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by Erwan Erwan

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CONSERVING INDIGENOUS LOMBOK BEES THROUGH COMMUNITY EMPOWERMENT IN BEE QUEEN REPRODUCTION

Baiq Yulfia Elsadewi Yanuartati[1)], Erwan[2)]

[1)]Faculty of Agriculture The University of Mataram, yulfiae@gmail.com; [2)]Faculty of Animal Studies The University of Mataram, erwan@gmail.com

ABSTRACT

Lombok is a small island in Nusa Tenggara Barat (NTB), Indonesia that is popular with its honey product. More and more tourists are interested to come to the island since it has become the popular tourism destination to visit. The increasing numbers of tourists in Lombok make the demand for honey product also has been larger than before, which is sometime difficult for the beekeepers to fulfil the demand. There are some problems make it difficult to conform the demand, such as the beekeepers only rely on their bees production naturally without any effort to develop their bee farm due they do not know how to enlarge the numbers of bees population. The second problem is honeybees cannot produce honey optimally if the colonies in each box are too dense, while most of the beekeepers in Lombok do not know how to devide the colonies in other boxes. And thirdly, the beekeepers really depend on the season, where the bees cannot produce honey any time during a year meanwhile the beekeepers' income only depend on harvesting honey. So, they need another source of income from their bee farm such as from providing colonies for other beekeepers. A development program has been conducted in West Lombok by the University of Mataram team in order to help the beekeepers to enhance the numbers of productive bees through trained and supervised the beekeepers to do bee queens reproduction. There have been some techniques being introduced to reproduce the bee queens such as zigzag cutting of the bee hive and creating bee-queen cell bowls. There are some economic, social and natural advantages of introducing such knowledge and technology to the beekeepers. From economic aspect, the technology will help the beekeepers to diverse their business in the bee farms through not only providing honey but also the colonies. From social aspect, the improving bee farms business will provide employment for other people and to promote the health of local people. Lastly, from the environmental aspect, this program will lead to biodiversity conservation of the honey bees, some tree and other plant species for bee's forages in Lombok Island.

Keywords: Bee reproduction community, empowerment, Lombok Island

INTRODUCTION

Lombok is a small island in Nusa Tenggara Barat (NTB), Indonesia that ispopular with its honey product. More and more tourists are interested to come to the island since it has become the popular tourist destination to visit. The increasing numbers of tourists in Lombok make the demand for honey product also has been larger than before, which is sometime difficult for the beekeepers to fulfil the demand. There are some problems make it difficult to confirm the demand, such as the low skill and knowledge of the beekeepers' in reproduction technology, less bee colonies productivity, and seasonal productivity.

Firstly, the beekeepers only rely on their bees' production naturally. Some of them get the honey by doing honey hunting, or the people are called bee hunters. They inherit skill in honey hunting from their ancestor. As they rely on the nature prepare for them, they cannot do anything if the honey production is very low in certain season.

Meanwhile, some others try to keep their own bees in boxes at their houses or called beekeepers. They are able to harvest the honey without gather it from forest or plantation. However, they do not put any effort to develop their bee farms such as to reproduce the colonies into more boxes due they do not have skills and knowledge about how to enlarge the numbers of bee colonies. Hence, most of the beekeepers in Lombok are only able to get high yields in certain season during a year, but the other season, the production is very low, which make the beekeepers income also low. The last but not least, the honey yield are getting lower because the colony in each box is getting denser. If the colony is too dense in each box, the honey product will also be decreased.

Actually, there are some strategies could be done in order to help the beekeepers in Lombok to keeping their income sustainability in the whole year. Recently, the beekeepers do not only rely on the honey production, as the honey yield is not stable during a year. As They also need another source of income from their bee farm, so we can train them to not only focus on honey product, but also to provide colonies for other beekeepers through queen bee reproduction. We need to teach them how to reproduce their queen bees, so that they can enhance the numbers of the bee colonies and bee boxes.

