

# Coop

*by H M*

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## ASSISTANCE IN PLANNING THE CONSTRUCTION OF CLOSED HOUSE CHICKEN COOPS IN KEDUNGREJO VILLAGE, REMBANG REGENCY

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### **Abstract**

*The high demand for poultry production has recently become the basis for farmers who are members of the Mbesi Chicken Farmer Group, Kedungrejo Village, Rembang Regency to strive to increase productivity by optimizing the construction of their chicken coops. The type of poultry coop that suits the environment and weather of the partner's location is a closed-house system by optimizing the land. The implementation of the construction of the coops is usually left entirely to third parties. Changes in coop design and price increases in the middle of the construction process often occur and are charged to breeders. The lack of understanding of farmers regarding the design drawings of poultry closed-house system buildings is the reason for the Community Service (PkM) activities through assistance in making coop building drawings. The output of this PkM is the submission of design drawings of poultry closed-house system buildings. An evaluation was conducted by providing pre-test and post-test, and it was concluded that there was an improvement in the partner's competence in understanding working drawings.*

**Keywords:** *chicken farmer; close house; construction; design drawings*

### **Abstrak**

Tingginya permintaan hasil produksi ternak ayam akhir-akhir ini menjadi dasar petani yang tergabung dalam Kelompok Peternak Ayam Mbesi, Desa Kedungrejo, Kabupaten Rembang, berusaha untuk meningkatkan produktifitas dengan mengoptimalkan pembangunan kandang. Tipe kandang ayam yang sesuai dengan lingkungan dan cuaca lokasi mitra adalah kandang tipe tertutup dengan mengoptimalkan lahan. Pelaksanaan pembangunan kandang biasanya diserahkan sepenuhnya kepada pihak ketiga. Perubahan desain kandang dan kenaikan harga ditengah proses

pembangunan seringkali terjadi dan dibebankan kepada peternak. Minimnya pemahaman peternak terkait gambar desain bangunan kandang ayam tipe *closed house* menjadi alasan adanya kegiatan Pengabdian kepada Masyarakat (PkM) melalui pendampingan pembuatan gambar bangunan kandang. *Output* kegiatan PkM adalah penyerahan gambar desain bangunan kandang ayam tipe *closed house*. Dilakukan evaluasi dengan memberikan *pre-test* dan *post-test*, dan diperoleh kesimpulan bahwa terdapat peningkatan kompetensi mitra dalam pemahaman gambar kerja.

**Kata kunci:** peternak ayam; kandang tertutup; konstruksi; gambar desain

## Introduction

The livestock sector is one of the business fields that are currently the focus of public interest because the value of demand is quite high. This is triggered by the high demand that is the basis for people to try to start a business in the livestock sector with selling prices soaring from the previous price, especially on chicken farms. This situation is a promising business opportunity in post-pandemic conditions with efforts to restore economic conditions, especially for chicken farmers. This situation is a high business opportunity in post-pandemic conditions with efforts to restore economic conditions, especially for chicken farmers. The chicken farming business is one of the businesses that has prospects in meeting industrial-scale needs (Widiansyah & Rahayu, 2019).

In 2020, Aceh Province is still importing eggs from Medan City because its production and internal business are not optimal (Fradinata, Yaman, & Dasrul, 2022). In this activity, education is carried out in laying hen farming with an opened-house coop system in meeting internal egg demands. However, only 7 coops are active in the field out of a total of 20 opened-house coops that have stood with accompanying conditions.

Currently, what has become a trend and interest of chicken farmers is the condition of a representative coop with a large capacity with a minimum land area and still prioritizing the health of the condition of the livestock chicken coop. Coops with this specification can be applied to the concept of a closed-house chicken coop. The concept of a closed-house system broiler chicken coop is a closed coop that ensures biological safety (contact with other organisms) with good ventilation

arrangements so that less stress occurs in livestock. Closed-house-type chicken coops are usually designed with a permanent and closed wall system so that it is possible to arrange good air ventilation to reduce the influence of air humidity (Nuryati, 2019).

Increasing the livestock population, not accompanied by good and efficient maintenance management will cause fundamental problems. This has an impact not only on livestock productivity but also on livestock health, ecosystems, and humans (Repi, Ervandi, & Fahrulah, 2020). The study (Putri, Fauziah, Rifa'i, Adhisuwignjo, & Yulianto, 2021) mentioned that, in the livestock business, sufficient electrical energy is needed so that lighting and temperature control to stay warm cause high production costs as operations that must be prepared.

