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Evaluation of Rice Farmers' Climate Field School with “Context, Input, Process, and Product” Model

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Abstract: The field school pattern ensures that farmers' learning opportunities to interact with their realities directly are widely open. Also, the CIPP (Context, Input, Process, and Product) is an evaluation analysis model developed by Stufflebeam and colleagues at Ohio State University. Therefore, this research aims to describe and analyze the Climate Field School program using the context, input, process, and product components. The basic method used was descriptive analysis, while the samples used as respondents were 20 members of the farmer group. The results showed that overall components of the CFS program implemented at the Tunas Muda Farmer Group were described following the adult learning approach model. In conclusion, due to the implementation's status, the capacity building of rice farmers through climate field schools is categorized as quite good.

Keywords: field school, CIPP, farmer, evaluation.

用背景、投入、過程和產品模型評估稻農氣候田間學校

摘要：田間學校模式確保農民直接與現實互動的學習機會是廣泛開放的。此外，上下文、輸入、過程和產品是由俄亥俄州立大學的同事開發的評估分析模型。因此，本研究旨在使用上下文、輸入、過程和產品組件來描述和分析氣候實地學校計劃。使用的基本方法是描述性分析，而作為受訪者的樣本是農民組的二十名成員。結果表明，在金槍魚穆達農民集團實施的氣候實地學校計劃的整體組成部分是按照成人學習方法模型進行描述的。總之，由於實施情況，通過氣候田間學校的稻農能力建設被歸類為相當好。

关键词：田間學校，上下文、輸入、過程和產品，農民，評估。

1. Introduction

Since the climate is the main element affecting the metabolic system and plant physiology, changing its general conditions by global warming hurts food security sustainability. However, data from the Central Statistics Agency in 2010 showed the total population of Indonesia had reached 237,641,326 people with a growth rate of 1.40 in the 2010-2035 projection.

The continued increase in the population has caused problems, such as higher rice consumption. In addition, data showed national rice consumption in 2006 was only 30.96 million tons, but reaching 33.42 million tons in 2010 statement form Directorate of Food and Agriculture. This condition requires sufficient food to prevent it from becoming one of the reasons for national food instability. However, there are still many obstacles at the field level in fulfilling the needs, especially by maintaining and increasing food production. The work [1] identified barriers and obstacles that can be overcome by introducing technology and other strategic efforts, but some are difficult to handle, mainly those related to natural phenomena.

Climate is one of the natural phenomena with a significant impact on the agricultural sector. Once this factor experiences globally, at least its three elements and natural components closely relate to agriculture: (a) rising air temperature, which also affects other elements, especially humidity and atmospheric dynamics, (b) changes in rainfall patterns, (c) increasing intensity of extreme climate events (climate anomalies) such as El-Nino and La-Nina, and (d) rising sea levels due to melting of icebergs in the north pole [2].

Besides reducing productivity, especially due to floods & droughts, shifting seasons, and increasing the

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intensity of extreme climate events, global warming is also the cause of shrinkage and fluctuations and expanding planting areas that fail the harvesting of foods other seasonal crops. Therefore, climate change and extreme events such as El-Nino and La-Nina threaten national food security and agriculture sustainability in general. The work [3] claims that one El-Nino event (Weak-Medium category) reduces national rice production by 2-3%; therefore, once an increase follows the extreme climate in air temperature, a higher decrease in the production occurs.

The greatest impact of global climate change on agriculture, which equally affects farmers, is the shift at the beginning of the rainy season. Forecasting information at the end of the rainy season or the beginning of the dry season is necessary to determine the next perfect planting time for farmers; therefore, the right crop commodities can be predicted. One way to increase the capacity of farmers to understand climate change and adjust cropping patterns and the planting schedule requires intensive counseling, for example, through the Climate Field School (CFS). This program is informal for farmers learning about climate independently through the process of experiencing, sharing opinions, drawing conclusions, and determining action steps that create new experiences transmitted to their colleagues.

Through the CFS activity, farmers are educated to gradually increase knowledge about water and climate, closely related to plants' age and skills improvement. This is employed in predicting the next planting time and can be used to decide the right cultivation strategy during excessiveness and shortage of water. Moreover, the program is successful once the objectives are achieved. The evaluation of its success is carried out to determine the extent of the assessment and changes in farmers after participating in the learning process. Program evaluation is the first step in supervision, which involves the right data collection and can be continued with proper guidance. This is very useful, especially for decision-making, because decision-makers determine the follow-up of current or already implemented programs [4].

