The Impact of Input and Output Prices on The Household Economic Behavior of Rice- Livestock Integrated Farming System (RLIFS) and Non RLIFS Farmers

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Abstract. Integrated farming system is a system that emphasized linkages and synergism of farming units waste utilization. The objective of the study was to analyze the impact of input and output prices on both Rice Livestock Integrated Farming System (RLIFS) and non RLIFS farmers. The study used econometric model in the form of a simultaneous equations system consisted of 36 equations (18 behavior and 18 identity equations). The impact of changes in some variables was obtained through simulation of input and output prices on simultaneous equations. The results showed that the price increasing of the seed, SP-36, urea, medication/vitamins, manure, bran, straw had negative impact on production of the rice, cow, manure, bran, straw and household income. The decrease in the rice and cow production, production input usage, allocation of family labor, rice and cow business income was greater in RLIFS than non RLIFS farmers. The impact of rising rice and cow cattle prices in the two groups of farmers was not too much different because (1) farming waste wasn’t used effectively (2) manure and straw had small proportion of production costs. The increase of input and output price didn’t have impact on production costs and household expenditures on RLIFS.

1. Introduction

1.1. Background an Issues

The contraction of the rice field area requires an agricultural technology that is able to encourage the production increasing without having to increase land area. Intensification of agricultural systems is appropriate to resolve the issue. The problems arise when the use of chemical inputs is disproportionate that causes degradation of soil fertility and declined the income of farmers (Ashby, 2001). Soil fertility improvement requires a systematic and gradual effort in reducing the use of high external input with low external input. One of the efforts in addressing these problems was the implementation of an integrated farming system. Integrated farming system is a system that emphasized the existence of linkages and synergism of several units of farming (crops, livestock, fisheries and plantations) through the utilization of farming waste from each unit of farming that aims to increase production (Maudi and Kusnadi, 2011). Integrated farming system is capable of restoring the fertility of the soil and stabilize the incomes of farming (Lightfoot and Minnick, 1991). Rice- livestock integrated farming system (RLIFS) is an environmentally friendly technology and appropriately done for several reasons; (1) support the nature which the integration used the concept of zero waste that minimize waste by recycling process, (2) minimize the use of chemical inputs.

Integrated farming system is one of the farming system that has been developed particularly in the developing countries that the people still rely on agriculture as a source of household income. The implementation of an integrated farming system generally has a positive and negative impact. Some studies showed the positive impact of integrated farming system and applied in several countries such
as Indonesia, Philippine, Thailand, Vietnam, Nigeria, Bangladesh and India. Integrated farming system gave positive impact and was able to increase production and income significantly (Channabasavana et al, 2007; Priyanti, 2007; Prayitno, 2009; Nageswaran, 2009; Jayanthi et al, 2009; Ugwumba et al, 2010). Integrated farming system gave negative impact which the efficiency of labor and capital usage on the Minapadi farming system was lower than the farming of rice monoculture (Dwiyana and Mendoza, 2006). The study by Handayani (2009) showed that the integrated farming system positively impact like rice-cocoa-livestock program at Donggala, Indonesia. This is due to the availability of cocoa rind as the raw material was very low caused by the pests stricken and the difficulty of obtaining probiotics for the making of animal feed (Handayani, 2009). The study at Zhujian River delta, China suggested that the integrated farming system of sugar cane farming, fisheries, mulberry leaves and silkworm gave negative impact on farmers’ profit. The low availability of input was low, causing high production costs so the profit became smaller (Ruddle and Zhong, 1988).

Based on the varying results from integrated farming research in some areas that requires a detailed analysis about what kind of factors that affect rice-livestock integrated farming system in particular the farmers’ household economic behavior and then analyze the impact of input and output prices on both Rice Livestock Integrated Farming System (RLIFS) and non RLIFS farmers.

2. Methodology
2.1. Location and Method of Samples Determination
The research conducted in West Java Province as one of the provinces that ever implemented rice-livestock integrated farming system development program from Indonesia government. Based on surveys and information from a related department, there were selected three districts consisted of Subang, Sumedang and Tasikmalaya which were representative enough particularly of the characteristics of respondents. The sub-district and village samples were determined using a purposive method based on (1) rice production centers, (2) livestock population centers. The sample of this study was the Rice-Livestock Integrated Farming System (RLIFS) and non RLIFS farmers. Based on the sampling frame, the sample households were determined using a simple random technique. The number of samples was 199 farmers consisted of 134 RLIFS farmers and 65 non RLIFS farmers.