To support optimal productivity, there need to be alternatives in the livestock business process. The process carried out is by using a scheme to make native chicken coops to minimize the mortality rate of chicken livestock as implemented in Sungai Batang Village, Banjar Regency (Gunawan, Djaya, & Samudera, 2018). The stages that have been running are carried out on a small scale by optimizing the local farming community, but it still needs to be provided extensive assistance considering that the scope of the livestock carried out is small-scale.

The intensification program for native chicken farmers is also a concern for the community considering the high demand for this type of chicken. Some efforts that can be optimized such <sup>3</sup> improving maintenance management semi-intensively include training and assistance in hatchery management, disease prevention, housing, and brooding management (Suwarta, Suryani, & Amien, 2021). The main problem is that in addition to feeding and drinking livestock, the layout of the coop also determines the productivity of livestock as mentioned by (Syah<sup>5</sup>uddin, et al., 2022). Inefficient construction and layout of the coop in Bintang RS. Pulubala can cause a decrease in egg production and affect the health of the livestock of chickens.

Determining the type of coop building is the first thing that must be taken into account in starting a chicken livestock business. Considerable preparation of costs and strong building specifications are required to create a safe and comfortable design for the chicken

coop for chickens. The comfort of the coop affects the productivity of livestock, so farmers need to pay attention to it (Hasrullah, Ananda, & Qurniawan, 2022).

Seeing the geographical conditions in Rembang Regency-Central Java, especially in Mbesi Hamlet, Kedungrejo Village which has dry weather, the choice of coop type is the main reason for starting a chicken farming business. Based on the weather conditions at the site, the closed-house chicken coop type is the most likely option to be applied in this area. Closed house-type coops are considered safer against outside disturbances in the form of weather, disease, physical disturbances, and due to the influence of air pollution (Susanti, Dahlan, & Wahyuning, 2016). In addition, this type of coop can also make it easier for farmers in terms of animal feed efficiency.

The problem faced by chicken farmers collected in the container of the Chicken Farmers Group-Mbesi, Rembang is that the construction of chicken coops is carried out with a wholesale system by third parties. Wholesale prices, which in practice can be volatile, are determined unilaterally by the contractor. Thus, if the contractor makes a price increase based on an increase in the price of materials or building materials in the implementation of the construction of the coop, then the breeder also cannot evaluate and control the bid price as given at the beginning. Constructing a closed-house system chicken coop requires greater costs compared to the opened-house system chicken coop (Wulansari, Sukanata, & Suasta, 2018).

Perfect planning is required for cost efficiency both at the planning stage and the implementation of the construction of a closed-house system chicken coop. This condition is a problem for the Chicken Farmers Group-Mbesi, Rembang Regency, which has limitations in planning chicken coop buildings. The lack of background of residents who can plan closed-house-type chicken coop buildings is an obstacle at the planning and implementation stages in the field. The existence of experts in the planning and construction of chicken coops is a requirement so that the designed building is guaranteed safety and certainty in terms of implementation costs. The existence of building experts needs to be taken into account to assist in controlling the implementation of work (Onibala, Inkiriwang, & Sibi, 2018).

Therefore, this PkM activity aims to provide technical assistance to the Chicken Farmers Group-Mbesi, Rembang in planning a closed-house system chicken coop building. It is hoped that with this PkM activity, good communication can be established between universities and the community as well as a means of strengthening the existence and promotion of the Civil Engineering, Faculty of Engineering, Universitas Semarang, especially in Rembang Regency.

## Result

This PkM activity was carried out on Jl. Rel, Mbesi Hamlet, Kedungrejo Village, Rembang District, Rembang Regency, Central Java Province by the PkM team of the Civil Engineering, Faculty of Engineering, Universitas Semarang. The method of implementing PkM activities used in solving partner problems is in the form of assistance by giving lectures on the planning of closed-house system chicken coop buildings. The flow of the stages of PkM activities can be seen in Figure 1.

