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Factors Influencing Farmers' Interest in Adopting KUB Chickens for Sustainable Livestock Development Program

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Abstract. Superior native chickens Balitbangtan (KUB) is an innovation in breeding technology from the Indonesian Agency for Agricultural Research and Development (IAARD) that has been successfully disseminated to all provinces in Indonesia. The estimated dissemination of KUB chicken seeds from 2009 to 2019 reached 1,839,664 seeds with different numbers of distribution in each region. However, from the dissemination data, it is necessary to know the level of farmer adoption in carrying out the sustainability of KUB chicken breeding. This also correlated to the seeds that are disseminated are not necessarily successfully developed in the area. The purpose of this study was to determine the factors that influence the adoption of KUB Chicken seed adoption technology by farmers in order to create sustainable livestock. The method used in this study is a schematic literature review (SLR) that consist of planning, conducting and reporting process. In general, the factors that influence farmers' interest in adopting technology as the dominant factors influencing technology adoption are age (26%), education (22%), experience/skills (18%), land ownership (13%), family conditions (13%), income (4%), and communication (4%). As a follow-up for future livestock development plans, it is necessary to study the profile of KUB chicken distribution and estimate the production potential of the dissemination seeds by looking at the characteristics of farmers in an area through field surveys.

Keywords: Adoption Technology, KUB Chickens, Dissemination, Farmers, Development Program

INTRODUCTION

Livestock development in Indonesia is the most important part of efforts to increase the availability, access, and quality of food consumption as part of the National Medium-Term Development Plan (2020-2024). Efforts to increase livestock productivity are carried out through extensification, intensification, and diversification of livestock supported by the use of science and technology. Along with the increasing population, the demand for animal protein, especially meat, will increase. On the other hand, the increase in production output is still moving slowly.

One of the ways to fulfill the demand for animal protein is by increasing poultry production. The richness of poultry species in Indonesia is promising enough to be seriously developed by the government by utilizing the potential of native chickens by increasing their productivity. Increasing the productivity of local chickens can be achieved through improving the genetic quality of seedlings, improving aquaculture management, controlling disease, and improving feed [1]–[2]. Improving the quality and quantity of local chickens can be achieved through the process of purification and crossbreeding. In terms of improving genetic quality, the IAARD has succeeded in producing a superior native chicken strain, namely KUB-1 chicken in 2013 [4].

The target of developing poultry commodities through the development of superior native chickens is aimed at (a) reducing mortality through animal health control and treatment, (b) increasing import substitution and diversification of poultry products, and (c) creating organic products based on certain market shares, and (d) disseminate the results of the Indonesian Agency for Agricultural Research and Development (IAARD) research in the form of the IAARD Superior Native Chicken (KUB) [3].

KUB chicken is an superior native chicken, an innovation from the IAARD, released in 2014 supported by The Minister of Agriculture of the Republic of Indonesia Decree Number 274/Kpts/SR.120/2/2014. KUB chicken is a line of selection of local chickens (*Gallus-gallus domesticus*) originating from the Cianjur, Depok, Majalengka, and Bogor areas of West Java Province [10]. Selection of superior local chicken seeds is one of the breeding processes that is expected to provide more permanent results for local poultry and the results can be used to help the community, especially people in rural areas [11]. From 1997 to 2010 KUB chicken breeding activities have been carried out through a selection of 6 generations [4].

The superiority of KUB chicken compared to native chicken with the same rearing technique, namely intensive maintenance produces different output as mentioned in the research results of Tike Sartika and Sofyan Iskandar, 2019 [25] as in Table 1. It shows significant superiority in KUB chicken characteristics, especially in egg production, egg laying frequency, peak laying, feed conversion, and mortality.

