e-ISSN: 2745-9535
No. 105/E/KPT/2022
Jurnal Pengabdian Masyarakat
Member of: AJEBI
Editorial Office: Jl. Soekarno-Hatta, Rembuksari No. 1A, Malang, East Java, Indonesia, 65113
Contact: Phone: +62 (341) 478494 e-mail: jpm@asia.ac.id
The journal is published by LP2M Institut Teknologi dan Bisnis Asia Malang
Website: https://jurnal.stie.asia.ac.id/index.php/jpm
Indexed in: Google Crossref neliti GARUDA Journal Dimensions

Training in the Use of Automatic Incubator for Kampung Chicken Farmers in Liliba District Kupang NTT

[1]Ni Gusti Ayu Mulyantini*, [1]Ni Putu Febri Suryatni, [1]Markus Sinlae, [1]Ulrikus R Lole
[1]Universitas Nusa Cendana, Indonesia

*Corresponding author
Email: ngamulyantini@gmail.com

Volume
5
Issue
2
Edition
November
Page
469-475
Year
2024

Article History

Submission: 12-02-2024
Review: 04-03-2024
Accepted: 17-4-2024

Keyword

Hatching Machine;
Chickens;
Farmers;

How to cite

Ayu Mulyantini, N. G., Febri Suryatni, N. P., Sinlae, M., Lole, U. R. (2024). Training in the Use of Automatic Incubator for Kampung Chicken Farmers in Liliba District Kupang NTT. Jurnal Pengabdian Masyarakat, 5(2), 469-475 https://doi.org/10.32815/jpm.v5i1.2224

Abstract

Purpose: This activity aimed to address low kampung chicken production in Liliba district, Kupang City, NTT, and farmers' limited knowledge of using hatching machines. The goal was to increase chicken and egg production through training in incubator use to meet the local demand for chicken meat.

Method: Training was provided to three groups of farmers, each consisting of five participants, focusing on using egg hatching machines. The farmers were trained and guided until proficient in machine use.

Practical Applications: The use of hatching machines increased chicken production by 80%, improving breeding cycles, chick survival rates, and egg quality. This approach made farming more efficient and sustainable.

Conclusion: The activity successfully improved farmers' skills in using hatching machines, accelerating kampung chicken production and enhancing chick quality to meet local demands.

Introduction

Liliba is a sub-district in Kupang City whose residents have a variety of jobs. One of the part-time jobs that is popular is raising chickens. The member of chicken's farmers in Liliba is around 15 people. Farmers location is about 5 km from the University campus, and the distance to Kupang City is only about 3 km, with a travel time of ±20 minutes. One of the goals for raising kampung chicken is to meet the increasing public demand for kampung chicken meat. However, chicken rearing system is still done traditionally and on a small scale, so the chick's production remains constant and even tends to decline. With traditional rearing systems, the time required for chickens to produce egg is reduced, because the chicken's hen spends her time incubating her eggs and caring for her chicks. Egg production is less than 50 eggs per year, and chick production is low. The low population and egg production of kampung chickens is caused by the fact that hens are raise their young for 2-3 months, so eggs production is not much, and ultimately the chicken population grows slowly.

Chicken farmers in Liliba district need to increase the productivity of the chickens they raise. Therefore, efforts need to be made to increase the productivity of kampung chickens by replacing the brooding role of the hens with an incubator or hatching machine (Krisna et al., 2023). Artificial hatching machine is one strategy for the farmers to secure their business, so that egg production can increase (Aksan et al., 2021). But, increasing egg production is not only influenced by hatching machine, but there is also another factor need to be considered. The success of egg hatching machine is influenced by many factors, including pre-incubation conditions such as parental stock age, egg weight, eggshell quality, and environmental factors during incubation such as temperature, humidity, gas concentration, and ventilation (Elibol and Brake, 2008; Meijerhof, 2009, Okur 2022, Waryani et al.,2020). Additionally, the conditions and duration of egg storage, nutrition, semen quality, mating ratio, the presence of antinutritional components, toxicants, or feeds, inbreeding, chromosomal abnormalities, instances of parthenogenesis, and stocking density have been documented to affect the fertility and hatchability of poultry eggs (King'ori, 2011, Niswatin et al., 2019; Suryadi et al., 2018). Removing the hatched chicks from the hatching machine is also important to obtain good quality chicks. Delays in removing the chicks from the machine will cause the chicks to experience a lack of water (dehydration) resulting in low chick quality (Mulyantini, 2009; Niswatin et al., 2019, Suryadi et al., 2018,).

