The role of grazing land on the buffalo population dynamics in Brebes regency

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Abstract. Brebes District is one of the centre of grazing buffalo in Indonesia that involve thousands of rearers usually kept as a family savings. This paper highlighted the availability of land and the role of the grazing land for the durability of the maintenance of buffalo in Brebes Regency. The information obtained is from interviewed the livestock facilitators in the sub-district (primary data) and from statistic of agriculture in Brebes Regency 2014 (secondary data). Generally the buffalo kept semi-intensively and commonly the buffaloes graze in the fields that are not used from morning until evening and during nights buffaloes are placed in the stalls. Rearers chose the semi-intensive system in rearing the buffalo because it is considered easy to manage and they do not need to provide fresh money to prepare the roughage for feed, because commonly the grazing buffalo are shepherd by herdman that will receive buffalo as their payment. The population density is very high (1.056 heads/km²), the buffalo ownership is between 2-4 head/households; generally the location of the grazing land is in the forest, rice fields fallow, and sleeping land, and estimated that greenfeed stock is still available abundantly, on the other hand the urban land is less capacity of feed. The spread of buffalo is only in 125 villages from 297 villages in Brebes. The acceptance of buffalo business is around IDR 3.5 million to IDR 7.5 million/family/year. The availability of grazing land strongly influence the maintaining of buffalo farming by rearers.

1. Introduction
Buffalo population in Indonesia in 2014 reached more than 1.3 million head spread in all provinces, but the number of population varies. There are 9 provinces that the Buffalo population is fairly high (above 50 thousand), the province of East Nusa Tenggara is the most highes (150,038 head), followed by Nangroe Aceh Darussalam (131,494 head), West Java (130,157 head), Banten (123,143 head), North Sumatera (114,289 head), West Nusa Tenggara (105,038 head), West Sumatera (100,310 head), South Sulawesi (96,515 head) and Central Java (75,674 head) [10]. The trend of Buffalo population growth is likely continuously to decrease in the last ten years, buffalo population in 2004 was around 2.5 million head and in 2014 decreased up to 1.32 million head [3,13]. Even so, buffalo still contribute to the production of national meat as much as 2.11% [9]. The type of buffalo in Indonesia is mostly swamp buffalo (95%) and the remaining 5 percent is river buffalo that formed in North Sumatera.

In Central Java, Brebes Regency is the most populated buffalo following Pemalang Regency [8] and the growth of the population also tend to decrease from 13,504 head in 2005, become 7,713 head in the year 2014 [5,7]. According to [12], the general obstacles in the development of buffalo is caused by internal
factors such as: slow in sex maturity, ten months of gestation period, late weaning time, silent heat so that the signs is difficult to detect, the calving interval often takes long time, the quality of bull is not good and external factors such as: management system, low quality of livestock, less capital, mating system is uncertain and unknown, knowledge of ranchers/farmers is low especially on the buffalo reproduction and social culture of the community.

Eventhough in that such condition, thousands of ranchers still maintain buffaloes. The major role of buffalo for the rural is as a savings account and plowing the rice fields to help the economic development of agriculture in rural area of Brebes regency. The buffalo is generally maintain semi intensively (shepherd) and the ownership farmer is generally also small as producer. Buffaloes also contribute to help farmers in the cultivation as drought animal power, milk for butter or ‘dunke’, dali and leather [2]. Since 2013, Brebes Regency is one of ten Districts or cities in Indonesia that were chosen to be the source of the buffalo feeder origin by Director General of Livestock and Animal Health Ministry of Agriculture, due to its population that is still high [14].

Buffalo can grow well in the range of a very broad agroecosystem conditions of the region that is very wet to the extremely dry condition, buffalo is well developed even in swamp land in South Kalimantan [11,16]. Brebes region with 166,296 ha wide, about 80.4 percent is in the form of the rice fields, dry land, forests and other plantations that produce roughage as the source of green stuff and plants waste that used as ruminants feed. Further more those land can be used as grazing land for ruminants, including buffalo. Studies on natural roughage and waste plants that support its capacity for ruminants feed in Brebes indicates that the supporting capacity index is about 5.1 (safe limits =3), which means that Brebes is still safe for the development of the ruminants [15]. The availability of land for ruminant’s grazing is still wide enough in Brebes, this mean that there is a chance to maintain the existence of buffalo.

