

MODEL SPECIFICATION AND ESTIMATION

Model Specification

Peasant household behavior model in this study was developed based on the Barnum Squire (1979) model. As it was discussed before, peasant in undertaking his farm is mostly faced in to three interrelated problem that he has to solve with. Peasant as a producer has to make a series of decision in term of his farm business, household consumption fulfilling, and labor allocation between on farm and off farm activities.

By assuming that the land area is restricted, it is argued that the number of labor supplied on farm business very much depends on the size of farm area cultivated. If it is so, then it could be said that the supply of labor for off farm activities become the residual. It is meant that farmer will first allocated his labor power on his farm activities and supply the rest to other activities if any. Demand for domestic labor will increase in higher wage, wider farm area cultivated, and larger amount of own household labor force. Most of the time, input variable needs will be fulfilled from the farm yield that in its term depends on the size of land area cultivated. Fertilizer and plant medicine utilizing is some how effected by the input price and domestic financial availability. For this argument, the input fertilizer and plant medicine used will also affected by both food and non-food consumption expenditure as well as labor cost and farm area cultivated.

Due to large variety in vegetable commodity, production variable is measured in term of money value in this study. It is argued here that vegetable production rate is affected by the size of farm area cultivated, amount and type of seeds, fertilizer, medicine, and labor used as well as farmer experiences. Household farm income on the other side is the total income generated from both on farm and

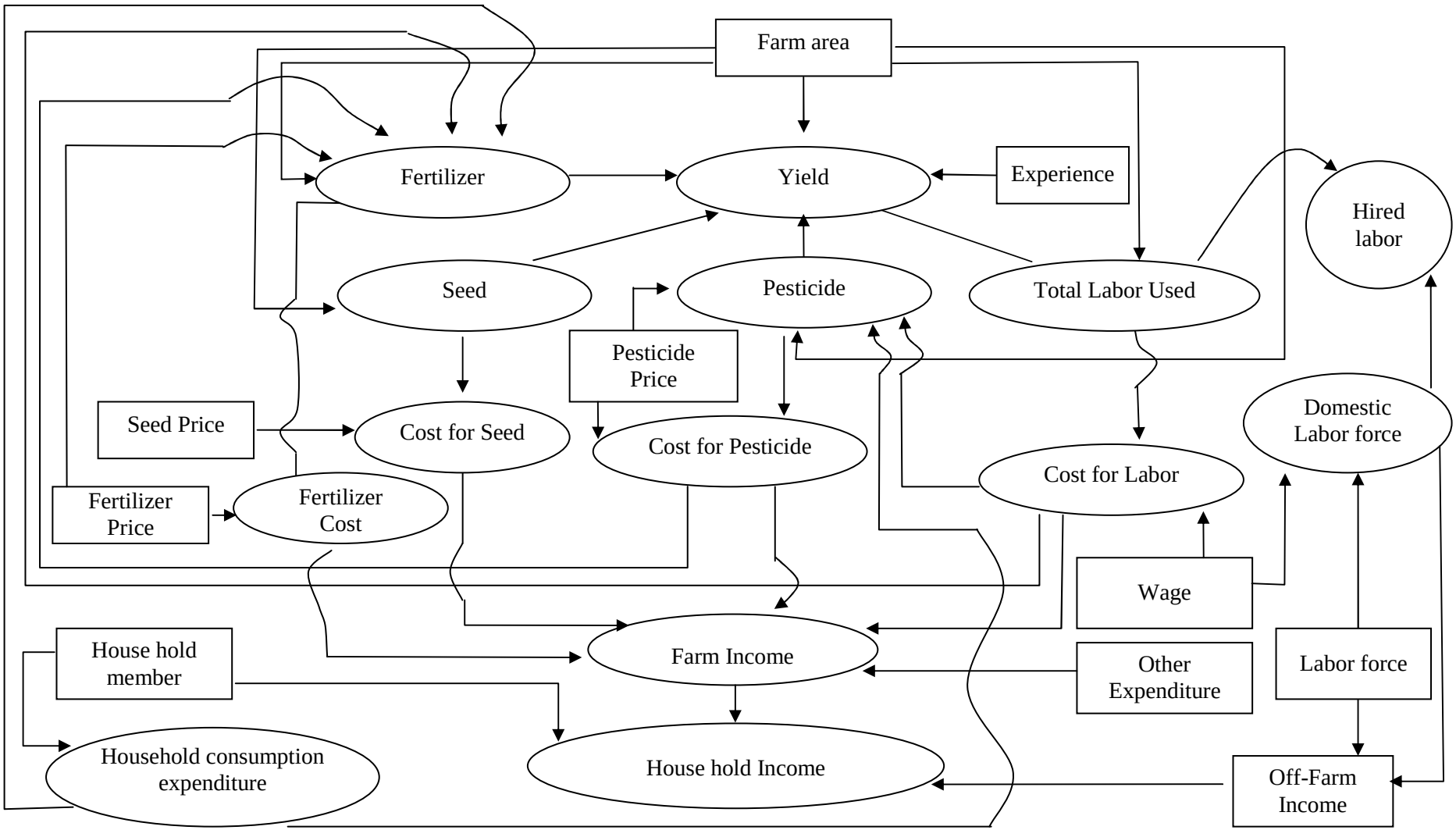
off farm income. Consumption expenditure in this research is treated as exogenous variable which is consist of amount of money spend for food, and non food need such as school tuition fee, health expenses and other daily spending.

