Development of Agrinak Compass Sheep in the Application of Seedlings from Superior Science and Technology

Harmini and S Rusdiana
Indonesian Research Institute for Animal Production, P.O. Box 221, Bogor 16002

E-mail: Hmini2011@gmail.com

Abstract. The appearance of sheep Compass Agrinak (CA) with pastura care management such as the habits of farmers in Indramayu district shows that CA sheep can adapt well. The research method used in the research is social and technical approaches. One of the indicator can be seen from the birth weight of lambs from cross-breeding between local ewe and CA buck. Birth weight of lambs from crosses is relatively higher than local lambs, which is 3.08 vs 2.5 kg for females and 3.50 vs 3.04 for males. Some problems that require more careful observation where CA sheep die because of "consumed" plastic that may still have left in them as food leftovers consumed by humans wrapped in plastic bags, so that when eating the leaves "eaten" also the plastic wrap that blocks the system digestion and breathing which eventually die. Technology guidance on the preparation of sheep feed from rice (straw) by-products has been carried out at the Bogor experimental station as well as making good and true block minerals and sheep cultivation.

Keyword: Agrinak Compass Sheep, Application, Superior Science, Technology

1. Introduction
Sheep are included in a small group of ruminants with thick fur characteristics. The sheep that are kept can be taken part of meat, milk, skin, and fur. One type of livestock that has the potential to be developed in Indonesia is sheep. Lambs can be developed for the production of meat, skin, and fur. In general, sheep business in Indonesia is still focused on producing meat. Sheep has considerable development potential because sheep are easily developed through maintenance systems, the reproductive cycle is relatively short, resistant to various diseases [1]. The sheep population in Indonesia is 18.7 million or 66.72% in West Java [2]. Maintenance of sheep is generally carried out intensively, namely by grounding, feed (grass) provided by farmers or by way of grazing extensively. The need for sheep for national products and for exports with criteria for a minimum body weight of 35 kg.

One way to improve sheep productivity is by a system of repairing marriage and feeding. Improvement of the marriage system can be done by introducing superior buck. Besides that, the direction of sheep cultivation technology is good and correct in feeding management and the marriage system. Research Center for Animal Husbandry has superior research results from 3 sheep breeds, namely Sumatra Local sheep, St. Croix sheep and Barbados Blackbelly sheep named Compass.
Agrinak Sheep (CA Sheep) which has a composition of 50% Sumatran local sheep blood, 25% St Croix sheep and 25% of Barbados Blackbelly sheep [3]. On maintenance in breeders in highland areas with intensive maintenance of body weight sheep Compass Agrinak (CA) is higher than local sheep. According to Jarmani and Setiadi (2012) [4] that, CA sheep can be maintained by every farmer, able to increase sheep productivity and farmer income.

Sheep is the second livestock commodity that many people maintain by grazing with a population of $\pm 327,000$ head and $\pm 70,000$ goats in 2013 spread in several districts. Reports from the Indramayu District Agriculture and Animal Husbandry Service (2013) [5] state that the incidence of parasitic diseases was found in 17 cases, 16 gastrointestinal tracts, 8 cases of respiratory tracts, 18 reproductive tract cases, 19 limbs, and skin cases and 32 cases of metabolic disorders but the cause has not been identified. Whereas the information from the sheep breeders community states that the cases of diarrhea and bloating sheep until sheep deaths often occur especially in the rainy season but the cause is unknown. The introduction of CA sheep in Bangodua Subdistrict, a lowland area with a system of raising sheep is herded, until now according to the cooperator, it can attract non-cooperative sheep breeders to nurture/marry their female sheep with CA rams.

After seeing the showing of the lamb from the crossing, it was greater than the local lambs, so further research was needed, so that the sheep raised by farmers could increase farmers’ income. Therefore various efforts were made to increase the productivity of local sheep. Whereas to accelerate the development of sheep livestock the results of the research are nursery institutions with classification according to the conditions in the Balitnak. It is necessary to establish an institution that is suitable for the development of sheep from research in Indramayu Regency.

2. Methodology
Social Approach: Activate the farmer group which begins with inviting the sheep breeders to come and learn. In each group meeting, farmers can discuss various problems related to the sheep business. The problem is that it is about sheep cultivation and or forming groups by inviting other farmers, with the aim of increasing sheep productivity, increasing livestock knowledge and increasing farmers' income.