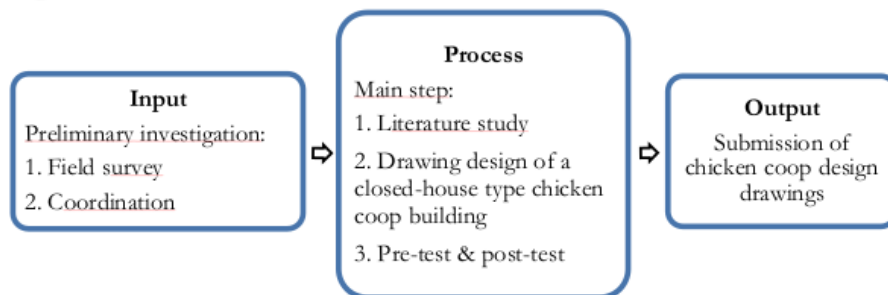


Figure 1. Methodology

This activity was carried out in the initial coordination stage with partners of the Chicken Farmers Group-Mbesi to share and locate the process of making a chicken coop building design which was carried out in November 2022. Accompanied by residents who own the land that will be planned to build a closed-house system, the community service team conducts permit and coordination to measure the land. In addition, this initial coordination aims to synchronize the development plan that will be carried out by the landowner so that a closed-house chicken coop system drawing design can be made according to the needs of farmers. This is also done to minimize differences in

perceptions of the size, material specifications, and criteria of the closed-house system from the breeder and the PkM implementation team.

Furthermore, on December 5, 2022, land measurement was carried out as the main stage at the beginning of this community service activity. This activity was carried out at a rice field location that was used by groups of breeders to plan the location of the closed-house system coop. In the rice field area, there are already several closed-house system chicken coops that have been established before that are owned by residents from the farmer group. This will make it easier for the Chicken Farmers Group-Mbesi to share and coordinate the process of making the chicken coop building design.

After measuring the location, the next stage is coordinated with the Chicken Farmers Group-Mbesi regarding the details of the land area and the design of the coop building that will be submitted by the community service team for the closed-house coop system construction plan. This process is the main stage before the design drawings are carried out by the community service team. Thus, the design plan data is obtained by the conditions expected by the partner. At this stage, it was agreed that the design drawings of a closed-house chicken coop system with a building size of 12 x 30 m would be carried out on the land of the Chicken Farmers Group-Mbesi.

After the coordination activities and field surveys were carried out, the PkM team proceeded to the next stage, namely the literature study, and began the process of drawing a closed-house chicken coop system design. The drawings made are in the form of structural drawings and 3D drawings which are then proposed to the Chicken Farmers Group-Mbesi. Next, the PkM team discusses with partners to determine whether the design made is in accordance with the needs or not and whether there are design changes.

The design drawing of the building plan of the closed-house system chicken coop is made with the help of the AutoCAD and SketchUp programs. The planned closed-house chicken coop system building structure specifications are designed to be able to withstand the load of the building structure and support the function and designation of the closed-house chicken coop system building using

steel construction. The enclosure building is made with the concept of a 2-floor building. The lower structure of the coop used a footplate foundation with dimensions 50 x 50 cm with a depth of 1.00 m below the original ground level with concrete quality K-225 MPa and BJTP steel quality 24 MPa. The reinforcement of the sloof with dimensions of 15 x 20 cm is given as a stiffener for the structure of the lower building. In the upper structure, columns, and beams are used in the form of steel CNP 150 x 50 x 20 x 3.2 mm and CNP 100 x 50 x 20 x 3.2 mm. The structure of the 2nd-floor plate is used sengon or bangkirai or teak wood measuring 5 x 7 cm and 2 x 3 cm. The roof frame is designed using CNP steel 150 x 50 x 20 x 3.2 mm with a cover in the form of a plain galvalume roof of 3.5 mm.

On the 1<sup>st</sup> floor, a coop design is planned to consist of a livestock area that is the main area of the coop building. In addition, to meet the operational needs of chicken livestock, well and ground tank locations are also designed to meet water consumption in livestock chickens, and 2 stairs are added located inside the coop and outside the coop building as access to enter and exit the coop building on the 2<sup>nd</sup> floor. Another main design that is needed for a closed-house system chicken coop is a warehouse as a place to store animal feed stocks and the placement of generators is also conceptualized on the 1<sup>st</sup> floor of this closed-house coop building. To support healthy air circulation in the closed-house system coop, 4 blowers were installed on the 1<sup>st</sup> floor on the back side of the coop.