Simultaneous interrelationship among variable in the model is presented in Figure 1 while mathematical formulation of those is presented as equation 1 until 13. The Model consists of seven behavioral and six definitional equations.

$$
\begin{aligned}
&(1).\ tkd = a_0 + a_1\, w + a_2\, l + a_3\, ak + \varepsilon_1\\
&(2).\ tkt = b_0 + b_1\, l + \varepsilon_2\\
&(3).\ tkl = tkt - tkd\\
&(4).\ bb = c_0 + c_1\, l + \varepsilon_3\\
&(5).\ pp = d_0 + d_1\, hp + d_2\, (w*tkt) + d_3\, (ho*ob) + d_4\, l + d_5\, ks + \varepsilon_4\\
&(6).\ ob = e_0 + e_1\, ho + e_2\, (w*tkt) + e_3\, l + e_4\, ks + \varepsilon_5\\
&(7).\ btk = tkt*w;\\
&(8).\ bsp = (hb*bb) + (hp*pp) + (ho*ob)\\
&(9).\ bp = btk + bsp + bl;\\
&(10).\ pr = f_0 + f_1\, l + f_2\, bb + f_3\, pp + f_4\, ob + f_5\, tkt + f_6\, pg + \varepsilon_6\\
&(11).\ put = pr - bp\\
&(12).\ prt = put + plt\\
&(13).\ plt = h_0 + h_1\, akl + h_2\, tkd + \varepsilon_7
\end{aligned}
$$

Variable name :

ak	= Number of labor force
akl	= Number of household member
bb	= Amount of seeds used
bl	= Other kind of cost
btk	= labor cost
bp	= Production cost
bsp	= Input cost
hb	= Seed price
ho	= Pesticide price
hp	= Fertilizer price
ks	= amount of consumption expenditure
l	= Farm area cultivated
ob	= Amount of pesticide used
pg	= Farmer experience
plt	= Amount of off farm income
pp	= Amount of Fertilizer used
pr	= Amount of vegetable produced
prt	= Amount of household income
put	= Amount of vegetable farm return
tkd	= Number of household (domestic) labor used
tkl	= Number off hired labor used
tkt	= Total number of labor used
w	= Wage


Farm area
Fertilizer
Yield
Experience
Hired labor
Seed
Pesticide
Total Labor Used
Pesticide Price
Seed Price
Cost for Seed
Cost for Pesticide
Domestic Labor force
Cost for Labor
Fertilizer Price
Fertilizer Cost
Wage
House hold member
Farm Income
Other Expenditure
Labor force
Household consumption expenditure
House hold Income
Off-Farm Income

Data and Model Estimation

This research was undertaken in Ngebrong - Tawangsari village of Pujon District Malang Regency - East Java Indonesia. This location was chosen since it is one of the largest vegetable production centres in East Java. Population unit in this research is vegetable household peasant in Tawangsari Village. Based on the farm area cultivated, it was decided that the number of sample in this research were 19 peasants for household who cultivated equal or more than 0,5 Ha and 55 peasants for smaller size (less than 0,5 Ha) of vegetable farm area.

