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The potential mapping of the needs of appropriate technology of cattle farm

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Abstract. The purpose of research "The Potential Mapping of the Needs of Appropriate Technology of Cattle Farm" is to describe the profile of dairy farmers, evaluate and measure the level of technological readiness ability of cattle ranchers which doing in Pudak sub-district, Ponorogo. The analytical tool used is a teknometer that serves to measure the level of technological readiness capability used for the production of milk, meat, skin and feces of the cows that are divided into three stages, basic (level 1 to level 3), medium (level 4 to level 6) and ready (Level 7 to Level 9). By using teknometer is expected to provide basic information about the mapping of potential needs and the use of appropriate technology both tools, process and cow production in Pudak, Ponorogo. The results of the evaluation and measurement of TK2T Cattle Farm in Pudak, Ponorogo showed that all samples had not passed the measurement at level 1 to level 3. In addition, no one has passed the middle level 4 to level 6, while the top-level measurement, Namely level 7 to level 9 only get a maximum score of 60 percent. This explains that milk and meat production in Pudak still needs government intervention both in the use of appropriate technology, as well as supporting indicators such as management, hygiene in production, and human resources.

1. Introduction

Pudak District is located in east of the government center of Ponorogo Regency. Cattle farming is the dominant livelihood in Pudak which total calculate 9,351 people in to the average population. Women constitute the largest total population of 4,795 while the total male population is slightly below the total number of women, which is 4,556 [1]. They maintain at least 3 dairy cows in each family head, the results of which are mostly paid to collectors who are then distributed to Nestle and Frisian Flag. The total number of cattle in Pudak District is 3,446.

In addition to being deposited with collectors, there are conditions where residents have managed it into various products with the help of tools from the Indonesian Ministry of Agriculture in 2015 but now the business has been abandoned for approximately five months because the consumers do not want to increase the price, because the price of basic materials also rises so if not raised, the farmer loses. Farmers expect distributors to be able to market their products so that they do not depend on these large companies.

Users of technology with limited financial capabilities (both based on direct financial capability and access to financing sources), generally also require technology that is technically simple to support micro, small, or medium scale economic activities. Although this economic activity unit is small scale, its cumulative contribution to the national economy is very significant and is able to absorb large numbers of workers [2].

One of the efforts in creating a business climate with optimal conditions and highly competitive product yields is an analysis of the level of technological readiness capability. This analysis supports government programs that are aware of the importance of village development. Various forms and programs to encourage the acceleration of rural development have been carried out by the government, but the results are still not significant in improving the quality of life and welfare of the community. Besides, the analysis of the level of technological readiness capability in line with the spirit of village law in giving birth to developed and independent villages certainly cannot be done partially. The challenge of building a village will certainly be part of the dynamics of the community in guarding changes where previously the village only thought about its own village without much thought and synergy-coordination and communication with other villages or neighboring villages that were geographically close together.

Analysis of the level of technological readiness capability has been carried out by Anjar Prasetyo in his research, which deals with SMEs in Magelang Regency. At this stage, the system can be modified in the livestock sector. Standards are very much needed by farmers including cattle breeders in achieving quality product results. One of the supports is the minimum capability of science and technology that must be achieved by farmers, which is a level of ideal conditions to be achieved by farmers. Some breeders already know about standards related to the production process, such as International Standards Organization 9001: 2008, Hazard Analysis Critical Control Points (HACCP), Indonesian National Standards (SNI).

Based on the phenomenon that has been stated, the authors are interested in conducting research on mapping the potential needs of appropriate technology for cattle farmers in the Pudak District area of Ponorogo Regency. In the Veterinary Principles Act, Law Number 6 of 1967, concerning the Basic Provisions of Animal Husbandry and Animal Health, in Chapter I Article 1, several terms are stated, including Animal Husbandry is the cultivation/cultivation/raising of livestock with all supporting facilities for livestock life. Then Livestock are animals whose life is about place, breeding and its benefits are regulated and supervised by humans and maintained specifically as producers of materials and services that are useful for the benefit of human life.

Livestock with appropriate technology-based is by combining patterns of livestock in a broad sense with the system of regulating the life cycle of livestock at a certain time span, which includes the components of maintaining, caring for, regulating marriage, regulating birth, maintaining health and taking benefits. Appropriate technology is the technology fits the needs of the community so that it can be used during a certain time span [3]. Usually used as a term for technology that is related to the local culture of appropriate technology as one of the important pathways to achieving a fundamental goal, namely to improve the welfare of the community.

Most Indonesian people with a variety of science and technology (IPTEK) can be positioned, not only as a supporter, but also as a pioneer of road encroachers towards the realization of a just and prosperous society for all levels of society in Indonesia in various parts of the country with technological mastery and limited economy. Appropriate technology means technology that is in accordance with cultural conditions, and economic conditions and their use must be environmentally friendly.

Technology readiness can be interpreted as how ready or mature a technology can be applied. The definition of "readiness" indicates the possibility of a difference between "ready", "unprepared" and "unprepared" for a technology "or the difference in" level of technological readiness "to be used or applied to its usefulness. how ready or mature a technology can be applied and adopted by the user/prospective user can support the assessment of maturity or readiness of a particular technology and the comparison of maturity or readiness between different types of technology systematically [4].