TABLE 1. The superiority of KUB chicken compared to native chicken with intensive maintenance

Description	KUB chicken	Ordinary local chicken
Egg production/Grain/day	180	146
Egg production (%)	61.2	40
Egg Laying Frequency (times/year)	Every day	7
Peak Production (%)	75.4	50
Age of first egg laying (mg)	16-22	20-24
Egg hatchability (%)	85	84
Egg weight (g/egg)	39-46	39-43
Frequency of brooding (%)	10	30-100
Feed consumption (g/head/h)	100	80-100
Feed conversion (kg feed/kg eggs)	3.54	4.9-6.4
Mortality up to 6 mg (%)	0.98	<27
Mortality from productive to end (%)	<8	<10

KUB Chicken breeding technology produces chickens that have advantages over local chickens in general. The advantages of KUB chickens are that they can produce egg production of 180 eggs/head/year, egg weight of 36-45 grams per egg, and adult body weight of 1,200-1,600 grams, and are more resistant to disease [12]. So that it can be used as female line seeds that can be bred with other local male chickens.

In the history of agriculture, the adoption of agricultural technology is an important component for the progress of agricultural development [5]–[6]. However, if the innovation conditions are difficult for farmers to apply, this can cause innovation to be difficult to adopt and there are various problems faced by farmers in managing their livestock business which are quite complex so that it can hinder a process of optimal adoption of technological innovations [7]–[8].

KUB chicken seeds have been successfully disseminated since 2009 to all provinces in Indonesia. A total of approximately 1,839,664 seedlings were successfully distributed with different compositions in each area. It depends on the stakeholder’s agreement or policies. The process of adopting KUB Chicken business innovation can take place quickly or slowly, depending on the pattern and method of delivering technological innovation as well as the situation and condition of the region [9]. Thus, it is necessary to know the level of farmer adoption in maintaining the sustainability of KUB chicken maintenance. This needs to be analyzed because KUB chicken seeds that are disseminated are not necessarily successful in developing in the area. The purpose of this study was to determine the factors that influence the adoption of KUB Chicken seed technology by farmers.

METHODS

The data that is used in this study is the distribution map of KUB chicken provided by the Center for Livestock Research in Ciawi, Bogor which is the distribution data for the Source Seed Management Unit Program and the dissemination program from 2009 - 2019. The research design is needed to support research literacy. The design used in this study is a schematic literature review (SLR). SLR is a research stage that consists of the planning stage (early stage), conducting stage (implementation stage), and reporting stage which is the last stage of writing SLR into a report.

RESULTS AND DISCUSSION

KUB chicken Seeds Dissemination

In an effort to support the fulfillment of local chicken products in Indonesia, the acceleration of the dissemination of KUB chicken seeds to the community continues to be carried out. Based on distribution data from the Center for Livestock Research, KUB chickens since 2009 have been spread throughout Indonesia with a total distribution of 1,839,664 DOC (Day Old Chicken) seeds from 2009 to 2019.



FIGURE 1. Distribution Map of KUB Chicken

The distribution of DOC KUB chicken by province is presented in Figure 1. It shows that the chickens have been distributed to 32 provinces through dissemination program in collaboration with Technical Implementation Unit of the Agricultural Research and Development Agency and/or the provincial service. West Java Province was the largest distribution area for DOC KUB chicken (71.46%), followed by Central Java Province (22.07%), Banten Province (1.13%), and East Java Province (0.64%), while the lowest distribution of DOC KUB chicken is in Bali and Bangka Belitung (0.0054%), Bengkulu (0,01%), Maluku (0,02%) dan North Sulawesi (0,02%). The number of KUB chicken that distributed in each province is not equal. West Java Province become the largest recipient area of DOC KUB chicken seeds probably cause by the location factor that near seeds production center, so that the program declaration is prioritized in the nearest area to facilitate access to receive the seeds. This is also probably because the province was one of three provinces with the largest population in Indonesia and the top four provinces with the largest local chicken population in Indonesia (BPS, 2020) [14]. On the other hand, the distribution remains low in the other area because it is relatively far away (outside Java Island and eastern Indonesia). The average percentage of distribution is still relatively low because the area is difficult to reach or perhaps there is no collaboration with the relevant agencies. In addition, the transportation budget possibly considered.

Agricultural Technology Adoption

Technology adoption is the process of accepting technological innovation through the behavior of the individual concerned. The innovation adoption process is an internal process that occurs in farmers when facing an innovation, where there is a process of implementing a new idea since it is known or heard until the innovation is implemented

[15][16]. Adoption is knowledge, persuasion, decision, implementation, and confirmation. So, the speed of the adoption process will depend on the dynamic nature of the target.