Technical Approach: The introduction of sheep Compass Agrinak (CA) technology by providing guidance on sheep breeding management technology that is true and understandable to farmers. Maintenance management introduced to farmer groups is the procedure for feeding, marriage, weighing, recording. Cooperation with Distanak of Indramayu Regency is very necessary considering that CA sheep have been determined by the Government c/q Ministry of Agriculture. Therefore, for CA sheep not to be "lost" during development in the farm, it is necessary to do a continuous recording and follow up with the signing of the Cooperation text between Balitnak and Distanak. Terms of Reference implementation of cooperation, which will be carried out when the sheep have been handed over to cooperative farmers.

Economic approach: carried out to see the condition of the sheep raised by a group of farmers. Then the sheep can be seen how big the selling value of the sheep, seen from body weight, appearance, male, female and sheep age. In group meetings, it is taught to empower groups, especially in the marketing of sheep products, so that they can go through the marketing section so they can cut the market chain [6].

The activity of sheep research collaboration with the Animal Husbandry and Animal Health Service Office of Indramayu Regency in West Java involves a group of farmers. Determination of location begins with a study desk to find locations in the province of West Java that are densely populated with sheep, sheep grazed in sugarcane plantation areas. From the selected location Rapid Rural Appraisal (RRA) was conducted and the collaboration was conducted with the Livestock Service Office and continued with Random Sample Purposes (PRA). Next is the baseline survey in selected villages with the approval of the agriculture and animal husbandry service (Distanak) of Indramayu Regency, to find out the sheep cultivation in breeders and the possibility of sheep business and analysis of farming typology. The selection of 5 cooperators was carried out in collaboration with
Distanak and farmer group leaders with conditions to cooperate with Distanak researchers and officers and obey the stipulated requirements. Then intensively introduced to sheep CA cooperators and technology that must be carried out by cooperators under the supervision of the appointed Distanak officer.

Handover of sheep is done after the pregnant sheep is about 2 months accompanied by subsidized feed concentrates for 1 month and before birth each around 300 grams per head. The signing of the text of the collaboration between Balitnak and Distanak Indramayu Regency was carried out after the sheep were handed over to cooperative farmers. Monitoring is carried out every 2 times a month by Distanak officers who are appointed and reported to researchers. The parameters observed included sheep production (birth weight, weaning weight, mortality, increase/development of body weight) and reproductive appearance (breeding interval, birth type, and reproductive rate of the parent). Fecal sampling was carried out after CA sheep were adapted in the field. The stool was taken from male CA sheep, female CA, and local female sheep and male, young, adult males. The multiplication and distribution of sheep breeding activities can be carried out by various methods, namely introduction through the institutional pattern of livestock villages [7].

3. Result and Discussion

General conditions of Indramayu Regency

Indramayu Regency is one of the provinces in West Java which located along the north coast of Java Island, with an area of 204,011 Ha. Indramayu Regency is one of the provinces in West Java which around the north coast of Java Island and has 31 Districts with 309 Villages and 8 Villages. Based on the topography of the area in Indramayu it ranges from 0-8 m above sea level and the lowland area ranges from 0-6 m above sea level in the form of swamps, ponds, rice fields and yards with a slope of 0-2% covering an area of 96.03% of the total area or around 201.285 Ha [8]. Where 11 Subdistricts and 36 Villages are on the beach side with a temperature range between 22.90-30°C.

Lamb Compass Agrinak population in Cooperator Farmers

Sheep is the second livestock commodity that many people care for by grazing in sugarcane plantation areas with a population of 327,000 in 2017 spread in several districts. Meanwhile, reports from the Office of Agriculture and Animal Husbandry of Indramayu Regency (2017) [9] stated that there were 17 cases of diseases caused by parasites, 16 gastrointestinal tracts, 8 cases of respiratory tracts, 18 cases of reproductive tracts, 19 limbs, and skin diseases and 32 metabolic disorders case. The introduction of technology can be successful if there is a harmonious reciprocal relationship between technology producers and recipients of technology in the form of groups, making it easier for technology producers to disseminate it [10]. Cooperator breeders have decreased from the original 5 (five) peoples, now only 3 (three) peoples, for several reasons. Nuryanti and Swastika [11] stated that most farmer groups in Indonesia are no longer formed at the initiative of farmers to strengthen themselves, but most are responses from government programs that require group farmers.