One of the evaluation models applied in CFS is the CIPP, the most widely known and used by evaluators; therefore, the description provided is relatively long compared to other models. Stufflebeam and colleagues developed it at Ohio State University [5]. CIPP is an abbreviation, meaning context, input, process, and product evaluation, which are the components targeted in the activity program. In other words, it is a model that views the program being evaluated as a system [4].

Various things need to be studied in the evaluation with the CIPP model under the following components: the context includes the community condition and socio-economic and socio-cultural status. Input includes facilities and funds provided for program implementation. The process includes site surveys and participant data collection. Furthermore, the product includes enhancing the farmers' ability and skills to manage water and climate, increasing group cooperation in farming, and improving the agro-ecosystem quality. In particular, evaluation with the CIPP model describes all the elements playing a role in CFS, including their strengths & weaknesses, the process of program activities, gaps, and integration between the elements. Therefore, it produces useful suggestions for program improvement and development [6]. Based on the problem formulation above, this study aims to describe and analyze the CFS from the Context, Input, Process, and Product components.

2. Literature Review

Field School is a "school without walls"; hence the classrooms and the library are rice fields. The participants gather once a week for one season (12-14 weeks) to follow and analyze their crop development, phase by phase, and the occurring climatic cycles. This approach is based on two main interrelated challenges, namely the diversity of local ecology and the role of farmers that need to become "experts" in their land [7].

The *CFS* is implemented openly by empowering farmers to read climatic conditions and have local wisdom to carry out site-specific agricultural cultivation to minimize production declines due to climate anomalies such as floods and droughts. It is the same as other field schools, which have a curriculum and learning evaluation system and a graduation certificate. CFS only knows participants and facilitators because the materials used are built using field guides as facilitators in the learning process.

The climate field school has basic principles following Ausubel's meaningful learning theory [8], implying that farmers learn through experience and by doing something purely from nature that describes previous events. Furthermore, the program is implemented through the "Learning from Experience Cycle," namely experiencing/doing (observing in the field), revealing (drawing the ecosystem), analyzing (discussion/analysis), concluding (deciding the necessary actions to be performed) and implementing/re-doing (in the study area and private land).

The CFS is a natural learning process, where participants learn from one another/their personal experiences hence being more meaningful because problems arise and are solved together by the learning community. The facilitator only plays a role in helping this process run well. The cycle indicates the learning process is entirely based on the associated community, which is carried out based on experience, thereby making the outcomes easier to understand due to being more meaningful. The characteristics of CFS are as follows:

1. The rice fields are the main learning facilities for the CFS program. Also, ecological-organic agriculture and rice diversification are applied skills. Therefore, almost 80% of the total time is used directly in the fields, not in the classroom.

2. Learning through experience. Each activity begins with an appreciation or direct observation, then experience disclosure, result assessment, and conclusions. This learning cycle is attempted in every field school activity.

3. Agro-ecosystem assessment. The field school is patterned in a weekly cycle where every element of the agro-ecosystem is studied systematically and in-depth. This is based on the consideration that changes in the condition of the rice field agro-ecosystem are quite different from one week to another. At the end of each week, the conditions are compiled for the assessment and land management decision-making. This cycle resembles the monitoring principle applied at the farmer level and familiarizes the trainees to keep abreast of developments across the season, from land preparation to post-harvest.

4. Practical & appropriate methods and materials. Each field school activity and its supporting materials are designed to be applied directly by farmers in the village. Therefore, the skills and experience gained by the participants become a master stock, which is easily transferred to daily tasks at the village level.

5. Curriculum-based on required skills. The curriculum is designed based on the analysis of the field skills needed to become an expert in ecological-organic agriculture and diversification of rice crops to ensure that such is well understood and applicable in a personally owned land and can be passed from one farmer to another. In addition to technical knowledge, participants acquire skills in activity planning, collaboration, group dynamics, development of learning materials, and communication; hence they become facilitators to stimulate and help the farmers effectively.

The field school is designed to open the widest possible learning opportunities for farmers to interact with their realities directly and discover knowledge and principles. In addition, the educational pattern is not just "learning from experience," but a process; hence the students who are all adults tend to master a dynamic "discovery of knowledge" applicable in everyday life and the management of agricultural land. This is important because the present era is full of change elements; therefore, the Field School is expected to prepare strong farmers to face current dynamics and future challenges.

The CIPP model was developed by Stufflebeam at Ohio State University but was originally used to evaluate ESEA (the Elementary and Secondary Education Act). Furthermore, the work [5] developed a decision-oriented evaluation approach structured to assist administrators or decision-making leaders. This CIPP model consists of 4 components from the process of an activity program as follows:

2.1. Context Evaluation

The main purpose of context evaluation is to determine the strengths and weaknesses of the object being evaluated. The evaluator provides the direction of improvement needed by knowing the strengths and weaknesses. The work [4] explained it as an attempt to describe and detail the environment of unfulfilled needs, the population and sample served, as well as the project objectives.