The study of the adoption of agricultural technology is very important in understanding the factors related to the application of technology (new crops, high superior quality, or new production technology. In the history of agriculture, the adoption of agricultural technology is an important component for progress agricultural development. Successful adoption of sustainable technologies can be a major force in reducing poverty.

However, if the innovation conditions are difficult for farmers to apply, this can cause innovation to be difficult to adopt and there are various problems faced by famers in managing their livestock business which are quite complex so that it can hinder process of optimally adopting technological innovations [8]. This situation is one of the causes of the gap between research technology and technology at the farmer level [17].

Adoption or application of agricultural technology innovations, such as in KUB chicken cultivation, is defined as a process of behavior change that includes aspects of knowledge (cognitive), attitudes (affective), and skills (psychomotor) in a person after receiving "innovations" from other parties [18]. Farmers will adopt technology if it is related to aspects of their needs and preferences for technology. Farmers' preferences for technology are influenced by the direct benefits of technology in the form of relative advantages, conformity with socio-cultural values and farming habits and the complexity of the application of the technology.

The process of adopting KUB Chicken business innovation can take place quickly or slowly, depending on the pattern and method of delivering technological innovation as well as the situation and condition of the region. In addition, a very important determining factor is the characteristics of innovation in the KUB Chicken business which consists of KUB Chicken seeds or commonly called DOC (day old chick), feed, cages, medicines and equipment. Thus, it is necessary to know the factors that influence the interest of farmers in adopting KUB chickens so that these innovations can be optimally accepted and developed in a sustainable manner.

Factors Influencing Farmerss’ Interest in Adopting KUB Chicken

The success of technology adoption by farmers is also determined by several factors, such as government policies, the availability of technology that can provide added value and benefit from technical aspects, economic aspects as well as socio-cultural conditions and community institutions accompanied by other supporting facilities such as the role of private activities. The speed of innovation adoption is determined by several determining factors, including the nature or characteristics of the innovation; characteristics or characteristics of potential users; adoption decision making; the channel or media used and the qualifications of the extension worker.

In order for the results of research to reach farmers, it is necessary to accelerate the process of adopting innovations in technology dissemination at the breeder level, which is influenced by several factors, including; 1) the technology introduced is very helpful in solving the breeder’s problems; 2) the facilities needed to apply the technology are easily available; 3) the technology introduced has a higher level of efficiency compared to the previous technology; 4) products from these technologies have good market prospects [19]–[20].

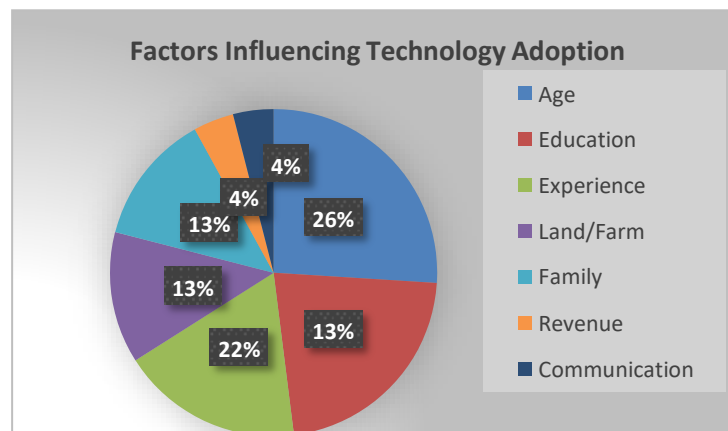


FIGURE 2. Factors Influencing Technology Adoption

In general, the factors that influence the interest of farmers to adopt technology as shown in Figure 2. are an analysis of various literatures which show that the dominant factor influencing technology adoption are age (26%), education (22%), experience/skills (18%), land ownership (13%), family conditions (13%), income (4%), and communication (4%). This is reinforced by several studies which state that the factors that influence the interest of farmers are knowledge, perception, skills, and communication intensity [21].