Model used in this research was constructed in simultaneous equation in form of linear equation. Parameter is estimated by using *Two Stages Least Square* (2SLS) methods. The model accuracy in predicting the relationship between dependent and explanatory variable is judged by coefficient determination (R^2). O*verall test* of the model will be tested by F-test, while parameter significance level will be tested by using t-test.

Furthermore, to evaluate the interrelationship between farmer decision and all factors determinant is analyzed by using simulation methods. As it was suggested by the rule of analysis procedure, before doing simulation, process on validation model has been first undertaken. Model validation is undertaken in order to find out how valid the model could predict the economic real condition. To validate the model in this research is approached by using *Theil's Inequality Coefficient* criteria. U-Theil consists of UM (proportion bias), UR (Variant bias) and UC (covariant bias). UM is the bias that can be used as a systemic failure indicator. This bias practically exposes the bias between average and actual simulation value. UR is the indicator of regression component deviation, while UC Indicator measures the residual component bias. The closer the UM and Ur value to 'zero' and UC value to 'one' the

better the model prediction power is. As it was mentioned before, another indicator that could expose econometric model validity is determination coefficient (R^2).

RESULT AND DISCUSSION

Peasant Household Characteristic

Peasant household in the research location was mainly characterized by small size farm area cultivated and relatively low formal school level. Most of the household sample cultivated less than one hectare of vegetable farm area (Figure 2) while formal eduication experience was at primary school (six year education, Figure 3)

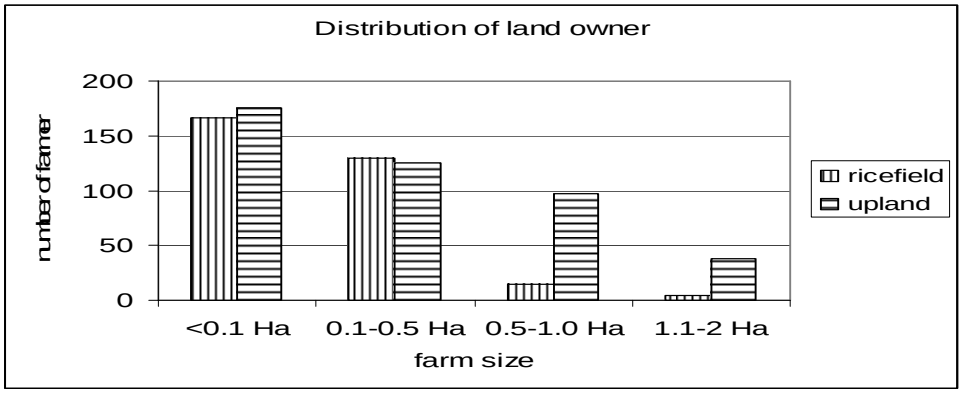


Figure 2. Rice field and dry land occupied by Tawangsari Villager, Pujon District, Malang Regency

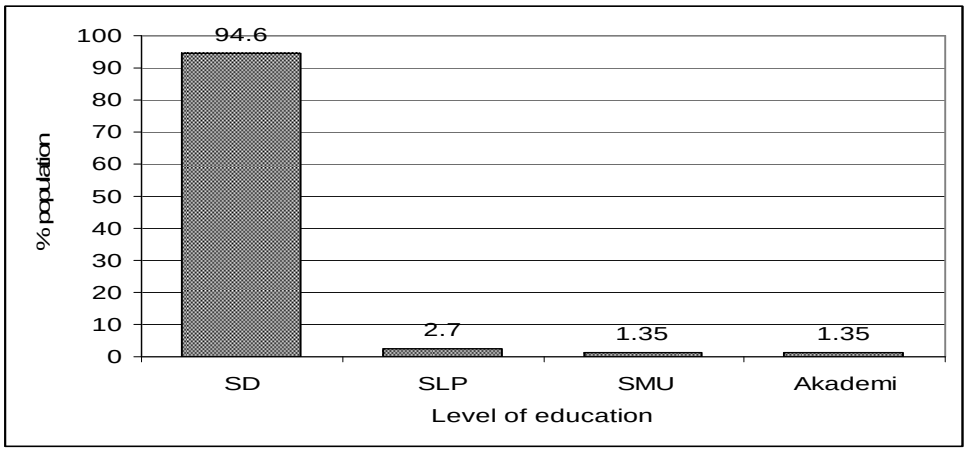


Figure 3. Respondent formal education level in Tawangsari Village Pujon District, Malang Regency, year 2002