2.2. Types of Data
The types of data were cross sectional and time series data, while the data source were primary and secondary data. Primary data were obtained through direct interviews with respondents, whereas secondary data were obtained from the Bureau of Statistics Center (BPS) in West Java, Department of agriculture and animal husbandry, district or sub district as well as the village, the results of the study, related publications and references.

2.3. Analysis Methods
The analysis method used econometric model in the form of a simultaneous equations system consisted of 36 equations (18 behavior equations and 18 identity equations). The impact of changes in some variables was obtained through simulation of input and output prices increases by 10%. Before the model was simulated, validation was performed to check whether the alleged model could reflect reality well. Validation aims to determine the extent to which the estimated value of the model approaches the actual situation. Size used in validation of this research was Root Mean Square Percent Error (RMSPE) and U-Theil statistics. The smaller the error, the better built model. If the statistical value is close to zero then the model simulation is considered to explain the actual data (Sitepu and Sinaga, 2006).

3. Result And Discussions
3.1. Specification Model of The Simultaneous Equation
The simultaneous equation model is a model specification of a problem as a system of equations. Model specification is an important step so it needs to be done precisely and carefully in order to obtain an appropriate model before the model estimation. The simultaneous equation model must also be checked in advance of the model identification requirements. The requirement is also called the order conditions obtained by calculating the variables in one particular equation by the following procedure (Koutsoyiannis, 1977):

Underidentified: \((K - M) < (G - 1)\)
Exactly identified: \((K - M) = (G - 1)\)
Overidentified: \((K - M) > (G - 1)\)

The total number of variables in the model \((K)\) of 77 variables consisted of 36 endogenous and exogenous variables of 41. The number of endogenous and exogenous variables belonging to a given equation in model \((M)\) of 6 and the total equations in model \((G)\). Endogenous variables in the model of 36 (Appendix 1). So the structural equation based on the order condition was required to be overidentified and therefore the parameter estimation method using the 2SLS method. The use of the 2SLS method avoided the simultaneous equation of bias, which basically suspects a system of simultaneous equations by forecasting any partial structural equations (Koutsoyiannis 1977). Analysis in this research using Statistical Analysis System / Econometric Time Series (SAS / ETS) 9.1 for Windows.

3.2. Validation of Farmer Household Economy Model
Validation is the stage that must be done before the simulation. Validation aims to determine the extent to which the estimated value of the model approaches the actual situation. Validation results in RMSPE size (Appendix 2) showed good results because of 22 endogenous variables in both groups of farmers yielding values below 100%. However, this quantity has not been able to provide guidance in the use of the model because there were still other criteria that was often used in validation i.e. the coefficient U-Theil. The validation results using U-Theil in this study using the minimum and maximum quantities and benchmarks of certain numbers, namely ≤ 0.50 (Kusnadi, 2005). There were 36 endogenous variables measured, 26 endogenous variables have a coefficient of U-Theil ≤ 0.50. The coefficient value of U-Theil ranges from 0.00 to 1.00 so that the validation results showed the goodness of the model was quite large.

Decomposition of U-Theil values showed more detailed validation results as presented (Appendix 3) Both groups of farmers who had UM ≤ 0.10 as many as 24 and 21 endogenous variables so that in general the model is quite good. The US criteria (variance proportions) indicate the model's ability to replace variations of the dependent variable. The result of model validation evaluation using US criterion showed that in household economic model from both farmers there were only 7 and 11 endogenous variables that met the standard ≤ 0.10. This was because this research used cross section data, so the data variation did not have a certain pattern. Then the UC criteria (covariance proportion) of the model indicated to both farmers there are 17 and 15 of 36 equations close to 1 so the model was said to be not good enough because the simulation error was less randomly fluctuated. Based on the criteria developed, it could be assessed that the overall model validation results were less satisfactory, mainly in US and UC criteria. Nevertheless, there were some fairly good assessment criteria, such as the UM coefficient, RMSPE and U-Theil coefficients.

