

# Factor Endowment of Dairy and Non-Dairy Farmers in Banyumas Region

(Faktor Pendukung Usaha yang Dimiliki Peternak dan Non-Peternak Sapi Perah di Kabupaten Banyumas)

Novie Andri Setianto<sup>1)</sup>, Manfred Zeller<sup>2)</sup> and John Michael King<sup>3)</sup>

<sup>1)</sup>*Faculty of Animal Science, Jenderal Soedirman University*

<sup>2)</sup>*Institute of Rural Development, Goettingen Universitaet*

<sup>3)</sup>*Institute of Animal Production, Goettingen Universitaet*

---

## Abstrak

Penelitian ini dilakukan untuk mengetahui kondisi faktor pendukung usaha oleh peternak sapi perah pada tiga tipe rumah tangga petani-peternak, yakni petani-peternak yang memiliki skala usaha sapi perah yang kecil, yang lebih besar, dan yang tidak memiliki sapi perah. Pengumpulan data menggunakan metode survey pada delapan desa terpilih, kemudian 80 responden dipilih secara acak sebagai sample yang berasal dari kedelapan desa tersebut. Data yang terkumpul dianalisis menggunakan analisis deskriptif. Hasil penelitian menunjukkan bahwa nilai *paddy-land* ratio lebih tinggi pada petani-peternak sapi perah. Meskipun jumlah pemilikan lahan sama, namun petani yang tidak memiliki sapi perah memiliki lahan padi yang lebih luas. Peternak yang memiliki sapi perah lebih banyak, menggunakan tenaga kerja keluarga yang lebih banyak pula.

**Kata Kunci:** Sapi Perah, Faktor Pendukung, Peternakan Rakyat, Banyumas

---

## Introduction

In agrarian societies, agriculture is, by definition, the most important economic sector and the basis for satisfying the people's material needs. The entire societal structure is based on agriculture (Manig, 1993). Livestock farming plays an important role in agricultural development (Birner, 1999). Karunaratne and Wagstaff (1985) reported that livestock are of almost universal importance in rural economies.

Milk is one of the high quality livestock product which is produced by dairy livestock (Webster, 1993). In Indonesia, milk is produced mainly from dairy cattle. Most of dairy cattle farmers in Indonesia are small holder farmers. They own 2-5 heads of cattle, which are on average looked after by family member who does not have high formal education level. Dairying is a secondary activity to their main activities in the agricultural sector (mainly paddy production). These condition will constrain the optimal level of milk production and may not contribute much to the farmers income. However, Karunaratne and

Wagstaff (1985) stated that despite low yields per animal compared with industrialised countries, livestock contribute a substantial proportion of the real incomes of many rural households. Given that the household is the production unit, a farm may be defined as all the agricultural activities under the control of the household members (Upton, 1996).

Dairy cattle farming is labour intensive (De Boer, 1999). Labour is needed for feeding, management, and especially for daily milking activities. This condition then lead into a question, are there any differences in the family composition between household with and without dairy farming activities. And since farmers live in the same area with the similar socio-economic situation, is labour the main constraint in the adoption of dairy activities in this area?

Commonly, dairy farmers with more cows have a better situation. Compared to smaller farmers, dairy farmers with more cows feed their animals with better forages and concentrates. Regarding that dairy is a labour intensive activity, more cows means

more labour requirement. It is also lead into question, are there any differences in labour availability between larger and smaller dairy herds. And if not, how larger farmer manage the shortcoming of labour requirements?

The study is aimed to provide data on family composition of smallholder dairy cattle farmers, especially on their land, labour and capital resources endowment and to compare it with farmers without those activity. These data can be important for the extension agent, because different condition between farmers types also requires different approach. Also extension agent can encourage small dairy farmers to learn from larger dairy farmers concerning the factors endowment used in their farms, so that small farmers can increase their herd scale.

## Research Methods

In accordance with the concept of the study, which is to limit the survey to dairy farming in Banyumas region, the objective is to select an appropriate area for the survey. In the beginning, survey was conducted in 105 selected households including 25 households without dairy cattle activities. Purposive sampling method was used in this research. Criteria for the selected village are the number of households that keep dairy cattle and the population of dairy cattle itself

With regard to cattle population and in each village, then eight villages chosen as a sample, which are; Limpakuwus, Karangsalam, Kemutug Lor, Singasari, Panembangan, Sambirata, Tumiyang, and Karangtengah. From those eight villages, based on a list of dairy farmers obtained from cooperative, then 80 households with dairy cattle randomly selected. List of non dairy farmers was obtained from the *RT* (neighbourhood, smaller unit within village level) head within the same selected village for dairy farmers. From this list, another 25 households without dairy cattle were randomly selected. A standardized questionnaire was used to obtain the data. Questions were focused on household composition and the dairy cattle

performance. Descriptive analysis were performed to gave specified information from each variables (Zeller, 2000; Kinnear and Gray, 2000).