There are some technologies to reproduce more colonies faster and in bigger amount. The techniques have been introduced through doing zigzag cutting of the bee hives and creating bee-queen cell bowls for Apis cerana. Meanwhile, Reproducing Trigona queen bees is more simple because it is only need two spoons as the tool.

HONEYBEE SPECIES IN LOMBOK

Indigenous honeybees are spreaded out in many parts of Lombok, especially surround the forest areas. In North Lombok, the bees can be found in Pusuk Forest, Pemenang, Sire Beach, Sigar Penjalin, Medana, Tanjung Forest, Gondang, Gangga Desa Genggelang, Kayangan, and Bayan. In West Lombok, the bees live and are cultivated in Desa Karang Bayan Kecamatan Lingsar, Narmada, Sesaot, Desa Lembah Sari, Sideman, Kekait, and Desa Senteluk. Meanwhile in Central Lombok, there are some areas such as Pringgarata, Aik mual Desa Marta Mas, and Mantang. Lastly, Desa Banok, Selong, Aikmel, Desa Rumeneng, Sakra, and Sembalun are the places in Eastern Lombok, where we can find the bees.

There are many kinds of honeybee species live in Lombok Island and are potentially developed in providing honey for beekeepers as the source of income and healthcare. Many of the beekeepers only recognise certain honeybee species to keep. The most common species is Apis cerana. Meanwhile, there are many honeybees species live in the island and can be kept in hives at their living areas (Ahmed et al 2007). Those species are presented as follows:

Apis dorsata

The honeybee species cannot be cultivated. This species generally live naturally in the forests of Sumatra, Java, Borneo, Celebes, and the islands of Nusa Tenggara. Until now, these honeybees are an important species for beekeeping Indonesia because of its contribution to the community around the forest, because the production of honey is quite high. In addition, hunting and gathering honey from these species is an income activity opportunities for people surrounding forests (Sihombing 2005).

Apis cerana

Apis cerana a local bee species being grown by rural communities as a side activity. Although productivity is low, these species is very suitable to be developed to increase the welfare and improvement of the degree of nutrient because it is easily available and relatively cheap (Sihombing 2005).

Apis andreniformis

This species make their nests in bushes. The bees productivity is relatively low and less economical considering the production of honey. Spread of bees was reported found in Sumatra, Borneo, Java and Nusa Tenggara(Sihombing 2005).

***Trigona* spp.**

This bee is an Asian native species of the genus Trigona. This species has a specific characteristic. The honey produced has a sour taste, but resistant to fermentation. Furthermore, the bees do not often move and the price of honey is higher than other kinds of honey from other species. Many people in the villages did Trigona cultivation because the species has many advantages, such as this little bee quickly adapt to the surrounding environment. In addition, these bees produce much more propolis than honey, have no sting and do not require large tracts of land in the cultivation process (Sihombing 2005).

COMMUNITY EMPOWERMENT IN BEE REPRODUCTION IN NORTH AND WEST LOMBOK AND ITS ADVANTAGES

Empowerment that is, enhancing an individual's or group's capacity to make choices and transform those choices into desired actions and outcomes" (World Bank 2000). There are many advantages of empowering community. One of them is community will be able to take effective choices. They then will be able to transform them into desired action and outcomes (Alsop and Heinson 2005).

North Lombok and West Lombok as the centres of beekeeping in Lombok have been the bases of community empowerment projects for beekeeping, especially in bee reproduction. One of those projects were funded by IPTEKDA LIPI (Science and technology in the Region, Indonesian Institues of Science) cooperated with the University of Mataram. The program was held for a year. The UNRAM team did some approach to some beekeepers individually and in groups in North Lombok and West Lombok. The beekeepers provided location and shelf to keep the boxes. Meanwhile the team provided boxes, any utilities to multiply colonies, training, and monitoring.

The technologies being introduced to the beekeepers is reproducing colonies through enlarging the numbers of the bee queens. In the IPTEKDA LIPI program, the team focus on the queen bee reproduction of Apis cerana and Trigona sp. Development of queen bees Apis cerana reproduction can be done through two ways, which are by cutting hives strokes in a zig-zag and making bee queen cell bowl (Proyek Pengembangan Ekonomi Masyarakat Pedesaan, Bappenas 2000). Meanwhile, the multiplication numbers of queen bee reproduction of Trigona sp. is more simple, which divide the colony into some other new boxes. the colony in old box are moved into new boxes by using spoon.