It is hoped that the hatching machine can help speed up chicken egg production in Liliba district, Kupang city. Hatching machine are considered strategic in overcoming egg production problems and empowering the community's economy. As mentioned above, the farmers problems are egg production and chick production are still low, and knowledge about egg hatching technology is still low. Also, motivation of the village chicken farmer group in Liliba Village to increase egg production is still low. Based on several problems faced by the village chicken farmer group in Liliba sub-district, it is necessary to provide information, practical technology and direct assistance to help increase economic added value, as well as help increase knowledge about increasing chicken egg production. The solutions offered to solve those problems are providing training in using hatching machine, providing assistance with fertile eggs, and providing counseling on increasing chickens production in all rearing management aspect.

Method

In Figure 1 can be seen that the first step of the activity program was survey to find out location for community services program. Next, identify various farmers problems in terms of raising kampung chickens and handling chickens hatching eggs. After identifying the problem, we find out the program to solve the farmers problems. The next step is to prepare all the tools and materials for hatching eggs, such as fertile chicken eggs, egg candling, thermostat and automatic hatching machine. Fertile eggs are needed to incubate chickens' eggs for 21 days in the incubator. Egg candling is a tool to help determine the

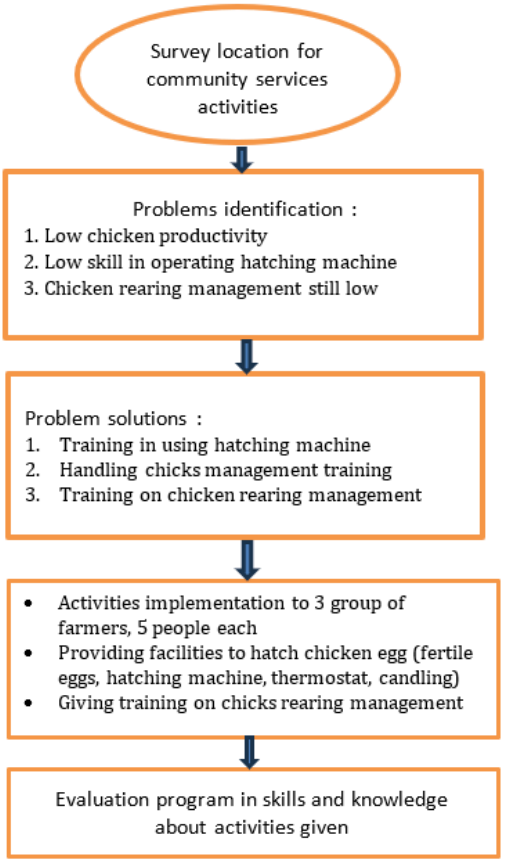
quality of egg by using light.

Thermostat is to stabilize temperature and humidity inside. Incubator also need and to allow air renewal and egg turning, providing the perfect environmental conditions for embryonic development, aiming at achieving high hatchability of healthy chicks, which is directly correlated with the survival and performance of individual chicks in the field. Automatic hatching machine is a device to stimulate avian incubation by keeping eggs warm at a particular temperature range and in the correct humidity with a turning mechanism to hatch egg. Incubating chicken eggs is a 21-day process and requires an egg incubator to help control temperature, humidity and egg turning.

After all the facilities are ready, we continue to implement some activities in chicken farmers group in Liliba Village, Kupang, NTT. There were 3 groups of farmers and 5 people in each group. Furthermore, we give counseling for using hatching machines and hatching management system. We also doing some demonstration or direct practice in using hatching machine. Mentoring: every stage of activity from start to finish is always provided with assistance, so that all activities can be carried out correctly. Assistance is provided until they are well skilled in using egg hatching equipment. Evaluate program implementation to find out:

- Partner's level of understanding regarding the operation and maintenance of hatching machine.
- Partner satisfaction level with the tools provided.
- The level of egg production of kampung chickens and the level of productivity of chickens raised by partners.
- Evaluation of egg production produced by farmers after being given hatching machine.

Figure 1. Stages of program implementation



Result

The chicken farming business carried out in the Liliba District, Kupang city is the KUB chicken farming business (Ayam Kampung Unggulan Balitbang/Balitbang Superior Village Chicken). KUB chicken is a new breed of local chicken resulting from research innovation by the Agricultural Research and Development Agency (Balai Penelitian dan Pengembangan/Balitbang) located in Ciawi, Bogor. Local government provide assistance to the farmers in Liliba district in the form of 100 KUB chicken breeders aged 1 month with the aim of raising the chickens. Apart from that, assistance is provided to motivate farmer groups to raise chickens well, so that they can help fulfill family nutrition and improve the economy of farmer households. However, maintenance is still carried out traditionally, and the facilities owned by farmers groups are still inadequate for their business. The raising system is carried out extensively, because it does not require large costs and is not for commercial purposes. The characteristics of KUB chickens at the service activity locations can be seen in Table 1.