2.2. Input Evaluation

According to Widoyoko [9], input evaluation regulates decisions, determines available sources, alternatives, plans, strategies, and work procedures to achieve goals. This component comprises human resources, supporting facilities and equipment, funds or budget, and various procedures and rules required.

2.3. Process Evaluation

Process evaluation includes the collection of assessment data that has been determined and applied in program implementation practices. Also, it aims to investigate the extent of the implemented plan and the necessary components to be improved [5]. According to [4], the CIPP model refers to "what" are the activities carried out in the program, "who" is the person appointed to lead the program, and "when" it is to be completed. Process evaluation is directed at the level to which the activities are carried out under the plan. The work [5] proposed the following process questions:

a. Is the program implementation according to schedule?

b. Will the staff involved in implementing the program be responsible for handling activities during the program? Is it possible to continue?

c. Are the facilities and infrastructure provided optimally utilized?

d. What are the obstacles encountered during the implementation of the program and their possibility if the program is continued?

2.4. Product Evaluation

Product evaluation aims to measure, interpret and assess program achievements [5]. The work [10] describes product evaluation to make further decisions regarding previous results and things to be done after running the program. Based on these two understandings, product evaluation is concluded as an assessment to examine the achievement or success of a program in attaining predetermined goals.

According to Widoyoko [9], the CIPP is more comprehensive than other models because the object is not only results but also includes context, input, and process. In addition to these advantages, it also has

limitations, such as a low implementation level in the absence of modification.

3. Research Method

Climate Field School (CFS) is an activity expected to solve water and climate problems in rice plants, carried out through applying learning principles by action. Therefore, the objectives of this program or the impact of activities from the implementation of the conceived plan need to be evaluated. Else, the means of implementing a policy that has been issued cannot be known.

The applicable evaluation model is CIPP. The components are explained as follows: context is a detailed description of the specific characteristics of the area and its community as a basis for determining the most appropriate strategy for program implementation. Various vital things to be studied include the community's condition and socio-economic and socio-cultural status. Input is an effort made by presenting several physical and non-physical things as the basis and completeness for the process implementation and a working mechanism for achieving goals. This includes physical facilities and funds provided for the CFS program. The process is the implementation of various activities and program work mechanisms to achieve objectives, including site surveys and participant data collection, pre-planting deliberation meetings, and farmer training. Product is the result of a program activity that describes its level of effectiveness. This improves the ability and skills in managing water and climate, increases group cooperation in farming, and improves agro-ecosystems quality.

The basic method used was the descriptive analysis, which focused on solving present problems, followed by collecting the existing data to be compiled, explained, and analyzed [11]. The location, namely Tunas Muda Farmer Group, Banyuresmi Village, Jiput District, Pandeglang Regency certain, was determined in the evaluation intentionally, based on the CFS program implementation.

The studied population was all the 20 participants of the CFS program, which were also selected as the samples. Meanwhile, the sampling technique was the census [12], usually used to collect data as a whole where the accuracy/level of truth is expected to be close to 100 percent. In particular, this evaluation used primary data obtained with interviews using questionnaires and secondary data from government agencies/related institutions. Data analysis was carried out descriptively, namely by cross-analysis. According to Singarimbun and Effendi [13], in cross-tabulation analysis, the percentage distribution is used in cells within the table as a basis for collecting relationships between variables.

4. Results and Discussion

4.1. Context Evaluation

The identity of the respondent describes the condition and status of the person. The identity of farmers is important to know because their ability as cultivators is influenced by several elements, including age, land area, education level, main occupation, and income.

4.1.1. Age of Farmers that Participated in the CFS

Age is one of the factors affecting the success of farmers and their physical abilities and mindset, where in general, young individuals have better physical abilities than their old counterparts. The age of respondents that implemented the CFS program at Tunas Muda Farmers Group was generally categorized as moderate for ten people (50%) > 50 years old or low age group for seven people (35%), while three people (15%) were under 40 years old. This illustrates the suitability of the farmers as participants in the Climate Field School due to being in the productive age, and the knowledge acquired can be applied in farming. Therefore they become an example for other persons in Banyuresmi Village, Jiput District, Pandeglang Regency.