The design of the 2<sup>nd</sup> floor closed-house chicken system building is also dominated by the livestock area, equipped with a 6-meter air filter each on the right and left sides of the coop at the back of the coop. This filter is useful as an air filter and air circulation in livestock, especially on the 2<sup>nd</sup> floor. So that the humidity on the 2<sup>nd</sup> floor can also be controlled by the presence of 2 air filters in optimizing the work function of the blower on the 1<sup>st</sup> floor. This concept was chosen because it will be much more efficient in the procurement of blowers and electricity consumption during the operation of the coop. The 2<sup>nd</sup> floor livestock area with a wooden floor plate covered with tarpaulin is then sprinkled with rice husks to maintain the room temperature and facilitate the disposal of chicken manure. On the 2<sup>nd</sup> floor, there is also



a worker rest area and a stopover area as a need for workers in maintaining the operation of this closed-house chicken coop.

The specifications of the planned building structure can be seen in Table 1. Drawings of the 1<sup>st</sup> floor and 2<sup>nd</sup> floor plans of the closed-house type of chicken coop building are shown in Figure 2 to Figure 3.

Table 1. The specifications of structure

No	Structure	Type & Dimension (cm)	Total	Compressive Strength	Tensile Strength
1	Footplate	K1 50 x 50	19	K-225	BJTP 24
		K2 50 x 50	12	K-225	BJTP 24
		K3 50 x 50	2	K-225	BJTP 24
2	Sloof/ Tie Beam	15 x 20		K-225	BJTP 24
3	Steel Column	CNP 150 x 50 x 20 x 3,2 x 6 m	38		
		CNP 100 x 50 x 20 x 3,2 x 6 m	24		
		IP 15 x 15	6	K-225	BJTP 24
4	Beam	CNP 100 x 50 x 20 x 3,2 x 6 m			
5	Plate	Sengon/ Bangkirai/ Teak wood 5 x 7			
		Sengon/ Bangkirai/ Teak wood 2 x 3			
6	Rafter	CNP 100 x 50 x 20 x 3,2 x 6 m			
7	Roof	Galvalume 0,35 mm			