Tabel 1. Characteristics of KUB chickens at the locations of chicken farmers in Liliba Village

Characteristics	
Body weight age 5 month (kg)	1,00 – 1,5
Age at first laying egg (month)	5-6
Egg weight (g)	35-40
Egg production (egg/hen/yr)	100-120
Laying Frequency (times/yr)	7-8
Hatchability (%)	70-75

KUB chicken egg production at the location is lower compared to the research results reported by Priyanti et al., (2016) which can reach 180 eggs/year. Egg production is expected to produce day old chicks (DOC) in large numbers, because DOC is really needed by farmers to be raised as meat chickens. The demand for free-range chickens is currently very high and they can be harvested at the age of 70 days.

The material of counseling is about the benefits of hatching machines and procedures for using hatching machines. Apart from that, material was also explained about the comparison between egg production using hatching machines and using chicken hen naturally. Next, we talk about the ease of hatching with an egg hatching machine, selecting good hatching eggs, and handling of chicks after hatching. Instructions for using the hatching machine were distributed to each participant. There are 15 participants who are always present and actively ask questions at every outreach event. The hatching machine provided is a semi-automatic hatching machine as shown in Figure 1. Participant were very enthusiastic about learning all the components contained in the hatching machine (Figure 2)

Figure 2. Hatching machine

Figure 3. Show all the component in hatching machine

Hatching machine assistance for a group of chicken farmers in Liliba Village is a type of automatic hatching machine that can hold 200 eggs. Apart from the hatching machine, other tools provided are an egg candling to test whether the eggs are fertile or not, a thermostat to stabilize the temperature of the hatching machine, and fertile chicken eggs. The hatching machine is equipped with an egg rack, heating lamp, thermometer and tray to regulate the humidity of the machine, automatic egg turning device. Thermometer to determine the temperature value of 370C -38.50C and humidity 60% -70%.

Demonstrations were carried out starting on the first day of activities, namely sanitizing and disinfecting hatching eggs with materials that can kill microorganisms on the eggshells. All participants were actively participated in cleaning the eggshells/shells. Once the eggs are clean, then leave them in the open air to dry. Then, participants continued the activity of cleaning the hatching machine. Even though the hatching machine is new, it must still be clean. The cleanliness of the shells and the cleanliness of the hatching machine are one of the factors that greatly influence the hatching process. The shells usually dirt, especially from feces, which is a source of bacteria that can attack the embryo. Contamination of eggs can occur while the eggs are still in the hen's body and after the eggs hatch. After sanitizing and disinfecting, proceed with setting the temperature and humidity of the hatching machine so that the temperature remains stable, resembling the hen's body temperature, which is around 37-380C. Once the temperature of the hatching machine is stable, then the hatching eggs are put into the hatching machine in the egg rack with the blunt end positioned at the top. Next, the farmers were given the task of monitoring the condition of the hatching machine and what must be done every day by following applicable standard procedures. On the 21st day, 200 eggs successfully hatched with a hatchability percentage of 80%.

After the demonstration stage, the next activities are mentoring, monitoring and evaluation to ensure the sustainability of the program that has been implemented during the service activities. The service team actively assists farmer groups to implement the program by providing motivation, training and technical support. In addition, monitoring is carried out

periodically to monitor and evaluate the progress of the program. With assistance, monitoring and evaluation, the program is expected to be sustainable and provide economic benefits to farmers. The impact of the activities carried out can be seen in the following table.

Table 2. The impact of operational training of hatching machine for the KUB chicken farmers

	Before program implementation	After program
Age at first laying egg (month)	5-6	5-6
Egg weight (g)	35-42	40-44
Egg Fertility (%)	55-60	85-87
Hatchability (%)	70-75	80-82

Discussion

The KUB chicken farming business in Liliba District, Kupang City, is an important initiative aimed at improving local chicken production and contributing to household nutrition and economic growth. The KUB chicken, a new breed developed by the Agricultural Research and Development Agency (Balitbang), offers potential for enhancing productivity in this region. However, traditional farming methods and inadequate facilities have limited the success of local farmers. The introduction of 100 KUB chicken breeders by the local government is a step towards addressing these challenges, but more structured training and modern equipment are needed. One of the key interventions in this program is the provision of semi-automatic hatching machines, which significantly improves the efficiency of chicken farming. The training given to 15 farmers included how to use these machines, egg selection, and maintenance procedures. The use of the machines, compared to natural hatching by hens, offers several advantages, including a higher hatchability rate (up to 80%), improved egg quality, and better monitoring of chick development.