3.3. The Impact of Input and Output Price Changes on Household Economics
The simulation was done to see the impact of changes that occur when there are fluctuations in market prices and by the government. The simulation of rising input and output prices and wage increases is as done in 2 parts i.e simulation on input price output price. In integrated cattle-paddy farming system, the use of production input included the use of rice seed, the price of SP-36 fertilizer, urea, bran, straw, manure, medications and livestock vitamin. The input price simulations were performed with two scenarios, namely: (1) Increase in input price of rice-cow cattle production included the price of rice seed, SP-36 fertilizer, urea, medications and livestock vitamin, manure by 10%. (2) The wage increase of 10%. The output in integrated farming consisted of rice and cow cattle production so that at the output price was simulated with two scenarios, namely: (3) Increase in grain price by 10%, (4) increase in cow cattle price by 10%

3.3.1. The Impact of Input Price Increase
The policy of input price increase affected the economic activities of integrated household of rice-livestock farming i.e production activities, input use, labor, and income. The increase of input price of rice-livestock production included the price of rice seed, SP-36 fertilizer, urea, medications and vitamins for livestock, manure, rice bran and straw by 10% (scenario 1) impacted the decrease of all production on integrated farming (Table 1). The decrease of rice production was greater in non RLIFS farmers by 0.05% compared with non RLIFS farmers by 0.02%
The policy of input price increase had a decreasing effect on the manure produced by 4.32% on the RLIFS farmers. Farmers kept doing manure processing as usual because of low dependence on external inputs. Meanwhile, the non RLIFS farmers, the increase of input price had no impact on the production of manure. The non RLIFS farmers did not produce manure due to several things, namely (1) labor shortage to process the cow crap into manure, (2) difficulty in transporting manure rice fields, and (3) the availability of chemical fertilizers was quite easy to obtain.

Table 1 The Impact of Input Price and Wage Increase

| Endogen Variables | Scenario 1 | Scenario 2 |
|-------------------|------------|------------|
|                   | RLIFS Farmers | non RLIFS Farmers | RLIFS Farmers | non RLIFS Farmers |
| PRUP              | -0.0352     | -0.0714    | 0.1409       | 0.1429           |
| POSA              | -4.3181     | -11.2117   | -0.0284      | -0.0547          |
| PRPK              | -12.1326    | -13.2392   | -11.0356     | -12.3631         |
| PRJS              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| JLBK              | -0.0861     | -0.1233    | 0.0000       | 0.0000           |
| JLPJ              | 0.0002      | 0.0205     | -0.0659      | -0.0758          |
| TPDP              | -1.7300     | -1.7321    | 1.6513       | 1.6510           |
| TWDP              | -1.0765     | -1.0838    | 17.1384      | 17.4618          |
| TPDS              | 0.4969      | 0.4720     | 2.4845       | 2.3599           |
| TWDS              | -0.0060     | -0.0123    | 74.5385      | 73.2225          |
| TPLP              | -0.6582     | -0.7073    | -4.1325      | -4.4277          |
| TWLP              | -2.3194     | -1.9973    | -12.8755     | -11.0994         |
| JTDP              | -1.4235     | -1.4304    | 8.9143       | 8.9852           |
| JTLJ              | -1.6243     | -1.5255    | -9.2155      | -8.6078          |
| JTUS              | 0.4459      | 0.4785     | 9.8662       | 9.4099           |
| JTUP              | -1.4749     | -1.4563    | 4.2581       | 4.2065           |
| BYSP              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| BYSS              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| PNUP              | -0.0263     | -0.0575    | 0.1931       | 0.2017           |
| PDUP              | -0.0203     | -0.0456    | 0.1491       | 0.1599           |
| PNUS              | -0.0207     | -0.0435    | 0.1514       | 0.1527           |
| PDUS              | -0.0748     | -0.1336    | 0.5482       | 0.4691           |
| PUTS              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| PJDTR             | -3.0531     | -2.7828    | 4.7387       | 4.6906           |
| PDSTD             | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| KSBS              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| KSGP              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| KSNP              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| IVSD              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| TABN              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| KSTL              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| JVTL              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |
| PGTR              | 0.0000      | 0.0000     | 0.0000       | 0.0000           |

The use of inputs of rice and cow cattle production has decreased due to the increase in input prices of production in scenario 1. The use of production inputs such as rice seeds, SP-36 fertilizer, straw, grass and the use of livestock medications and vitamins decreased greater for the non RLIFS farmers than the RLIFS farmers. The larger decrease was seen in the use of rice seed and urea fertilizer ie 13.2% and 12.4% for the non RLIFS farmers compared to the RLIFS farmers that was 12.1% and 11%. Increased input prices such as urea fertilizers had less responsive impact on the RLIFS farmers (11%) with reduced use of urea as compared to the non RLIFS farmers (12%). This was because the RLIFS farmers had an alternative use of manure as a result of their own processing. Increase in input prices
such as urea fertilizer gave a greater impact to the non RLIFS farmers than the RLIFS farmers.