In research in Batanghari, the factors that influence the rate of adoption of livestock innovations are age, education level, number of dependents, number of livestock owners, experience of raising livestock and farmer's income [15] – [16]. In addition, research on the adoption of maize technology in Nepal and several other studies have stated that the factors that influence technology adoption include age, gender, education, education, number of families, land area, access to seeds and distance to marketing [5] – [6], [8].

Based on research on the adoption of KUB chickens in Papua, the factors that influence the interest of farmers towards the adoption of KUB chickens consist of internal and external factors. Internal factors include: 1) farmer's age, 2) number of dependents in the family, 3) productive family members, 4) education, 5) attitude towards innovation, 6) chicken farming skills, 7) mastery of land assets, 8) appreciation of good technology, and 9) access to sources of capital. External factors are 1) input (feed) prices, 2) output selling prices, 3) access to input/output markets, 4) access to technology sources, 5) access to less conducive capital sources, 6) Conducive Technology Assistance, and 7) Technical Guidance [18].

The recipient factor that has the most influence on accelerating the adoption of innovation is the characteristics of the target, in this case the characteristics of the breeder which includes age, education, income, livestock experience, land ownership and communication [22] – [23]. The characteristics of the target have so far received less attention as a consideration in the innovation dissemination program [24], so that it could be affect dissemination process become challenging. Likewise, in the distribution of KUB chickens, it is necessary to pay attention to the characteristics of farmers who will receive KUB chicken seeds in addition to the attachment to a cooperation agreement or government policy. This avoids the gap between dissemination and successful development of KUB chicken innovations.

CONCLUSION

The success of the dissemination of KUB chickens is not enough with how many seeds are distributed, but it is necessary to pay attention to the character of the target farmers through the factors that influence the interest of farmers to adopt KUB chickens, so that the dissemination carried out is right on target. This will affect the sustainability of livestock productivity in creating poultry farming development. As a follow-up for future livestock development plans, it is necessary to study the profile of KUB chicken distribution and estimate the production potential of the distributed seeds by looking at the characteristics of farmers in an area through field surveys.

REFERENCES

1. A. G. Nataamijaya, "Native chickens' potential development for supporting farmers' welfare improvement." *Jurnal Penelitian dan Pengembangan Pertanian*, **29** (4), 131-138 (2010).
2. A. G. Nataamijaya, "The native chicken of Indonesia Bul." *Plasma Nutfah*, **6** (1), 1-6 (2000)
3. C. Sumantri, I. Khaerunnisa, A. Gunawan, "The genetic quality improvement of native and local chickens to increase production and meat quality in order to build the Indonesian chicken industry." *IOP Conference Series: Earth and Environmental Science*, **492** (1), 012099 (2020).
4. S. Munawaroh, A. A. Rouf, D. Rohmadi, S. Anas, A. Nur, "Additional income for poor families through native chicken farming (KUB and Sensi) development in Gorontalo Province." *IOP Conference Series: Earth and Environmental Science*, **807** (3), 032060 (2021).
5. G. H. Houeninvo, C. H. Célestin Quenum, G. M. A. Nonvide, "Impact of improved maize variety adoption on smallholder farmers' welfare in Benin." *Economics of Innovation and New Technology*, **29** (8), 831-846 (2020).
6. R. Ghimire, H. U. A. N. G. Wen-Chi, R. B. Shrestha, "Factors affecting adoption of improved rice varieties among rural farm households in Central Nepal." *Rice Science*, **22** (1), 35-43 (2015).
7. Y. Hidayat, Sukono, B. Subartini, N. Khairunnisa, A. Sambas, T. Purwandari. "An Estimated Analysis of Willingness to Wait Time to Pay Rice Agricultural Insurance Premiums Using Cox's Proportional Hazards Model." *Mathematics*, **10**(21), 3935 (2022).
8. M. Mardiharini, C. Indrawanto, E. S. Rohaeni, "Performance evaluation of sustainable agricultural-techno park development in Cigombong, West Java." In *E3S Web of Conferences*, 306 (2021).