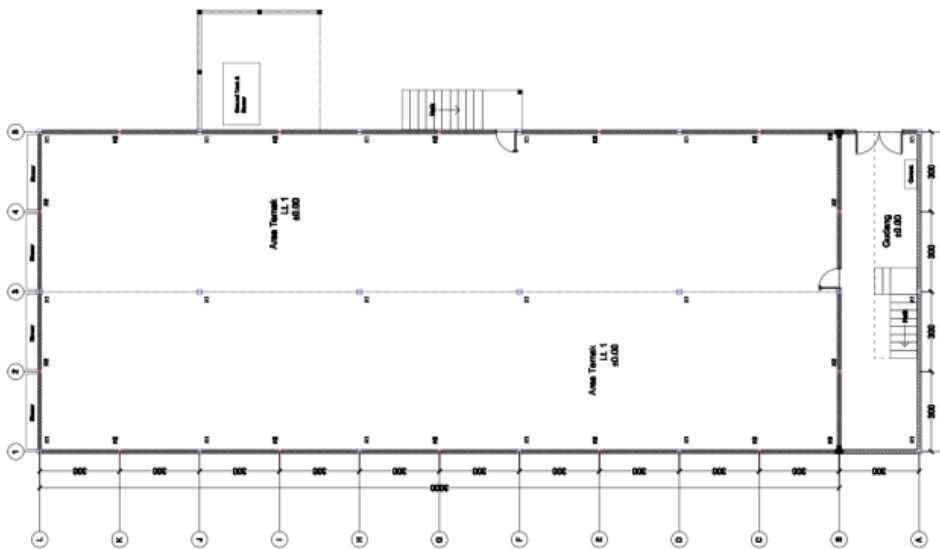


Figure 2. The 1<sup>st</sup> floor

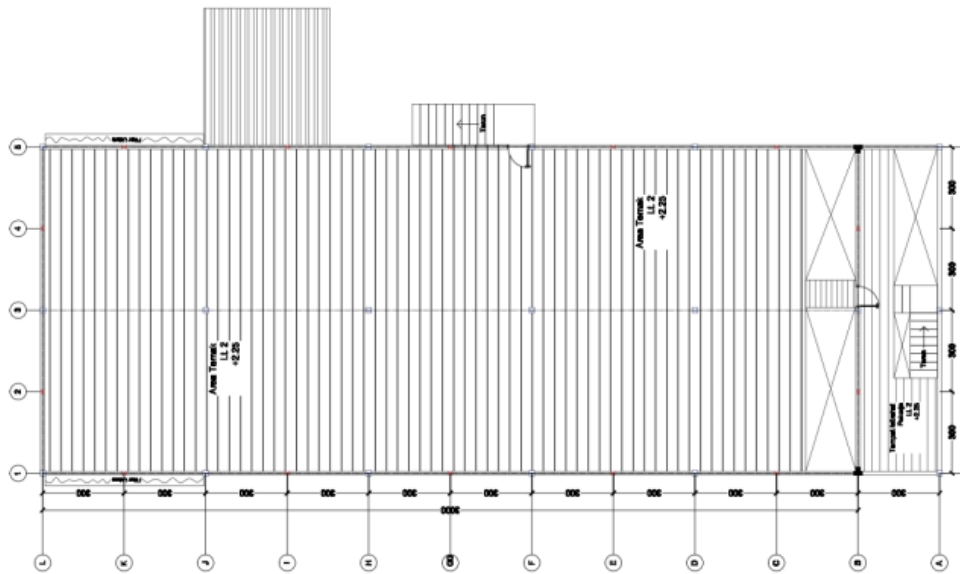


Figure 3. The 2<sup>nd</sup> floor

### Discussion

The creation of 3D drawing designs is carried out by the community service team concerning the needs of the room and requests from the farmer. Based on the availability of land owned by partners and a plan to accommodate approximately 10,000 chickens, the design of this closed-house system chicken coop is made of 2 floors with a size of 12x30 meters. Based on the function of the closed-house system coop, this chicken coop also has 4 (four) blowers and 2 air filters as air circulation and air humidity regulators in chicken livestock in the coop area. By using the closed-house coop type with the concept of a blower, it provides an arrangement of air humidity and even lighting, so it is very conducive and comfortable in optimizing the growth of chickens.

One of the characteristics of a closed coop is the use of automation of eating and drinking places and a measurable ventilation system so that it has high efficiency. This type of coop is also useful for ensuring the biological safety of chickens by limiting contact between chickens and other organism's outdoors. In addition, this coop is environmentally friendly and suitable for farmers. The selection of

materials used is based on the needs and concept of the closed-house coop, so the specs and criteria applied to meet the criteria in the closed-house coop concept. The display of 8 results of the 3D design of the closed-house coop construction plan is shown in Figure 4 and Figure 5.



*Figure 4. Site plan 3D view*



*Figure 5. Isometric 3D view*

Evaluation of PkM activities starts from the pre-test to post-test stages. The pre-test stage given is in the form of a questionnaire using a Likert scale. A Likert scale of 1-5 is used to describe the criteria of very unable to, unable to, sufficient, able, and very sequential. The pre-test results that have been obtained are then analyzed and used to determine the next step, which is to determine how the form of

technical assistance is carried out. The evaluation stage is in the form of filling out pre-test and post-test questionnaires followed by 5 partners. The pre-test results can be seen in Figure 6.