Increased input prices such as rice seeds had a less responsive impact on the RLIFS farmers (12%) with reduced use of rice seed compared with the non RLIFS farmers (13%). The RLIFS farmers are generally open minded farmers and always receive innovation and apply new technology. This could be seen from the application of integrated farming system conducted by the RLIFS farmers. The use of new technology in agriculture with less use of rice seeds in integrated farming system caused less responsive farmers in responding to rising rice seed prices.

The increase in input prices, especially those related to inputs that were the integration factors such as the manure, bran and fresh straw had no impact on production costs of rice and cow cattle farming. The use of straw as animal feed did not have a good impact on the RLIFS and non RLIFS farmers. The inputs of the straw, manure and bran were inputs derived from household wastes which obtained at low prices and generally were also obtained freely, so that the increase in input prices had no impact on production costs of farming. But the increase in input prices had an impact on the decline in medications and vitamin livestock use. This decrease was quite small in both RLIFS and non RLIFS groups, which was 0.086% and 0.12% respectively. The non RLIFS farmers had relatively larger numbers of livestock than RLIFS farmers, so the increase in input prices had a significant impact on the decline in in medications and vitamin livestock use.

The increase in input price includes the price of rice seed, SP-36 fertilizer, urea fertilizer, medications and vitamin livestock in general became obstacle in increasing farmer's income. The increase of input prices had a decreasing impact on the income of rice and cow cattle farming in both groups of the RLIFS and non RLIFS farmers. The decrease in income of both rice and cow cattle farming was responded greater by the non RLIFS farmers 0.05% and 0.13% while the RLIFS farmers responded by 0.02% and 0.08% respectively. Decrease in income was not too large between the two farmer groups. This was because both groups of farmers had a land area that was not too much different that was 0.190 and 0.165 Ha and the number of cattle production 1.058 and 1.057. Meanwhile, input price increase (scenario 1) did not affect the production cost in the two groups of farmers due to differentiation factors ie integrated rice farming inputs such as straw and manure could be obtained at a low price.

3.3.2. The Impact of Wage Increase

The production input in scenario 2 was the labor which included labor in rice and cow cattle farming. The increase in the wage of labor affected the decision of the farm household in the allocation of family labor (internal labor) and the demand for outside family labor (external labor). The wage increases had a positive impact on both groups of both RLIFS and non RLIFS farmers. The negative impacts were seen in the use of outside labor and the amount of fresh straw used as animal feed.

The wage increases had a positive impact on increasing rice production, production of manure and the amount of fresh straw produced by farmers in each farmer group. Both farmers gave almost equal response values to both farmer groups, but the non RLIFS farmers were slightly more responsive than the RLIFS farmers. This was because the non RLIFS farmers had a smaller land area so that the wage increases were responded by reducing the use of agricultural inputs (production inputs) and external labor. Table 1 showed the labor cost of the non RLIFS farmers was relatively lower than the RLIFS farmers. The production cost efficiency lead to a positive and more responsive wage increase in rice income for the non RLIFS farmers. The wage increases have a positive and more responsive impact on the cow cattle farming income for the RLIFS farmer. But for the total household income, the positive and more responsive impacts were shown by the RLIFS farmers.

The wage increase by 10% caused farm households to increase their labor time outpouring in both cow cattle farming and other farming businesses and reduce their outpouring to non-farm businesses. The wage increases also encouraged the farmers to reduce the demand for external labor. The behavior of farm households in demand for external labor for other farms, behaved differently when there was a change in wages. In the case of an increase in wages, the demand for the first off-shore workforce was female labor. This was because the number of female labor greater than men in a type of work on the farming. The Household reactions are always rational, that was when wages increased then households would add to the internal labor outpouring for farming, and reduce the demand for external labor. The wage increase by 10% did not have an impact on all expenditures. The farm households in the study area were farmers with an average age of 49 years which they had a small number of family dependents so that farmers' expenditures were not too large for consumption. This caused wage increases to have
no impact on spending.

3.3.3. The Impact of Rice Price Increase
There were two main products that produce in rice-livestock integrated farming system. They were grain production and cow cattle production. In this section simulations were done with two scenarios, namely: (3) Increase in the grain price by 10% and (4) Increase in the cow price by 10%. Furthermore, the increase in the price of grain and cow were called scenario 3 and 4.