The demonstration and active participation of farmers in sanitizing and disinfecting eggs, as well as maintaining the hatching machines, emphasize the importance of cleanliness and temperature control in the hatching process. This approach has led to increased egg fertility from 55-60% to 85-87% and improved hatchability from 70-75% to 80-82%. These improvements are crucial for meeting the high demand for free-range chickens, which can be harvested at 70 days of age. Continuous support through mentoring, monitoring, and evaluation ensures the sustainability of this initiative. The consistent involvement of the service team in providing motivation and technical guidance has enhanced the farmers' ability to adopt modern practices, which not only improve productivity but also have the potential to boost the local economy. The success of this program could serve as a model for other regions aiming to modernize their agricultural practices.

Conclusion

The KUB chicken farming business in Liliba district Kupang NTT has improved through training program of hatching machine. The impact of the program is an increase in understanding and skills of farmers in the field of egg hatching, breeding and cultivating KUB chickens, which can ultimately increase the independence and welfare of KUB chicken farmers in Liliba District, Kupang, NTT.

In order to meet high demand for chicken meat, chicken farmers in Liliba district Kupang city not only need hatching machine to maximize chick production but also, they

need to maximize the hatchability of healthy chicks with high survival rates. Therefore, as a recommendation farmers require another community services program about feed management, housing management, and all aspect management to improve chickens' productivity.

Acknowledgements

We would like to acknowledge to the groups who have contributed to the project. Secondly, dean of Faculty who gave funding sources that supported the activity. Furthermore, we would like to express gratitude to active participation from the chicken's farmers in Liliba district Kupang, special recognition should be given to them. Appreciation also given to the institutions that assisted in coordinating or supporting the project and contributions to the community engagement project.

Reference

Aksan, Satriani S., Nuraminah, Wawan I. (2021). PKM Pemberdayaan Masyarakat Usaha Ternak Ayam Kampung Melalui Teknologi Mesin Tetas Telur Otomatis di Desa Bontosunggu Kabupaten Gowa. Prosiding 5th Seminar Nasional Penelitian & Pengabdian Kepada Masyarakat. ISBN 978-623-98762-0-3

Elibol, O., and J. Brake. 2008. Effect of egg weight and position relative to incubator fan on broiler hatchability and chick quality. Poult. Sci. 87:1913–1918

King'ori, A. M. 2011. Review of the factors that influence egg fertility and hatchability in poultry. Int. J. Poult. Sci. 10:483–492.

Krisna A., Endi P., Bagus D. (2023). Prototype Penetas Telur Ayam Kampung menggunakan Arduino Nano V3.0 Atmega328. Aviation Electronics, Information Technology, Telecommunications, Electricals, Controls (AVITEC). Vol. 5, No. 2. pp. 97-109, ISSN 2685-2381, e-ISSN 2715-2626 http://dx.doi.org/10.28989/avitec.v5i2.1672

Meijerhof, R. 2009. The influence of incubation on chick quality and broiler performance. Proc. Aust. Poult. Sci. Symp. 20:106–111.

Mulyantini, N.G.A. (2009). Buku Teknologi Penetasan Telur. Penerbit Undana Press

Niswatin H., Nanang D. W., Achmad M. (2019). Teknik Manajemen Penetasan Telur Tetas Ayam Kampung Unggul KUB Di Kelompok Gumukmas Jember. Jurnal Ilmiah Fillia Cendekia Vol 4 No 1.

Okur, N., Sabri A. E. ,Ayse A. Y¸ Tuncer K. , Ruhi K. and Sule Y. ¸ Ozsoy. 2022. Effects of incubator oxygen and carbon dioxide concentrations on hatchability of fertile eggs, some blood parameters, and histopathological changes of broilers with different parental stock ages in high altitude. J. Poult Scie. oultry Science 101:101609. https://doi.org/10.1016/j.psj.2021.101609

Priyanti, A., Sartika, T., Priyono., Juliyanto, T. D., Bahri, S. dan Tiesnamurti, B. (2016). Kajian Ekonomik dan Pengembangan Inovasi Ayam kampung Unggul Balitbangtan (KUB). Pusat Penelitian dan Pengembangan Peternakan, Bogor.

Sapta A. (2022). Tatalaksana Penetasan Telur Ayam Joper (Jowo Super) di CV Joper Indonesia Unit Hatchery Desa Kencong Kecamatan Kepung Kabupaten Kediri. Prosiding Seminar Nasional Cendekia Peternakan.

Suryadi, Ujang and Prasetyo, Budi (2018). Teknologi Penetasan Telur. PNJ Press (Politeknik Negeri Jakarta), Jakarta. ISBN 978-602-1678-96-1

Waryani, Marina A., Denden M. T., Aryo D. W (2020). Sistem Penetasan Telur Berbasis PLC. Jurnal Rekayasa Teknologi Nusa Putra. Vol. 7, No. 1, September 2020: Hal 45- 53.