Most of the household sample satisfy their labor need in running their vegetable farm area domestically (own household worker, Figure 4). While additional capital sources, in case of they need more money in operating their vegetable farm production, were mainly preserved by reallocating their consumption expenditure and asking for some loan from their own closed family (Figure 5) .

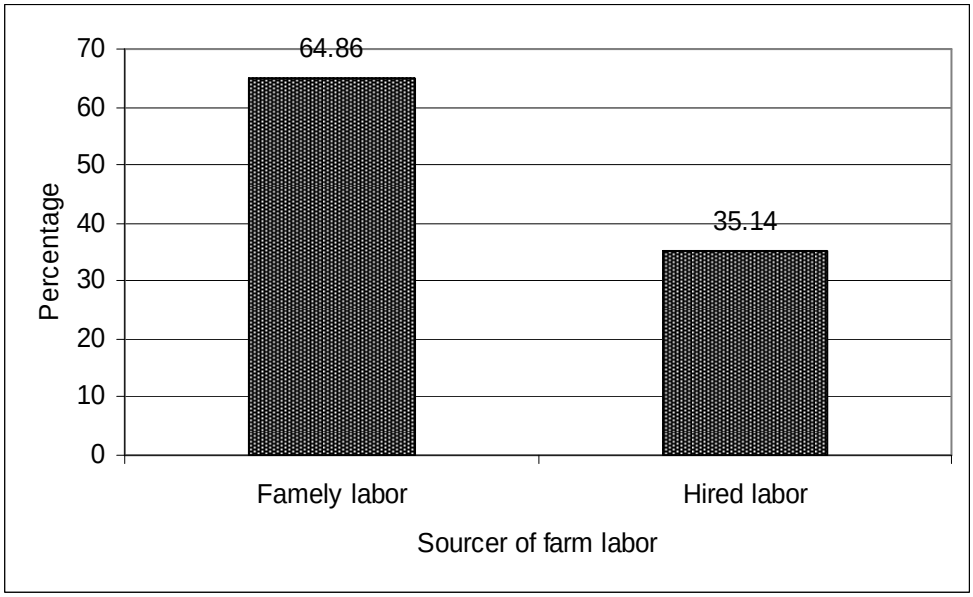


Figure 4. Farm labor resources of vegetable peasant household in Tawangsari Village, Pujon District, Malang Regency

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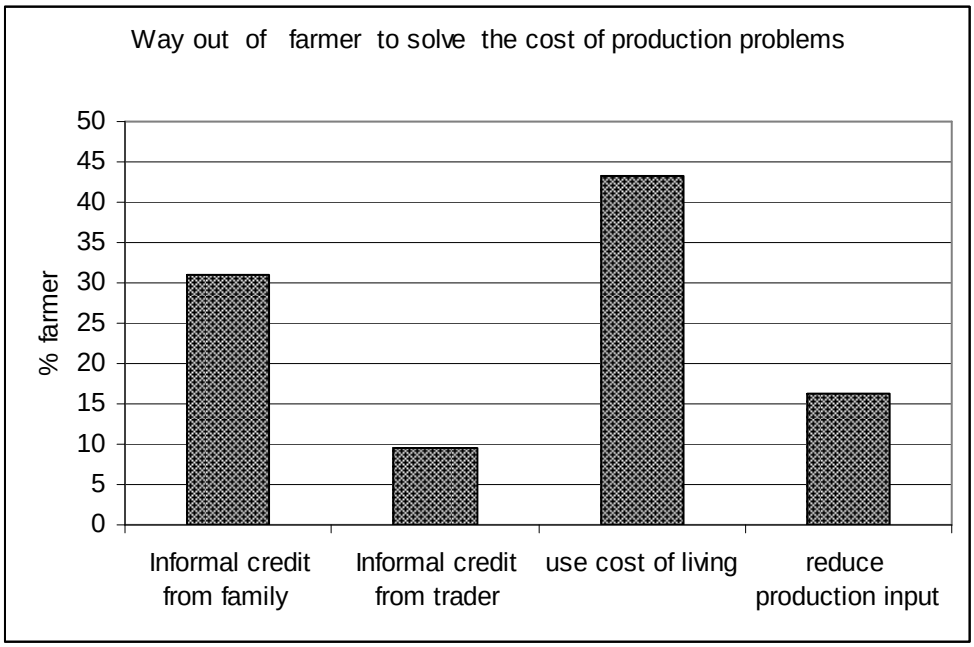