2. Methodology
The primary data on grazing land for buffalo per sub-districts in Brebes is obtained through the list of contents questioner, covering the role of buffalo, the average ownership of buffalo, the grazing area, rearing patterns and income per year earned from buffalo farming. Primary data collect from 17 sub-districts were conducted by the officers of animal husbandry of Brebes regency for 2 months in the year of 2014.

While the secondary data that were collected as supporting data, obtained from the BPS and the Livestock office in Brebes, the supporting capacity of the region in Brebes [15] and information related to the study of the buffalo rearing was also collected. The results of the data collection was processed, tabulated, and analysed descriptively.

3. Results and Discussion
3.1. The Profile of The Brebes Regency
Brebes Regency is one of the autonomous region in the province of Central Java, with an area of around 1,662.69 km², Brebes Regency is administratively divided into 17 sub-districts, which consists of 292 villages and 5 kelurahan, Brebes is a second largest district in Central Java Province. Most of the area consist of lowlands. The southwestern part is a high land (with the peak of Pojkotiga mountain and the Gunung Kumbang), while the southeastern part are mountains which is part of Gunung Slamet. The condition makes the area of the great potential for the development of agricultural products such as rice, horticulture, plantation, fishery and livestock. Land Use data in the region Brebes shown in Table 1.

The total population in the year of 2014 is about 1,773,379, the average of the population growth is around 0.22 % per year, whereas the population density is 1066 people/km². Brebes is a district with the most highest population in Central Java and the most widest regency in Central Java after Cilacap Regency. Of 297 villages/subdistricts spread in Brebes Regency, only 4 villages that have low population density, 11
villages in the status of medium, 58 villages were high density status and 224 were villages in the status of the very high density [1].

**Table 1. The land use in Brebes Regency 2014**

| Land Use             | Width of area |
|----------------------|---------------|
| Wetland/ rice field  | 62,703        |
| Yard and Building    | 19,250        |
| Dry Land/plantation  | 17,499        |
| Unused land          | 279           |
| Pond/swamp           | 9,001         |
| Forestry             | 52,265        |
| Plantation           | 1,252         |
| Others               | 4,047         |
| **Total**            | **166,296**   |

*Source: [7]*

3.2. *The Population and The Development of The Buffalo in Brebes Regency*

Besides the agriculture and plantations sector, Brebes Regency has the potential source of greenfeed and roughage abundantly for livestock, that spread over almost in every sub-district [1]. The condition makes this district become the source of the development of the ruminants, including buffalo. Since 2013, Brebes Regency was appointed by the Directorate General of PKH as the centre for the development of buffalo [14]. In fact up to now, the farmer keeps the buffalo as saving for the family (55%), and also for the purpose of plowing the land (45%). By the increasing use of the tractor to plow the land, the benefits of buffalo decreases because it is not used as the drought animal power so that the buffalo much more often to be sold and slaughtered rather than to be maintained. The population of buffalo and its development from the year of 2008-to 2014 shown in Table 2.

**Table 2. The development of the buffalo population in Brebes Regency 2008-2014**

| Year | Population (head) | Development head | %  |
|------|-------------------|------------------|----|
| 2008 | 8,373             | -                |    |
| 2009 | 10,949            | 2,576            | 30.8|
| 2010 | 11,582            | 636              | 5.8 |
| 2011 | 8,774             | -2,808           | -24.2|
| 2012 | 8,867             | 93               | 1.1 |
| 2013 | 7,885             | -982             | -11.1|
| 2014 | 7,713             | -172             | -2.2|

*Average 9,163 -109.5 - 1.2

*Source: [5,6]*

The Table 2, shows that the number of the population of buffalo in Brebes was fluctuated from 2008 until 2014, but there is a tendency to continue to decrease in the year of 2008 buffalo population was 8,373 head and in the year 2014 has decreased up to 7,713. In the period of 2008-2014 the buffalo population decreased 1.2% /year in average.
3.3. Ownership, farm management and farmers’ income earn from buffalo rearing

The spread of the population, the role and management system of buffalo per sub-districts in Brebes is shown in Table 3. Buffalo is not found in some villages in Brebes Regency. Of 297 villages in Brebes regency, the spread of the buffalo population is only in 125 villages (42.1 percent from 297 villages) with the level of the scale of the ownership of buffalo is 2-4 head/household. The pattern of buffalo management generally is semi intensive, where in the day time, the buffalo shepherd in the community land such as in the forest, rice fields, river bank, shepherd or grazing land and during the afternoon until the next morning of the buffalo kept in the stall/animal shed. The quality of livestock feed is generally not good, but according to [2] the production and the reproduction of the buffalo are still better than the cattle at the same conditions. In addition in certain conditions the buffalo is also kept for several weeks in place of shepherd area in the edge of the forest, because the source of livestock feed (forage/roughage) still plenty enough and usually the herd are guarded by 2-3 ranchers interchangeably, as happened in the group "Sidamulyo" in the village of Pamulihan, sub-districts of Larangan, Brebes. The percentage of land, where the buffalo were herded on village-based shown in figure 1.