The policy of increase in the grain price (scenario 3) affected the economic activities of integrated households of rice-cow cattle farming ie the production, the use of inputs and the use of labor and income. The increase in the price of grain had a positive impact on increasing the cow cattle production, the manure production, the demand for bran, The cow cattle farming labor and the income. But the increase in grain prices had a negative impact on the rice production, the fresh straw production, the demand and use of external labor and total household income.

Table 2. The Impact of Output Prices Increase

| Endogenous Variables | Scenario 3 RLIFS Farmers | Scenario 3 non RLIFS Farmers | Scenario 4 RLIFS Farmers | Scenario 4 non RLIFS Farmers |
|----------------------|--------------------------|-----------------------------|--------------------------|-----------------------------|
| PRUP                 | -0.0871                   | -0.0870                     | 0.1216                   | 0.1249                      |
| POSA                 | 0.0032                    | 0.0032                      | -0.0046                  | -0.0046                     |
| PRPK                 | 0.0027                    | 0.0023                      | -0.0038                  | -0.0033                     |
| PRJS                 | -0.0870                   | -0.0870                     | 0.1217                   | 0.1248                      |
| JLPB                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| JLPJ                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| JLS                  | 0.0295                    | 0.0326                      | -0.0412                  | -0.0469                     |
| TPDP                 | 0.0000                    | 0.0000                      | 0.0001                   | 0.0001                      |
| TWDP                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| TPDS                 | 0.0006                    | 0.0006                      | -0.0006                  | -0.0006                     |
| TWDS                 | 0.0010                    | 0.0009                      | -0.0014                  | -0.0013                     |
| TPLP                 | -0.0001                   | 0.0000                      | 0.0001                   | 0.0001                      |
| TWLP                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| JTDP                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| JTLP                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| JTUS                 | 0.0006                    | 0.0005                      | -0.0011                  | -0.0005                     |
| JTUP                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| BYSP                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| BYSS                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| PNUP                 | 0.0042                    | 0.0043                      | 0.1210                   | 0.1252                      |
| PDUP                 | 0.0033                    | 0.0034                      | 0.0934                   | 0.0993                      |
| PNUS                 | 0.0033                    | 0.0033                      | 0.0949                   | 0.0948                      |
| PDUS                 | 0.0120                    | 0.0100                      | 0.3434                   | 0.2913                      |
| PUTS                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| PDRP                 | -0.0602                   | -0.0578                     | 0.0843                   | 0.0830                      |
| PDTR                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| KSBS                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| KSPG                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| KSNP                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| IVSD                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| TABN                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| KSTL                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| IVTL                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
| PGTR                 | 0.000                     | 0.000                       | 0.000                    | 0.000                       |
The increase in grain prices had a negative impact on rice production. Increasing rice production in the research area was difficult due to: (1) the average land area of rice cow cattle farming under 0.2 Ha (subsistence), (2) location of rice farming in hilly topography area and (3) planting season in certain area that can only one time planting season in subdistrict area like Cisalak (Subang), Tanjungmedar and Tanjungkerta (Sumedang). So that the increase of grain price had a negative impact on both RLIFS and non RLIFS farmer groups. The impact of decreased rice production was followed by decreased straw production. This straw decline eventually encouraged the farmers to collect straw from outside their own farming as it was needed as a feed for livestock.

The increase in grain prices had no impact on demand for rice seed and urea fertilizer. The development of rice cultivation technology is primarily the use of the right superior seed, reduce the use of inorganic fertilizers and maximize the use of organic fertilizer. The negative impact due to increase in grain price was the decrease of labor usage in cow cattle farming. Decreasing rice production made farmers maximize the outpouring of internal labor on rice farming and reducing labor outpours in livestock business. Reducing external labor the family was done to reduce production costs.

The increase in grain prices had no impact on farmers’ expenditure. The average farmer in the study area was the less productive farmers with the age range of 49 years and even more. The need for consumption and investment was quite small that could be seen on the average number of school children i.e. 0.8 people and 3.5 family members. In addition, the small land area did not make the farmers could not enjoy a considerable profit if the increase in grain prices in the range of 10%. Many factors influence: farmers are subsistence, grain quality and harvest time.