Figure 5. Alternative for additional capital resources taken by vegetable peasant house hold in Tawangsari Village, Pujon District, Malang Regency

Most peasant sold their vegetable commodity directly in the farm gate to some village collecting traders or we call it 'tengkulak tingkat desa' (66,22 percent, Figure 6), and the rest farmer went to local market (9, 46 %0 and collective trader (24.32 %).

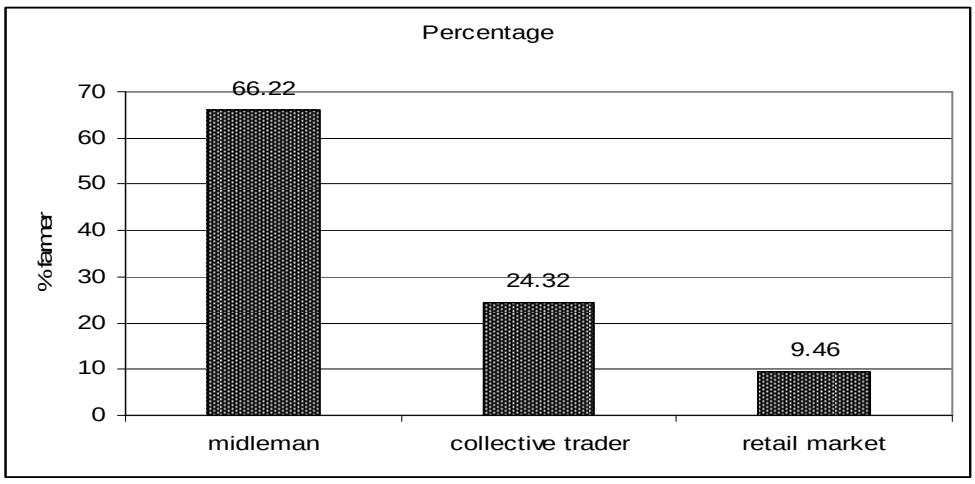


Figure 6. Alternative for vegetable marketed chosen by peasant house hold in Tawangsari Village, Pujon District, Malang Regency

Data showed that the average peasant household income was relatively low. Most of them (66 %) made less than Rp 1 million (approximately US $ 120) a year.

This low income condition, most of the time, makes peasant became un-capable in undertaking their vegetable farm well and traps them in to unique decision making in distributing their income for production activities and satisfying consumption needs. Beside of that, as it is presented in Figure 7, there is a significant positive correlation between household income and farm size area cultivated.