Most of the respondents are still in the productive age range, which makes them actively involved in farming activities from upstream to downstream such as plant type selection, provision of land & seeds, planting, and maintenance. Following [14], [15], the respondents are classified as productive age, meaning the farmers have good physical abilities. At these ages, people are usually in a relatively productive condition at work. They are looking for opportunities or beneficial information for activities related to improving welfare and seeking self-prestige, which ends with a sense of satisfaction based on the success obtained. With good physical condition, they carry out activities optimally and still develop personal abilities in terms of farming.

4.1.2. Education Level

The level in question is the duration of the formal education attended by the respondent farmers. This is a factor that encourages a person to think and act rationally. The higher the education level attained, the more dynamic and responsive people accept new things compared to those with relatively low education. Respondents implementing the CFS program have two levels: people who only received formal education starting from junior to senior high school are 15 (75%), and some, i.e., five in number (25%), only attended elementary school. The low education level is influenced by several things, including observation results, namely the school location is quite far from Banyuresmi Village, and the residents do not widely know the tuition-free program for high school. This also shows that people are limited to elementary level due to the lack of funds to continue learning,

inadequate infrastructure, and most high schools in faraway cities only. Riana [16] stated that the quite far distance and inadequate infrastructure and educational facilities in the village do not support farmers to pursue higher education. Furthermore, weak desire and the cost of tuition are also other factors causing the affected persons not to reach college.

4.1.3. Land Area

Land area greatly influences farmers in making decisions regarding seeds, fertilizers, medicines, and technology. Therefore, persons in possession of large areas obtain huge production results. However, this does not guarantee more productivity than narrow land. Respondents are more categorized as having large land, dominated in the range of more than one hectare. This means that members of the Tunas Muda Farmer Group are relatively good in terms of ownership, leading to being very suitable as CFS participants. This is different from [17] that claimed the farmers' land area is relatively narrow.

Moreover, the land is divided into three categories, namely narrow (low) provided the farmer has an area of fewer than 9000 m2, quite wide (medium) for a range of 9000 to 16000 m2, and very wide (high) for greater than 16000 m2. The area cultivated by farmers tends to come from their land and lease or by working on other people's land with a profit-sharing system. These three tenure systems influence the required management, especially during the cultivation of annual or long-term crops. In line with land tenure, [18], [19], and [20] said the land area controlled by farmers for business has a significant relationship to participation.

4.1.4. Other Indicators

Another indicator in the context evaluation is that all CFS participants have their main job only in the agricultural sector, with an average monthly income of fewer than 2 million rupiahs. Until the end of the program, the interaction between the Tunas Muda Farmer Group members was still going well, especially in terms of information exchange on planting time, prices, and others. Also, their activities were performed fast while holding strong the norms and culture of the Banten community in Banyuresmi Village.

Based on the description, the condition of the farming community participating in the CFS Program has complied with the requirements of the general guidelines issued by the Directorate of Land and Water Management – Ministry of Agriculture. Therefore, the context evaluation conducted also complied with the requirements and can be used to measure implementing similar programs in the future.

The results of the questionnaire data recapitulation showed the overall context evaluation was categorized as satisfactory (2.8), meaning the components following the requirements in the general guidelines and technical implementation instructions based on the participants' assessment were not very good. This was because the average answers provided were in the range of the satisfactory category (2-2.9). The three sub-variables used had relatively close values ranging from 2.8 to 2.9 (enough). Meanwhile, the socio-economic conditions of farmers indicated the highest value of the other two sub-variables.

In order to strengthen the answers, the interview result showed that the relationships between participating farmers and non-members of the group, production facilities' providers, and government financial institutions presented during the program activities remained well established afterward. Therefore, this causes the participating farmers to feel helped by the program. On the contrary, the socio-cultural conditions related to the actual relevance of the CFS to solve problems regarding water, climate, and good cultivation processes are not sufficient because the participants' farming habits are seemingly difficult to change. The habitual factor needs to be changed; therefore, programs such as Field Schools, counseling, and socialization are intensified to promote farmers' responsiveness at Banyuresmi Village, Jiput District, Pandeglang Regency towards technological innovations. This potentially increases income and welfare in the end.

4.1.5. Input Evaluation

All CFS participants were members of the Tunas Muda Farmer Group that were assisted in the National Rice Production Improvement Program (P2BN) by the Ministry of Agriculture, with one of the derivative programs being the implementation of the Climate Field School. During the activities carried out, required equipment and practicum materials and field guides were available properly and appropriately to support the explanation presented at each meeting.

The allocation of funds or budget costs to the Head of the Farmers Group was quite smooth to manage meeting consumption, transportation replacement, and the participants' daily money, which was paid every two meetings. The ratio of the field guides and facilitators from the Ministry of Agriculture's educational institutions with the needs of Field Schools was ideal; namely, each meeting consisted of five previously trained field guides.