For Apis cerana, cutting in a zig-zag strokes by cutting the bottom of the nest in waves at an angle 45°. These cuts will stimulate worker bees to prepare the queen bee cells. Six days

after the queen bee cells are closed, and then the cells were taken and placed in a bee colony that requires prospective new queen bees. The second way can be done by making queen bee cells bowls made of beeswax. This bowl will be filled with larvaes those aged less than 20 hours. Taking larvaes are done carefully with a larvae spoon from the back so as not to defect them, then moved and placed them in the a bowl of bee queen bee cells. Eight days after the bowls are closed then they are moved to the honeybee colonies that require bee queens.

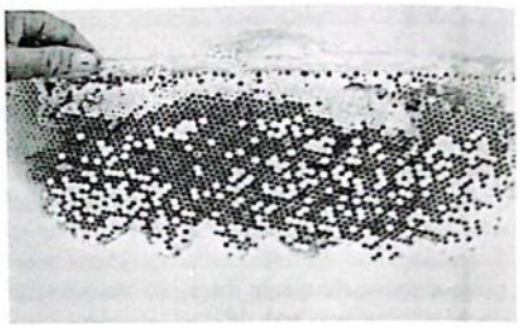

Figure 1. Zig-Zag Cutting to Enhance the Numbers of Queen Bees.

Meanwhile, the development of Apis trigona queen bees is conducted by transferring some of the eggs that will be hatched. The eggs those are ready to hatch can be seen from the white color of the egg coating on the surface of the egg and lightly browned. The eggs are then transferred to new boxes, which have been prepared. The new boxes are then hung in the old location of the box hence the worker bees those are out for food hunting are willing to enter into the new boxes. Through queen bee reproduction, the concern over the depletion of natural resources can be reduced, due fulfillment of the demand for larvaes are obtained from hunting and poaching of wild bee queen.

Figure 2. The beekeepers' Training on Trigona Bee Queen Reproduction

There are economic, social, and natural advantages of introducing bee reproduction technology in Lombok. Each of the aspects is presented below.

ECONOMIC ADVANTAGES OF COMMUNITY EMPOWERMENT IN THE TECHNOLOGY DISSEMINATION OF BEE QUEEN REPRODUCTION

It has been realised that community capacity building will be able to improved the beekeepers income. By training and supervise their beekeeping activities, they even can increase their income up to 25 % (Ahmed et al 2007). In Lombok, the beekeepers were trained to not only do honey harvesting or honey hunting but also to generate income from the honeybees byproducts.

The business of honeybees' byproducts in Lombok such as the bee queen reproduction, is one of the honeybee product diversification. It have helped the beekeepers to generate sustainable income throughout the year. The people made their own boxes as the new beehives and multiply the colonies from each of the old box. For each of the old box can result three to four new colonies. Then, the farmers can sell the hives within three months.

For some beekeeper participants in the empowerment project in North and West Lombok, many of them already focus on supplying colonies for other beekeepers. The development of selling colonies has led to the ability to fulfil the demand anytime, but are also able to harvest much more honey.

Figure 3. Bee Queen Transportation in order to Fulfil Demands from Other Beekeepers

SOCIAL ADVANTAGES OF COMMUNITY EMPOWERMENT IN THE TECHNOLOGY DISSEMINATION OF BEE QUEEN REPRODUCTION

Since the IPTEKDA LIPI 2011 in North and West Lombok, the beekeepers icluded in the project have been able to manage their business professionally. They were trained to manage their location, such as bulding shelf, planting honeybees' forages, bee queen reproduction, looking after the bees, and harvesting.

There are some empty lands where they arrange them into complex of beekeeping areas.

The areas are cleaner and tidier. The participants are not only arrange them as the beekeeping areas, but also to be the place of local recreation and education. Soon, other people surround the place of the program do the same thing. It means, this change has motivated the neighbours to do the same thing in beekeeping and bee queen reproduction as their occupation.