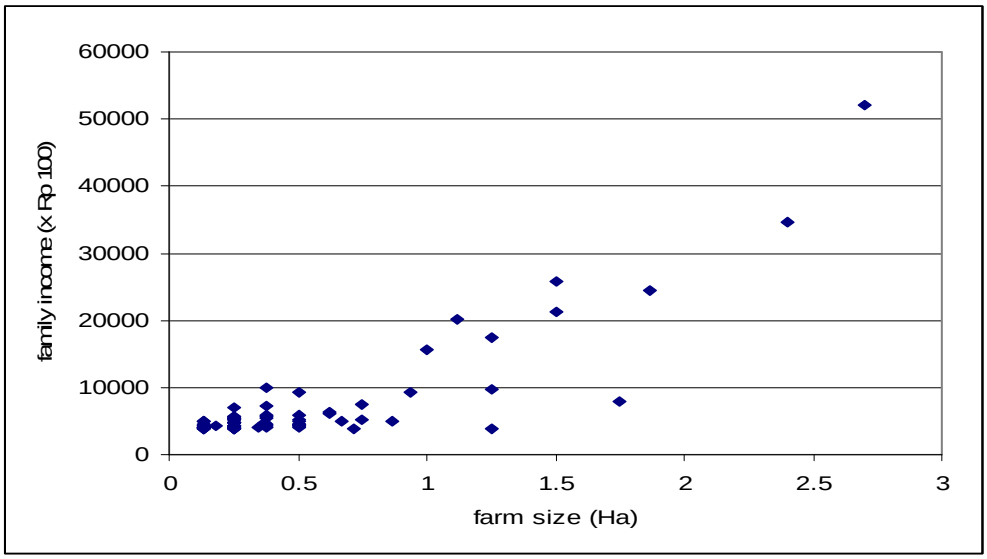


Figure 7. Income distribution of vegetable peasant household in Tawangsari Village, Pujon District, Malang Regency

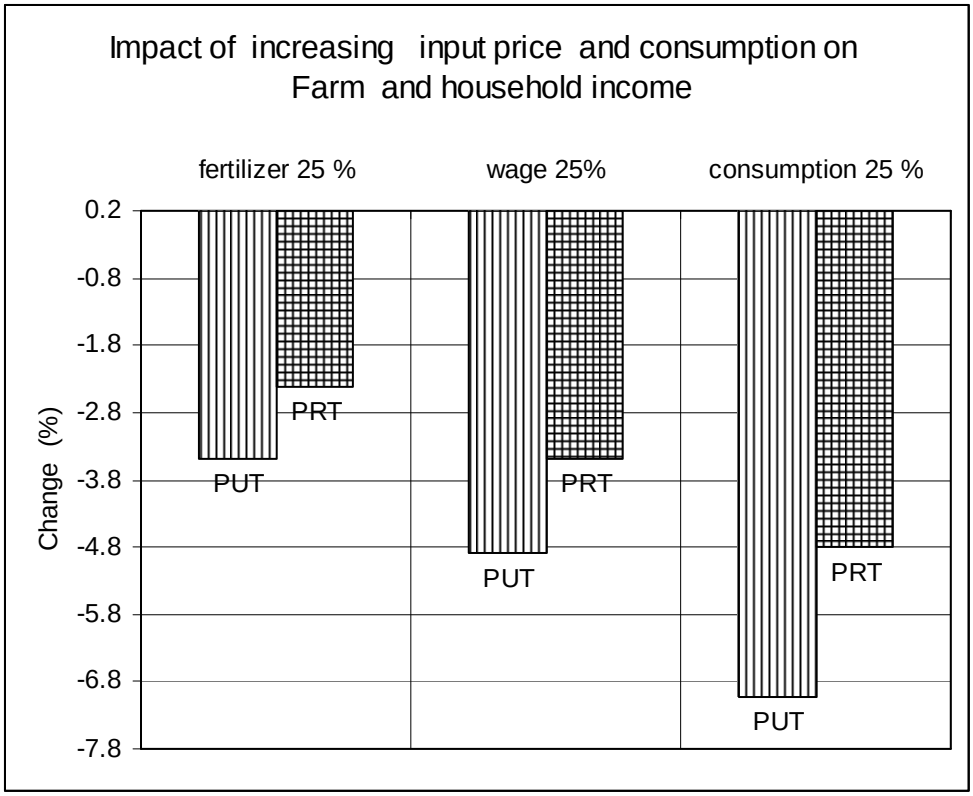
Vegetable Peasant Household Economic Decision

Data analysis, as it was presented in Appendix 1, shows that labor input was positively correlated to farm size area cultivated and the number of domestic labor force. It is also found that most of other production input such as fertilizer, seeds, and pesticide exposed a positive correlation to the farm size cultivated. On the other hand, fertilizer used was negatively affected by consumption expenditure, while pesticide used was not significantly correlated to this variable. This result is some how consistent to descriptive approach done as it was shown in Figure 5 where any additional need to the farm production cost will tend to reduce the household consumption expenditure. Further more it is also found that vegetable farm

production was positively effected by all input used but fertilizer. It is found that fertilizer was not significantly effect the vegetable production rate.