## Results and Discussion

### Factor Endowment of Non Dairy Cattle Farmers

#### Human Capital

The average family size for the 25 non dairy farmer households interviewed, were 4.60 person including the household head himself. Most of the households have the family size less than six (88 percent). This condition has further relationship with the family labour availability, although not all of the family members are work in the farm. Age of the household head range from 38 until 98 years old, with an average of 56 years old. Age has a further relationship with the farming experience. Usually farmer get the capability in paddy production from their parents. Altogether with education level, this variable could affect the decision making quality, because one of the characteristics in traditional farming system is that decision making were decided by the household head.

On average, education level of the household head is graduated from elementary school (52 percent). The maximum education level observed from this 25 respondents are graduated from junior high school (SLTP). Farmer's education level on average not more than elementary school (SD), because in that time, their parents do not aware that study is important to their children as long as children can do farming. But the importance of this condition is, farmer can easily get new information about new innovation through extension service, because most of farmers can read (*melek huruf*). From the extension agent, farmer can get new information. Even so, not all innovations were applicable. Still, household head has the authority to make decision about their farming, such as how they allocate resource endowment, what kind of manure, etc. Doing paddy.

Table 1. Total Land Area Used to Paddy Production in Non Dairy Households

| Farm Size      | Frequencies | Percent | Cumulative Percent |
|----------------|-------------|---------|--------------------|
| Less than 0.50 | 19          | 76      | 76                 |
| 0.51 – 1.00    | 4           | 16      | 92                 |
| more than 1.01 | 2           | 8       | 100                |

cultivation is the main agricultural activities in Banyumas. These activities become the main job to most of the households

#### Land Ownership

Total area of land owned by the household can be obtained by addressed the question about the area of land which are used to do the paddy cultivation (regardless the land owned or leased), land used to another cultivation, and land surrounding household's house. The average total area of land owned by each household is 0.67 hectares. Data shows that most of the households interviewed have less than 1 ha area of land. As mentioned above, this total land area is area of land owned by the household regardless of it is really owned or leased. From the data, shows that 84 percent of farmers are not leased in land, and only 16 percent have the leased land. However, this total land area are still divided into several function, not all of the land owned are contributed to paddy production. Total land of paddy production shows in the Table 1.

Most of the farmer owned less than 0.5 ha of land, which is used to cultivate paddy. It is a very common situation in high-density populated island like Java. In one year usually farmers cultivated paddy two or three times. Most of the areas for paddy cultivation were irrigated with high application of fertilizer.

#### Labour Availability

Apart from land, labour also an important factor in farming activities. There are two types of labour, family labour and hired labour. It is a common thing that family labour does not get paid in cash. They come from household member such as wife or adult child in the household. But not all of adult in the household are working in agricultural sector. Some of them also work in another sector, in order

to earn more income. Out of 25 non dairy farmer households, average number of adults is 3.8, including household head himself. Data shows 88 percent of the households have more than 3 adults member, but in fact, not all adult are working in the farm.

It shows that 56 percent of the respondents did not use another family member as a labour in their farm except the household head and 36 percent use two family labour. However, with the condition that children helping only from time to time, farmer hire labour occasionally especially in certain period, such as for land preparation, planting, weeding, applying fertilizer and harvesting period.

Number of labour hired for *long 25* area of land (equivalent to 0.175 hectare) can be described as follows: two persons for 3.5 days full time working in land preparation, two persons for planting, two persons for weeding (two times in one production cycle) and five persons for harvesting. In one production cycle, fertilizer are applied two times. From *long 25* area of land, it may produce 7.5 quintals dry paddy (still in the form of *gabah*, unhulled paddy separated from the stalks). In order to prepare the land, farmer use cattles or buffaloes. For threshing, some farmers already use threshing machine, which can be rent for Rp.7000 for each *long 10* area of land.