Empowerment has an important role in social transformation (Sadan 2004). In this case, there are several social roles have been shifted. People, who have been empowered, are able to attract other people surround to see the potential development of the honeybees as a permanent source of income to rely on. Thus, the development of honeybees and its byproducts have been able to encourage other people surround the beekeeping areas to open their beekeeping business. So it is expected that the community can make their area as a center of beekeeping and learning centers for honeybee business.

In addition, the emergence of beekeepers in Lombok is considered necessary to make the beekeepers' associations surround them. The associations will be able to support each other in marketing efforts of honeybees or byproducts, and in technology and information transfer activities. The groups or associations become the place to be more edvance beekeeping communities in Lombok so that the aim to establish central beekeeping areas on the island of Lombok can be manifested. The success of the community in working together to achieve these objectives will enable them to live more prosperously.

Along with the development of the community honey bee business, especially the skill in colonies development techniques, people are easier to get access to healthy nutrition, that is honey consumption. Given the very high price of honey to reach the public at large on the Lombok Island, many of them cannot buy and consume it. Though honey is very good for beauty care, health and a cure for some diseases (Molan 2011). Therefore, to maintain honeybees in the location where they lived in ever-increasing numbers, people will not only be able to sell a variety of honey bee products, but also be able to consume honey without having to buy.

With the efforts to introduce the queen bee reproduction, people have better knowledge in the development of byproducts of the honey bee, as well as the tecniques of queen bee reproduction. In this case, the public are willing to accept and apply the science and technology in their businesses, so that they become more empowered socially and economically.

NATURAL ADVANTAGES OF COMMUNITY EMPOWERMENT IN THE TECHNOLOGY DISSEMINATION OF BEE QUEEN REPRODUCTION

Along with the development of beekeeping business, society has indirectly participated in the conservation of queen bees. indigenous species on Lombok Island. Moreover, the high demand of honeybees colonies become the driving of higher production effort. This effort must be able to conserve some honey bee species such as Trigona and cerana, even able to increase the population of the species.

Trees and other plant species are a source of bees' forages, which determines the type and amount of honey products and other byproducts. Honeybees are able to produce if the diverse plant species available surround the hives. Therefore, through empowerment project, which is run associated with the beekeeping business, has encouraged the public, especially the beekeepers to plant different. types of trees, to continue to increase the amount of honey and its by-products. Activity replanting trees there is certainly not only aim for the beekeeping business, but also encourages. the preservation of plant biodiversity and greening efforts. Community indirectly preserves biodiversity of many kinds of trees and other plants. Forexample, Zea mays dan Acacia auriculiformis are the pollen provider for thehoneybees forages (Sulistyorini 2006). Furthermore, people are becoming aware not to cut trees, thus help provide oxygen and trap carbon, so that the air becomes cleaner and healthier. Another advantage is that the bees assist crops fertilization, so that other farmers can help farmers to get optimal agricultural produce (Liferdi ny).

Figure 4. Planting Bee Forages by the Beekeepers

SUMMARY

Queen bees reproduction of both Apis cerana and Trigona sp has various advantages. There are economic, social, and natural advantages of introducing bee reproduction technology in Lombok. From economic aspect, bee queen reproduction that leads to providing more hives has encouraged the beekeepers to ensure sustainable income troughout the year, because they are not only provide honey but also hives and other byproducts for selling. From social aspect, the development of beekeeping business in Lombok can encourage the beekeepers to develop the byproducts of the honeybees as the sources of revenue through the year, thus are expected to reduce unemployment. The development of the honeybee also allows improved public health, especially those who practice beekeepings. In addition, beekeepers can strengthen their businesses through associations, which allows them to work together to develop the beekeeping centers on the Lombok Island. While aspects of the environment, beekeepers efforts to provide diverse forages sources for the honeybees, provide great benefits for the environment. Such benefits include helping preserve the types of trees and plants, and helping farmers to reforestation, fertilization.

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