Evaluating the peasant economic model shows that the model has a good predicting power in explaining the relationship between dependent variable and explanatory variable suggested. As it was presented in Appendix 2, the UM and UR value of the model were closed to 'zero' while the value of UC was closed to 'one', though the determination coefficient of the model is relatively small.

Model simulation shows that household consumption expenditure some how more sensitive to the amount of peasant household income (Figure 8). This phenomenon was mainly because of at the higher household consumption expenditure, the amount of money spending on vegetable farm input cost tend to decrease. Lower input used will in its term decrease vegetable farm production. However it is also found that amount of fertilizer used and labor wage do not effect the production significantly but to the input cost. Higher fertilizer used and labor wage were only increased the production cost but not the production rate.



Note: fertilizer 25 % = 25 % increasing in fertilizer price
Wage 25 % = 25 % increasing in labor wage
Consumption 25 % = 25 % increasing in consumption expenditure. Such as for education tuition fee, health expenses and other household daily needs

Figure 8. The effect of fertilizer price, labor wage, and household expenditure increasing on farm production and peasant household income.

CONCLUSION

The research findings show that peasant household decision making is very much affected by consumption expenditure. It is proven by using model simulation that peasant household income was much more affected by consumption expenditure rather than input price variable. This is mainly because whenever peasant household need more money to spend on farm production, then he will reallocated his household consumption expenditure. For this result finding it is argued that the government policy should not only be restricted to the input price subsidy, but also need to be enhanced to support household consumption expenditure.

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Appendix 1. Peasant household econometric model

(1). tkd = 12.236 + 0.708 w + 73.607 l + 26.631 ak
(13.908) (2.043) (11.35) (4.95)
R-Square 0.6226

(2). tkt = -10.853 + 572.642 l
(32.205) (43.096)
R-Square 0.7103

(3). tkl = tkt - tkd

(4). bb = -4.237 + 22.595 l
(2.045) (2.737)
R-Square 0.4862

(5).pp = 3127.097 + 133.606 hp +0.638(w*tkt)+1.348(ho*ob)+ 606.815 l - 0.920 ks
(1272.097) (527.963) (0.164) (0.252) (574.518) (0.323)
R-Square 0.6648

(6). ob =-13.114 + 0.194 ho -0.0007 (w*tkt) + 41.235 l - 0.0005 ks
(20.429) (0.197) (0.003) (8.986) (0.006)
R-Square 0.5867

(7). btk = tkt*w;

(8). bsp = (hb*bb) + hp*pp) +(ho*ob);

(9). bp = btk + bsp + bl;

(10).pr =-2688.55 +7381.467 l + 105.75 bb + 0.29 pp + 125.35 ob +14.73 tkt + 11.31 pg
(904.54) (1814.236) (41.05) (0.85) (43.424) (3.10) (30.83)
R-Square 0.9420

(11).put = pr - bp;

(12). prt = put + plt;

(13).plt = 2242.97 + 813.22 akl - 25.56 tkd
(352.62) (127.526) (3.01)
R-Square 0.5045

Note : number on brackets (...) shows the standard deviation value

Appendix 2. Statistic of fit

Variable	actual	predicted	R-Square	(UM)	(UR)	(UC)
TKD	122.1189	122.1191	0.6226	0.000	0.000	0.882
TKL	172.6176	172.6171	0.6482	0.000	0.001	0.911
TKT	294.7365	294.7362	0.7103	0.000	0.000	0.915
BB	7.8203	7.8203	0.4862	0.000	0.000	0.822
PP	650.8838	503.3747	0.6502	0.032	0.240	0.901
OB	9.5378	9.6680	0.5952	0.000	0.000	0.866
BTK	1359	1166	0.7595	0.030	0.000	0.914
BSP	1628	1628	1.0000	0.000	0.000	0.000
BP	2998	2805	0.9589	0.030	0.001	0.954
PR	8077	8050	0.8393	0.000	0.000	0.956
PUT	5079	5245	0.6672	0.001	0.030	0.981
PRT	7486	7652	0.5892	0.001	0.034	0.972
PLT	2407	2407	0.2385	0.000	0.224	0.996