### Factor Endowment of Dairy Cattle Farmers

#### Human Capital

The average family size of dairy farmer households were 4.2 persons. Data indicates more than 80 percent household have less than four members (parents and three children). This data did not necessary

Table 2. Percentage of Dairy Households by Total Paddy Production Area

| Hectares of Land Owned | Frequencies | Percent | Cumulative Percent |
|------------------------|-------------|---------|--------------------|
| Less than 0.50         | 70          | 87.5    | 87.5               |
| 0.51 – 1.00            | 6           | 7.5     | 95                 |
| 1.01 – 1.50            | 1           | 1.25    | 96.25              |
| more than 1.51         | 3           | 3.75    | 100                |

indicates the labour availability, because not all family member were contributed to the farming activities. Data also showed that 75 percent of the households interviewed were under 51 years old. With regard to this age, they still have enough power and capability to manage two activities, which were paddy production and dairy husbandry. Furthermore, question also addressed to the household education level. On average the education level is only graduated from elementary school (SD). Only 14 from 80 respondents did not finished elementary school, and their age mostly over 50 years old. They argued that their parents can not afford to send them to school.

Dairy farming is an activity that needs a lot of knowledge. Extension service is considerably important. With higher education level, adoption of new innovation will be easier. Also, dairy farmer establish a dairy farmers group in each village. That will be an advantage, because farmers could share knowledge and information among each other.

Of 80 respondents, only 10 percent have this dairy farming as their main job. For another 90 percent, beside dairy farming, they also have another activities, such as paddy production (44 percent), and work as state employee (21 percent). This is one characteristics of traditional dairy farming. Farmers have another activities beside dairy husbandry, because farmer can not depend only on dairy farming. In most cases one or two family members work part or full time on other sector, run a small shop or are employed in the administration sector. This off farm activities will generate additional income for the household.

### Land Ownership

Land is an important factor, and sometimes become the limiting factor, especially in high dense area like java island. Therefore, farmers prefer cut and carry system. Cattle are kept in the barn, grass is cut down from the grass land, transported to the barn and then fed to them.

Data indicates that half of the interviewed farmers have land less than 0.5 hectare. And most farmers (85 percent) owned less than 1 hectare. Total area of land owned by each household were still divided into several different purposes, such as for paddy production and for grassland. Total land area contributed to paddy production are shown in Table 2. One thing that should be pointed out here is that 23 out of 80 respondents do not have land which are contributed to paddy production.

They prefer to optimize their land to plant grasses. Reasons replied from the question why they do not have area for paddy production are as follows: because grass is a must to maintain their dairy cattle (62.2 percent), owned land area not fertile enough to produce paddy (21.7 percent), did not facilitate with irrigation canal (8.7 percent), and because the land is too small to maintain paddy production economically (21.7 percent).

Almost all farmers have less than 0.5 hectares of land that is contributed to grass production. It comprises 95 percent of total respondents. In order to get real picture of grassland ownership, then farmers which have land more than 1 hectare would be excluded from the calculation. Average land area for grass production is 0.18

hectare, range from minimum 0.007 until maximum 0.5 hectare.

However, from this amount of land, farmers still have to find another sources to meet the cattle requirements. Most of the farmer chose *Pennisetum purpureum* as their main source of fooder. Farmers usually have this grass in their grass land. As an additional source, farmers cut traditional grassing in the forest near by, or in the harvest season, they take the paddy straw, and offer it to the cattle as bulky feed.

One thing that should be pointed out here is that 23 out of 80 respondents do not have land which are contributed to paddy production. They prefer to optimize their land to plant grasses. Reasons replied from the question why they do not have area for paddy production are as follows: because grass is a must to maintain their dairy cattle (62,2 percent), owned land area not fertile enough to produce paddy (21.7 percent), did not facilitated with irrigation canal (8.7 percent), and because the land is too small to maintain paddy production economically (21.7 percent).

A group of dairy farmer or even sometimes more is formed in each village. Farmers run this dairy activity in a certain area, usually the area belong to the village, and farmers rent them. Having a group in a certain same area will give a lot of advantages, such as: extension service is tending to be easier, and share information among farmers is feasible to overcome some problems that may appear. However it also has some disadvantages, such as; farmers, which are live far away from the barn area, they should walk in a while daily. Also farmer that have grass land far away from the barn, they have to walk, and it takes time. Another disadvantages is that farmers cannot look after their cattle all day. Especially when cattle need to be looked after, for example during pregnancy, calving, and when some serious diseases appear.