This encourages institutional strengthening through several efforts, including (1) encouraging and guiding farmers to be able to collaborate in the economic sector in groups, (2) to develop farmer groups through increasing facilitation of assistance and access to capital, increasing bargaining position, increasing facilitation and guidance to group organizations, and improvement of farm efficiency and effectiveness, and (3) increasing the capacity of farmers' human resources through various mentoring activities, and exercises specifically designed for administrators and members. Technically, efforts to strengthen farmer groups are carried out by Field Agricultural Instructor (PPL) [12]. At first, each cooperative farmer got 5 sheep consisting of 4 males and 1 male. So, in the beginning, there were 25 sheep in cooperative farmers. The decline in population is due to the existence of sheep that have been lost (stolen) when they were in a cage that was located some distance from the residential area.

Besides that, some sheep died from eating plastic. Plastics containing leftovers / sweet-flavored leaves. Sheep that eat plastic have a high appetite characteristic, but the body takes care of within ± 2
months, then the sheep die. Picture 1 sheep eating plastic when opened. The case of sheep death eating plastic is thought to also occur in local sheep, but when the sheep die it is not done surgically. The sheep population in cooperative breeders decreased as shown in Table 1.

Table 1. Population of CA sheep in cooperative farmers

| Cooperator | Lamb (<3 months) | Young (3-8 months) | Mature (>8 months) | Amount |
|------------|------------------|---------------------|--------------------|--------|
|            | Male Female     | Male Female         | Male Female        |        |
| I Sumitro  | 1 1             | 2 3                 | 3 4                | 14     |
| Darip      | 1 2             |                     | 1                  | 4      |
| Misja      | 2 1             | 3 6                 |                    |        |
| Amount     |                 |                    |                   | 24     |

Table 1 shows that the sheep population in breeders is decreasing because one of the determining factors is sheep grazing, so it is not controlled by sheep when eating food. The sheep breeders involved in the cooperation agreement were only one person who kept adult rams, so the other breeders if the lusty parent borrowed from the rancher who had adult rams. Almost all breeders have young rams, but there is one person who does not have an adult female parent, because the parent is kept dead, due to eating plastic. The impact of the decline in sheep populations on farmers, is not significant, meaning that the initial amount given is in agreement with the final amount calculated. However, only one parent dies from all the parents that are kept. Lamb breeding has a very large opportunity for business development because of several supporting potentials including social aspects (raising sheep has become a culture in the community), a source of protein in favor of meat, relatively easy to maintain, and is prolific (number of lamb more than 1 per birth)[13].

Nurcahyo et al. [14] stated that to increase sheep productivity by 1) extension agent activities are able to provide knowledge to farmers in terms of sheep raising and increase livestock productivity by applying programmed mineral feeds in livestock rations, 2) practical and demonstration activities capable and skills of farmers so as to be able to apply mineral block to prevent mineral deficiencies in food rations so that livestock obtain sufficient and balanced mineral intake. One way to increase the sheep population is through improving reproductive management, such as proper marriage. According to Hastono [15], genetic factors influence the sexual activity of male local sheep, male local sheep with short ear types have the ability to mate higher and efficiently when compared to male local sheep who have a long ear type. A prominent feature of people's livestock, namely (1) maintaining a relatively small number of sheep, (2) using traditional technology and relying on natural feed needs and (3), sheep only become part-time jobs [16,17].

The competitiveness of the livestock industry is largely determined by several inputs such as feed availability, seed factors, animal health and management, and technological innovation and other external factors [18]. Figure 1 shows sheep who died from eating plastic. The case of sheep deaths due to plastic feeding is a lot happening in the study area. At first, the sheep will experience bloating (bloat) and when it is opened the stomach is found in plastic. Bloat or bloated rumen is a non-infectious systemic disorder which results in a disruption in the digestive system of the ruminant [19]. The results of this study indicate that primary bloat that occurs due to the provision of grain or concentrated feed is more due to inaccuracies in grain processing and administration of administration as feed [20]. The cause of secondary bloat must be ascertained by careful clinical examination to determine the cause of erectile failure. Secondary bloat (free gas / dry bloat) is more often associated with rumen atony or physical or pathological problems that inhibit normal gas erosion.