The Figure 1. shows that the buffalo management pattern is mostly semi-intensive and still depend on the availability of livestock green feed (forage/roughage) that located within the region which is not owned by farmers and ranchers not issued for the cost of the daily woof. For the night buffalo also not given additional feeds. Forest land and/or paddy fields (>100 villages) region is often used by ranchers to herd and keep the buffalo. The rice fields can only be used when after harvest or at the time of the rice fields in the state of the fallow (not used for plants). Shepherd land (grazing land) is only available in 18 villages. Through the semi intensive of buffalo management, the ranchers obtain income varies in the range of IDR 3.5 to 7.5 million/year.

**Table 3**: The buffalo population, the role and the management system in Brebes Regency

| Sub district   | Total Number of village | Number of village found buf. | Av. of ownership (head/hh) | Buf. role (*) | Shepherd location (**) | Manag. system         | Income from buf (IDR mil./year) |
|---------------|-------------------------|-----------------------------|-----------------------------|---------------|------------------------|------------------------|---------------------------------|
| Salem         | 21                      | 19                          | 2                           | 1 and 2       | 1 and 2                | semi intensive         | 2.5-3                           |
| Bantar kawung | 18                      | 12                          | 1                            | 2             | 1 and 2                | semi intensive         | 5 -10                           |
| Bumiayu       | 15                      | 14                          | 2                            | 1 and 2       | 2 and 1                | semi intensive         | 3                               |
| Paguyangan    | 12                      | 9                           | 2                            | 1 and 2       | 3                      | semi intensive         | 3                               |
| Sirampog      | 13                      | 9                           | 2                            | 1 and 2       | 3                      | semi intensive         | 2.5                             |
| Tonjong       | 14                      | 14                          | 3                            | 1 and 2       | 1 and 2                | semi intensive         | 7                               |
| Larangan      | 11                      | 3                           | 2                            | 2             | 1                      | semi intensive         | 5 -10                           |
| Ketanggunangan| 21                      | 5                           | 4                            | 2             | 1                      | semi intensive         | 5 - 8                           |
| Banjarharjo   | 25                      | 7                           | 4                            | 2             | 1                      | semi intensive         | 5 -15                           |
| Location       | Number | Number | Number | Number | Number | Semi Intensive |
|---------------|--------|--------|--------|--------|--------|----------------|
| Losari        | 22     | 1      | 4      | 2      | 4      | 7              |
| Tanjung       | 18     | 0      | 0      | 0      | 0      | 0              |
| Kersana       | 13     | 1      | 6      | 2      | 2      | 10             |
| Bulakamba     | 19     | 2      | 4      | 2      | 2      | 8              |
| Wanasari      | 20     | 4      | 4      | 2      | 2      | 5 - 10         |
| Songgom       | 10     | 4      | 4      | 2      | 2      | 5 - 10         |
| Jatibarang    | 22     | 10     | 2      | 2      | 1      | 5 - 10         |
| Brebes        | 23     | 6      | 4      | 2      | 1      | 5 - 10         |
| Total         | 297    | 125    | 2 - 4  | 1 and 2 | 1 and 2 | 3,5 - 7,5 |
| %             | 42.1   |        |        |        |        |                |

Remark: * = 1. cultivation, 2. saving; ** = 1. forest; 2 = rice field, dry land; 3. Shepherd land; 4. River side

Figure 1. Shepherd Location for Buffalo on the Village Base in Brebes Regency

4. Conclusion
The dominant pattern of buffalo rearing in Brebes is semi-intensive, considered easy and do not need to provide fresh money, where buffalo herded by others with the payment with buffalo also. The spread of cattle buffalo only in 125 villages from 297 villages in Brebes.

Buffalo ownership range between 2-4 head/households and generally the location of the land of the shepherd is in the forest and rice field (>100 villages), available area of 133,064 ha estimated still able to provide livestock feed (forage/roughage) sufficiently.
The acceptance of buffalo business is around IDR 3.5 million to IDR 7.5 million/HH/year. Availability of land shepherds strongly influence the maintaining of the ownership of buffalo by farmers.

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