#### Labour Availability

Labour availability be could predicted from the family labour in the household, because most dairy farmer use family labour as their main labour. Dairy cattle farming is a labour intensive activities. In

particular the factor labour is of significant importance in smallholder dairy production. Number of adults in the household could be use as an indicator of family labour availability.

Out of 80 dairy farmer households, average number of adults is three, including household head himself. But in fact, not all adult are working in the farm. Most of dairy farmer use family labour in their farming. As far as dairy husbandry is concerned, it is mostly (48.8 percent) the farmer himself who is full charge with regard to feeding, veterinary treatment, milking, and another dairy activities. Only 31.3 percent of the respondents use one of their members helping the household head in dairy husbandry. So, from average three not all adult are working or helping in dairy husbandry. Some work in another sector, and some of them do not have a job (student).

Only 10 percent of the household are not use family labour in their dairy husbandry. When hired labour is concerned, it indicate that 57 percent of the responden did not use hired labour at all (all labour come from family member); while 30 percent of them hired one labour which usually still have a relationship with the farmers (relatives). At most, farmers need to hired labour in order to get the forage. Experience in dairy husbandry also addressed in the questionnaire. Out of 80 farmers, 70 percent have more than five years experience in dairy husbandry. The dairying experience range from two until 13 years, with the average eight years. This condition shows that most farmers already got enough experience. The number of cows for each household varying from one until 17 cows in each households.

### Conclusions

From the human capital point of view, with respect to family size, number of adults, and age of households head between dairy and non dairy households, showed that there were possibilities to introduce dairy husbandry to non dairy farmers. Even so, some factors should be pointed out such as willingness of adult children to work in dairy husbandry. Adults seems like more attracted to work outside of agricultural

sector, especially if they have better education level.

However, possibilities introducing dairy farming could be expanded with intensive extension service to encourage non dairy farmers with younger age of households head. Small dairy farming might fit with young households head who already work in and live from agricultural sector.

With respect to land availability, that non-dairy farmers owned total area nearly the same amount as dairy farmers, introducing dairy husbandry in non dairy farms were still possible. Although to do so, some paddy area might be necessary converted into grass production purposes, especially in unfertile paddy production area. Problems that likely to be occurred were that the distance between owned land which sometimes far away from farmer's home. To overcome this situation, farmers could leased in land nearby, but that would not be the case if farmers have enough labour availability in their households. But one should be aware that opportunity cost for land should be taken into consideration. This could be important, because land for dairy farming were preferably area that have good infrastructure (road, electricity, and water supply) in order to reduce transportation and operation costs. Usually area with those kind of facilities have higher opportunity cost compare to area without infrastructure.

Concerning labour situation, dairy farmers have more labour availability, but they also hired labour more than non dairy farmers. It indicated that availability of labour in households were not necessary lead to the statement that they also

available in the farm. Unlike paddy farming which required labour seasonally, dairy husbandry required labour to work daily. This might be the reason why not all farmers attracted to work in dairy farming.

## References

- Birner, R. 1999. The Role of Livestock in Agricultural Development. Theoretical Approaches and Their Application in the Case of Srilanka. Ashgate Publishing Company, London.
- De Boer. 1999. Socio-Economic Aspects of Smallholder Dairy Farmers. In: Smallholder Dairying in the Tropics. L. Falvey and C. Chantalakhana (Editors). International Livestock Research Institute, Nairobi..
- Karunaratne, G, and H. Wagstaff. 1985. Income and Employment From Dairy Development. Edinburg School of Agriculture. In: Proceedings. Milk Production in Developing Countries. A.J. Smith (Editor). Edinburgh University Press. Edinburgh.
- Kinnear, P.R. and C. D. Gray, 2000. SPSS For Windows Made Simple. Release 10. Department of Psychology, University of Aberdeen. Aberdeen.
- Manig, W. 1993. Family Farm Households in Agrarian Societies in Developing Countries Definitions of Relevant Units for Survey, Analyses, and Statements. In: Socio-economics Research. *Quarterly Journal of International Agriculture*. Vol 32 (1): 20-27.
- Upton, M. 1996. The Economics of Tropical Farming Systems. Wye Studies in Agricultural and Rural Development. Cambridge University Press.
- Webster, J. 1993. Understanding the Dairy Cow. Second edition. Blackwell Scientific Publications. Oxford.
- Zeller, M. 2000. Methods of Socio-Economic Analysis of Rural Development. Lecture Notes. Institut für Rurale Entwicklung. Georg-August Universität Göttingen. Göttingen.