Foreign objects that can cause obstruction include potatoes, apples, radishes, and kiwi fruit, bolus, carrots, tomatoes and corn cobs [21]. The occurrence of plastic found was indicated by sheep experiencing secondary bloat. Bloat can be prevented by various methods ranging from prevention through feed manipulation to treatment by stopping the gas formation process and helping to eliminate the gas [22]. Dewi et al. [23] stated that Haemonchus spp did not experience inhibition in its development even though sheep have been given benzimidazole treatment, the high percentage of
Haemonchus larvae compared to other worm larvae can endanger livestock productivity so that appropriate control strategies are needed [23]. Good livestock management, epidemiological studies and the use of molecular techniques are possible to be used to control parasite diseases.

![Figure 1. Plastic eaten by sheep](image)

**Daily weight gain (AWG) rams**

In Figure 2, as previously described, 25 rams and females were handed over to the Livestock Service Office of 20 female and 5 adult males. There are 4 of them are pregnant animals that are pregnant with 1-2 months of pregnancy. At the beginning of October 3 main breeds gave birth with 2 litter size (1 male and 1 female). At this time all (4) mothers have given birth, with an average litter size of 1.4. Of all children born, 63% of them were children with a single birth (litter size 1), while 37% of them were twins. Up to this report, the birth of lambs with more than 2 children is not found.

![Figure 2. Graph of daily weight gain in rams](image)

Daily body weight gain (AWG) is a mirror of the quality of feed given. The average AWG in the study was 67.871 grams head-1day-1. Daily body weight gain in this study was lower than the results of a study by Purbowati et al. [24] by providing a complete feed from various agricultural and agro industrial wastes which are 122 grams/head/ day and feed conversion by 7.62 grams head-1day-1. While the results of the research by Kamalidin et al. [25] by providing a complete feed of cocoa fruit + daily body weight gain (AWG) concentrations of 128.67 grams/head/day. Parakkasi [26] states
that feed consumption and digestibility have an effect on AWG. The main nutrients needed by livestock for fattening are energy [27]. Tomazewka et al. [28] stated that the need for dry matter per head per day for Indonesian sheep with body weights of 10-20 kg was 3.1% -4.7% of body weight for the body weight gain of 0-100 grams head-1day-1. Firdus [29] added forage feed formulations (fresh elephant grass, fresh calliandra, dry and steamed calliandra and fresh Gliricidia) that did not significantly affect sheep. Likewise, feed formulations consisting of fresh elephant grass, fresh calliandra and fresh Gliricidia also did not significantly influence the weight of sheep carcass. Feeding in the afternoon significantly increases body weight and percentage of meat [30].

In Figure 3, the body weight of the female ewe is quite diverse. Calculation of body weight gain showed that the average increase in female lambs was 70 ± 14 gram head-1day-1. The results achieved in this study were higher than the results reported by Handiwirawan et al. [31] where the average daily body weight gain after Garut Composite young sheep weaning, Sumatran Composites were 63.80, 61.45 grams head-1day-1. Sheep are livestock that has high economic value, because of their ability to convert forage into the meat, but need more food than cattle compared to their body weight. Zain [32] stated that the replacement of field grass with the skin of ammoniated cocoa fruit by 100% gave the same body weight as field grass, the skin of ammoniated cocoa fruit could be used as a substitute for field grass in sheep rations. Nuraini et al. [33] stated that the improvement of feed through reinforcement feeding would increase daily body weight gain at the level of 35% -52%, feed conversion ratio and feed cost for Bligon goats and efficient parent at 35% level and without reinforcing feed.

Handayanta [34] states tofu pulp and tempeh pulp can improve sheep performance. Razi (2004) [35] states that differences in cut weight will greatly influence the percentage of carcass produced because each increase in cut weight will be followed by an increase in carcass weight. Widiarto et al. [36] stated that the purchase price and cutting weight significantly and positively affected the production of local female sheep and goats with $R^2 = 0.718$ and slaughter weight significantly and positively affected the slaughterer's gross margin. Variable costs significantly and negatively affect the gross margin of the slaughterhouse with $R^2 = 0.665$.

![Figure 3. Graph of daily weight gain in female lambs](image)

4. Conclusion
Composite Agrinak (CA) Sheep is one of the clumps of livestock engineering technology from the Animal Research Institute. The development of sheep is carried out through an institutional collaboration with the Office / UPT of the Livestock and Animal Health Service Office of Indramayu Regency, West Java. Sheep that are cooperated with the Office or breeders show relatively good results. This is seen from the relatively adequate performance. Sheep raised by breeders can be seen from the increased body weight of the sheep. The results of this observation indicate that CA sheep...
can develop in high and low land agro ecosystems, thus becoming important information for efforts to develop sheep as further seeds.

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