9. L. G. S. Astiti, E. Widiastuti, B. A. Sudarmayanti, I. P. C. P. Adnyana, M. Yasin, Y. Triguna, N. Agustini,, "The KUB chicken farming technologies for the household in West Nusa Tenggara." *IOP Conference Series: Earth and Environmental Science*, **644**(1), 012010 (2021).
10. M. Masito, A. R. S. Putra, S. Andarwati, "The effect of Kampung Unggul Balitbangtan (KUB) chicken innovation characteristics toward the development of farmers perceptions in South Sumatra." In *IOP Conference Series: Earth and Environmental Science*, **1001** (1), 012027 (2022).
11. M. K. Padhi, "Importance of indigenous breeds of chicken for rural economy and their improvements for higher production performance." *Scientifica*, **2016**, 2604685 (2016).
12. H. S. Rahayu, M. Takdir, M. D. Asnidar, N. M. Rameda, P. Haryono, "Response and Feasibility of Kub Chicken on Household Business Level in Rural Area Sigi District." In *1st International Conference on Sustainable Agricultural Socio-economics, Agribusiness, and Rural Development (ICSASARD 2021)*, 46-52(2021).
13. A. Priyanti, T. Sartika, J. T. Priyono, T. D. Soedjana, S. Bahri, B. Tiesnamurti, "Kajian ekonomik dan pengembangan inovasi ayam Kampung Unggul Balitbangtan (KUB)." (Puslitbangnak, Bogor, 2016).
14. BPS. *Peternakan dalam Angka 2020*. (Badan Pusat Statistik, Bogor, 2020).
15. S. N. Sirajuddin, A. R. Siregar, P. Mappigau, "Adoption Rate of beef breeders' technology following partnership system in Barru Regency." *American-Eurasian Journal of Sustainable Agriculture*, **11** (6), 31-34 (2017).
16. H. Teklewold, L. Dadi, A. Yami, N. Dana, "Determinants of adoption of poultry technology: a double-hurdle approach." *Livestock research for rural development*, **18** (3), 1-20 (2006).
17. J. P. Makeham, L. R. Malcolm, "*The economics of tropical farm management*." (Cambridge University Press, Cambridge, 1986).
18. S. Tirajoh, G. P. Dominanto, A. Soplanit, B. Bakrie, "Production performance of KUB chicken with the inclusion of Lamtoro (*Leucaena leucocephala*) leaf flour in the feed" In *IOP Conference Series: Earth and Environmental Science*, **788** (1), 012035 (2021).
19. R. Burhansyah, "Factors Affecting the Adoption of Agricultural Innovation among Farmers Group in West Kalimantan (Case Studies: Pontianak and Landak Districts)." *Informatika Pertanian*, **23** (1), 65-74 (2014).
20. E. Suprijatna, "Local Chicken Development Strategy Based on Local Resources and Environmentally Friendly." In *Proceedings of the 4th National Seminar on Local Poultry*, **20**, 55-79 (2010).
21. E. Wantasen, S. J. K. Umboh, J. R. Leke, "Investment advantages of broiler production using the partnership system: A study in Indonesia." *J. Agric. Sci.-Sri Lanka*, **16** (2), 215-225 (2021).
22. E. M. Rogers, F. F. Shoemaker, "Communication of Innovations; A Cross-Cultural Approach," (ERIC, New York, 1971).
23. M. Amin, K. Sukesi, "The Effectiveness of Cyber-Extension-Based Information Technology to Support Agricultural Activities in Kabupaten Donggala, Central Sulawesi Province, Indonesia." *International Journal of Asian Social Science*, **3** (4), 882-889 (2013).
24. C. A. Afolami, A. E. Obayelu, M. U. Agbonlahor, O. A. Lawal-Adebowale, "Socioeconomic analysis of rice farmers and effects of group formation on rice production in Ekiti and Ogun States of South-West Nigeria." *Journal of Agricultural Science*, **4** (4), 233 (2012).
25. T. Sartika and S. Iskandar, "The productivity of 4th Generation KUB-2 Chicken," *J. Ilmu Ternak dan Vet.* **24**(4), 151-163 (2019).