The increase in the price of grain had a positive impact on the income of rice farming and cow cattle farming. The authors agreed on several aspects of Heatubun’s (2001) research that was integrated/multicommodity farming system could increase farm income according to local agro ecosystem. The scale of business and production of each business is inelastic to the price variable. Food crops were less market-oriented and more subsistent. However, the research results of Lindawati in West Java province in 2013 (Subang Regency, Sumedang, Tasikmalaya) that integrated farming system of paddy-cattle had not been able to increase expenditure which is an indicator of welfare. Several aspects of other authors were also approved, among others, Sawit (1993) states that the increase in rice prices would increase family income, employment, and the amount of rice sold in the market. Absorption of labor in integrated farming system of rice-cow cattle was derived from the labor of cow cattle farming in farmer’s household.

The policy of raising the price of live cattle (scenario 4) had a negative impact on cattle production, production of manure, the amount of bran demand, the labor of cow cattle business and income. But the increase of cow cattle prices had a positive impact on rice production, fresh straw production, demand and use of external labor and total household income.

The increase in the prices of cow cattle had a negative impact on cow cattle production. The increase in the prices of cow cattle was generally enjoyed for large investors. The conditions of the control of the farmers' resources in the study sites were (1) the average ownership of rice fields below 0.2 Ha (subsistence farmers), (2) the average cattle ownership of 2.35 animals (equivalent to 1.42 livestock units). The conditions of the location of the study area were (1) some farmers had two planting seasons and the others were only one planting season due to the hilly topography condition, (2) the cattle business was done to sustain the need if needed sometime. This condition caused most farmers selling their cows in times of need with unprofitable price situations. Thus, the increase of cow cattle prices was rarely enjoyed by subsistence farmers of integrated rice-cow cattle farming. The cow maintenance was relatively simple because it was done independently by farmers such as feed that only rely on straw, grass and bran causing cow cattle did not have the maximum weight. The impact of declining cattle production is followed by declining production of manure.

The negative impact of the increase in cow cattle prices was the decline in the use of labor in cow cattle business. The decreased cattle production enabled farmers to maximize the outpouring of internal labor on rice farming and reducing labor outpours on livestock business. This causing the production of rice and straw increased.

The increase in the price of grain had a positive impact on the income of rice farming and cow cattle farming/business and the total income of households. Table 2 could be seen that the impact of 10% grain price increase on both groups of farmers influenced some economic variables of production and income.
blocks. Most of the impact of this increase in cow cattle price approves some aspects of Kusnadi (2005) which stated that the effect of the increase in output prices in general leads to an increase almost all household economic variables on farming activities.

4. Conclusions And Policy Implications

4.1. Conclusions

1. The increase in price of seed input, SP-36 fertilizer price, price of urea fertilizer and livestock / vitamins, price of manure, bran price and straw price negatively affect rice production, cattle production, manure production, straw production, and income
2. The wage increases had a positive impact on manure, bran, straw on the allocation of cow cattle and labor labor in the family of rice farming, total income and expenditure of integrated cattle-paddy farming. Wage increases have a negative impact on the allocation of labor outside the family of rice farming.
3. The increase in rice paddy price has a positive impact on cow production, manure production, bran amount, straw amount, internal labor, rice farming income and cow cattle business income. The increase in rice prices had a negative impact on rice production, straw production and the allocation of male external labor of rice farming and total household income.
4. The increase in cow cattle prices had a positive impact on rice production, straw, the labor allocation of internal and external of rice farming and total household income. The increase in cow cattle prices negatively impacted cow cattle production, production of manure, the amount of bran demand, the amount of straw used and the labor allocation of cow cattle business.
5. The increase in production inputs, wages, rice paddy prices and live cattle prices by 10% did not have an impact on production costs and household expenditures on rice- cow cattle integrated farming system.

4.2. Policy Implications and Advanced Research

1. The results showed that the production of manure was carried out independently and has not been managed properly and optimally. Production of manure was used to meet the needs of fertilizer itself or subsistence. Need further research on institutional integrated farming. Preliminary observations indicate that the production of manure was quite good and the number was quite large if managed in a farmer group.
2. An integrated farming system of rice-livestock can be an alternative government policy to be developed in the countryside but a comprehensive concern is needed regarding the influence of external factors affecting the sustainability of the integrated farming system.

4. Appendices

- **Appendix A.** Endogenous Variables and Examples of validation programs Economic Model of Integrated Farming of Rice-Cow Cattle, prosedur PROC SIMNLIN, SAS versi 9.0
- **Appendix B.** RMSPE and U-Theil coefficients of household economic model RLIFS Farmers and non RLIFS Farmers
- **Appendix C.** Model validation (UM, US and UC) Economy Farm households

5. References

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