Based on this, the CFS participants felt comfortable carrying out the training because the equipment was available and assisted with smooth funds and optimization of the role of field guides and facilitators that worked well in delivering the material. This is in line with the results of the respondents' expressions and answers, which stated that the sub-variables in the input evaluation were considered in a satisfactory category (3.0). The most prominent sub-variables were the team of field guides and facilitators considered to have worked according to their competence.

Meanwhile, although the interview results seemed adequate and transparent for the sub-variables of funds or budget, they were still considered in the satisfactory category. The things that caused the budget or funds to be considered sufficient included the replacement of participant transport, which was not done every meeting but paid after holding three; therefore, some persons were unhappy with this. However, the overall results are considered good, meaning the inputs in the CFS implementation are under procedures, credibility, and accountability.

4.1.6. Process Evaluation

The CFS activity program carried out at the Tunas Muda Farmer Group in Banyuresmi Village was by the plan. This is evidenced by the respondent's answers to the evaluation process categorized as satisfactory (3.0). The survey conducted for participants showed the implementation time was correct during 12 meetings and one field visit (farmer field day) to Garut Regency, with 10 hours of learning activities. The training per meeting day and the time implementation matched the material presented by the guides and facilitators. As for the compatibility of learning time with the material, certain persons considered it neutral because due to the thought that some materials delivered with a fairly long prefix. The attendance rate was 100%, although some participants were sometimes late.

This is understood because the participants have respective individual interests in managing their farming. During the activity, farmers are expected to use the attributes provided by the committee. However, because the training pattern is adult education, any participant that does not use the attributes cannot be forced.

4.1.7. Product Evaluation

The product evaluation results focused on three sub-variables: the ability and skills of farmers, their cooperation within the group, and the quality of agro-ecosystems after participating in CFS. Based on the answers, the product evaluation was in the satisfactory category (2.9).

The success of climate school activities was measured in terms of increasing the farmers' knowledge, attitudes, and skills, carried out through pre-test and post-test during the CFS implementation, then permanent behavior after the program was also assessed. The results showed a change in the participants' knowledge from 66.5% to 86%, indicating their understanding of managing water and climate was quite good. Furthermore, the assessment was carried out by measurement using a questionnaire on product evaluation.

Based on the results, only 35% or seven farmers are consistent in applying appropriate water and climate management principles, but in terms of planting time simultaneously, all participants still follow the recommendations following CFS patterns. However, out of the three sub-variables in the product evaluation, the increase of farmers' ability belongs to a satisfactory category compared to other variables. The ability of farmers in the satisfactory category, especially for young farmers, is in line with research that has been carried out by several previous researchers [21], [22].

The farmers' cooperation after the CFS program was quite good, as indicated by the activities in compiling and planning simultaneous planting, identifying needs in the preparation of a definitive group plan, and conducting regular weekly meetings that were rare before the implementation frequency later decreased. This is in line with the respondents' answers. Namely, the increase in cooperation after the IDD program is only considered sufficient. Based on the observation results, the quality of the agro-ecosystem in the CFS participants' farms has not changed, meaning the conditions are still the same as before the implementation. This is because the participants have difficulty predicting weather changes that are already out of season. Hence, the agro-ecosystem in the farmers' land has not been optimized, especially in water management which is still a rotating system. Based on the description, product evaluation is still in the satisfactory category because not all CFS alumni apply the knowledge, insight, and technology gained in managing their farms.

Evaluation of the guidance and facilitator teams showed that they were generally not optimal or satisfactory in their ability to help farmers obtain answers. Usage of the method received a good and convincing response from the respondents because most of the guidance and facilitator teams had used the method according to the implementation instructions. This is under several research results that have been carried out by several previous researchers [22], [23], [24], [25].

4. Conclusion

Overall, the components of the CFS program implemented at the Tunas Muda Farmer Group and described using the CIPP were under the adult learning approach model for farmers. The evaluation result showed the Context and Product were in a satisfactory category, while Input and Process were in a satisfactory category; hence the overall implementation is considered quite good. It can be assumed that the sub-variable, increasing the capacity of rice farmers through climate field schools is fairly good. Another possible effort to maximize climate field schools for further incrementing rice farmers' capacity is to seek competent facilitators and management practices according to farmers' needs.

The novelty of this research is that the evaluation of community empowerment programs for farmers can be carried out using the CIPP method and can determine farmers' participation in the program. The limitation of

this study is that the sampling location was conducted on only farmer groups receiving government programs.

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