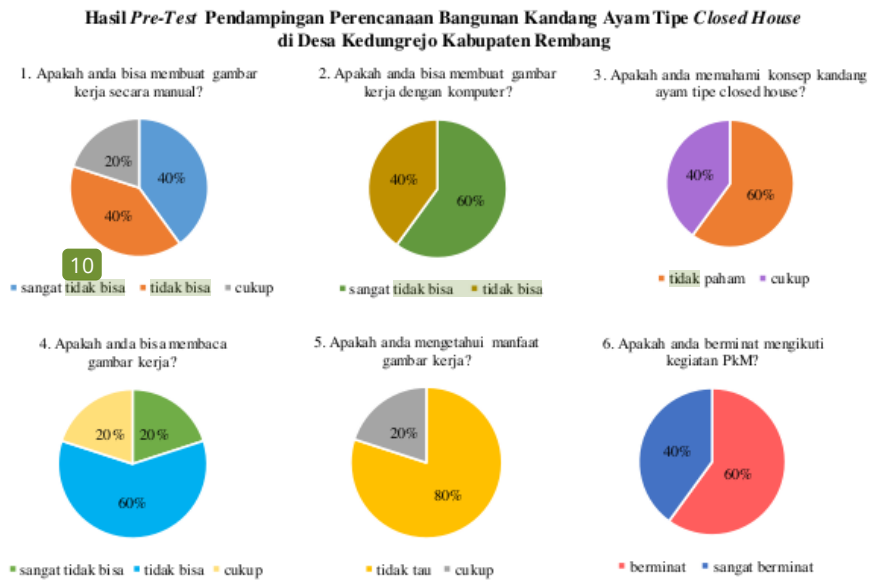


Figure 6. Pre-test result

Based on the results of the pre-test, it is known that there are still very few participants who can make design drawings of the closed-house coop construction plan. As many as 40% of participants stated that they could not and could not make manual work drawings, and in line with the limitations that existed in partners related to the use of computers for work to make design drawings of closed-house coop construction plans, it was known that partners (respondents) were on the criteria of being very unable and unable to make work drawings. Furthermore, regarding the understanding of work drawings, as many as 60% of partners cannot read work drawings. Therefore, 60% of partners stated that they were very interested in participating in this PkM activity. The PkM activities to assist in the planning of a closed-house system chicken coop building were carried out using the lecture method on January 10, 2023, with 5 chicken farmers participating. This activity ends with the submission of working drawings and joint documentation as shown in Figure 7.



Figure 7. Documentation of PkM

After delivering the material, participants were given an evaluation questionnaire in the form of a post-test using a Likert scale of 1-5 with criteria as well as in the pre-test. The post-test is given to know whether the partner has understood the planning drawings of the closed-house type of chicken coop building, and the extent to which the assistance provided can be useful in solving partner problems. The post-test results are summarized as shown in Figure 8.

**Hasil Post-Test Pendampingan Perencanaan Bangunan Kandang Ayam Tipe Closed House di Desa Kedungrejo Kabupaten Rembang**

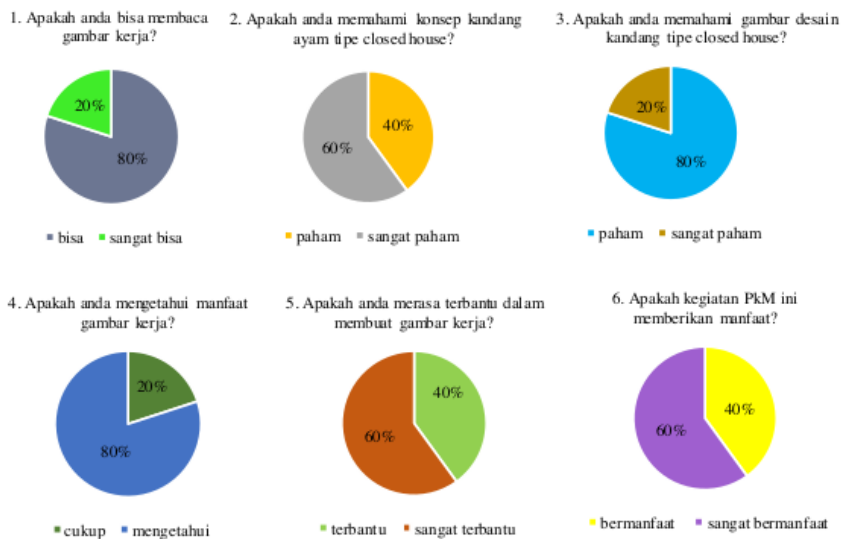


Figure 8. Post-test result

Based on Figure 8, it is known that 80% of participants stated that this PkM activity can provide benefits to partners in the form of being able to read and understand the working drawings of planning a closed-house system of chicken coop building. From the results obtained, as many as 60% of participants felt helped and useful in understanding work drawings.

### **Conclusion and Suggestion**

PkM activities of technical assistance to the Chicken Farmers Group-Mbesi, Rembang in planning the poultry closed-house system building have been completed. Based on the results of the evaluation of PkM activities starting from the pre-test to post-test stages, it is known that this PkM activity of 60% can help partners in knowing and understanding the planning drawings of closed-house type poultry coop buildings. The output of this PkM activity is the submission of drawings of a 2-story building plan for poultry closed-house system building given to the Chicken Farmers Group-Mbesi, Rembang to be used as a guide in the implementation of coops construction in the field.

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