Technology readiness is a measure of the level of technological readiness that is interpreted as an indicator that shows how ready or mature a technology can be applied and adopted by users/potential users. The level of technological readiness is a system of systematic measurement that supports the assessment of the maturity or readiness of a particular technology and the comparison of maturity or readiness between different types of technology.

Table 1. Technology readiness level (TRL)

TRL	Explanation
TRL 1	The basic principles of technology are researched and reported
TRL 2	Formulation of the concept of technology and / or its application
TRL 3	Proof-of-concept functions and / or important characteristics analytically and experimentally
TRL 4	Validate codes, components and or assemblages of components in a laboratory environment
TRL 5	Validate the code, components and or collection of components in the relevant environment
TRL 6	Demonstration Model or System Prototype/Subsystem in the relevant environment
TRL 7	Demonstration of system prototypes in the actual environment/application
TRL 8	The system is complete and qualified through testing and demonstration in the actual environment /application
TRL 9	The system is truly tested / proven through successful operation

TK2T is an indicator that is divided into nine levels of readiness (Table 1), where between one level and another level are interrelated and form the basis for the next level.

2. Methodology

This type of research is descriptive explorative by providing a description through a series of survey activities on selected respondents, for the purpose of exploration (exploratory), outlining (descriptive), explanatory (eksplanatory), namely to explain causal relationships and hypothesis testing, evaluation, prediction or predicting certain events in future, operational research and development of social indicators [5]. The focus of this research is citizens who have cows in Pudak Subdistrict, Ponorogo Regency with a sampling model of the existing cattle breeders' population. The research location in general is Pudak District, Ponorogo Regency which consists of 6 villages.

The population in the analysis of the level of technological readiness capability for farmers was sourced from the database of the Pudak District Central Bureau of Statistics in Ponorogo Regency, Ponorogo in Figures 2016. The population was obtained from the population of Pudak Subdistrict, Ponorogo Regency with 9,351 people. Then, data was obtained, a total of 4,236 cows, consisting of 3,446 cows and 790 dairy cows in Pudak District.

Table 2. Distribution of population population and number of livestock

District	Banjarajo	Pudak Wetan	Pudak Kulon	Krisik	Tambang	Bareng	Total
People	2.454	1.766	993	1.073	892	2.173	9.351
Cows	1.220	826	506	559	399	726	4.236

From the formula above, samples can be determined to be surveyed. So, from a population of 2,337 family heads, the sample to be surveyed was 294 heads of families using the One Stage Cluster. While for secondary data comes from supporting documents that can be legally referred. Measuring the level of technological readiness capability is carried out using a techno-meter. Teknometer is a spreadsheet-based software from Microsoft Excel that collects a number of standard questions for each level and displays TRL achieved graphically. This software is quite helpful in the TRL measurement process.

3. Result and Discussion

In level 1 measurements of 294 respondents all were met, this shows the lowest level of technological readiness. In this level 1 measurement the indicator is that basic assumptions and laws such as physics/chemistry used in technology have been determined. The study of literature (theory/empirical-previous research) about the basic principles of technology that will be developed indirectly already exists. The composition of ingredients in each business unit (the process of feeding animals, the process of milking, recycling of feces) already exists with a hereditary tendency from its predecessor. At this level there is no need for government intervention because the pattern in this level is the need for the cattle farmer business unit which must be implemented if it wants to increase its production.

In TRL measurements of business units up to level 4, it has been below 50 percent of the total sample of cattle farmers who do not meet the requirements. Both from broiler and dairy cows. From this measurement, it can be explained that the average business unit of cattle farmers is still in the use of appropriate technology based on experience in producing it, this can be seen in the field of food technology.

Most of the cattle farmers basically have the technology used to increase their production capacity, such as the biogas production process that uses used drums, as well as modified tires. In addition, cow feed production using modified lawn mowers and modified counter. Farmers using such technology are not an appropriate technology category but fall into the category of community technology, namely the tools used are tools that are made or modified in such a way that they have a function to facilitate cattle farmers in the production process. This community technology exists because of the ability and capacity of the community to find solutions to technological problems even though they are aimed at efficiency and effectiveness of production. The government's attention in increasing the production capacity of the business units of cattle farmers is still very much needed, when referring to the results of these measurements. As an illustration of the sample surveyed for milk production, this sample was discussed because Pudak Sub-district has abundant natural resource potential and one of the dominances of business units is the dairy and beef cattle business units.

4. Conclusion

Cow Farmers in Pudak Subdistrict, Ponorogo Regency are dominated by milk and meat production businesses. Business units in the field of milk and meat still need government intervention primarily on production process issues. The majority of business units in the field of cattle are still using simple and simple technology. Then, the business process of cattle breeders is still ignoring the hygienic side of both the production and the production.

The results of the TRL evaluation and measurement of Cattle Farmers in Pudak Subdistrict, Ponorogo Regency showed that all samples had not passed measurements at level 1 to level 3. In addition, no one had passed the intermediate level, level 4 to level 6, while the upper level measurement level 7 to level 9 only gets a maximum value of 60 percent. This explains that milk and meat production in Pudak District still needs government intervention both in the use of appropriate technology, as well as supporting indicators such as management, cleanliness in production, human resources.

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