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Research Article

Development of An Agribusiness Textbook on Raising Giant Prawns (Macrobrachium Rosenbergii) in Environmentally Friendly Biofloc-Aquaponics Ponds''

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Abstract.

The agribusiness textbook on "rearing giant prawns (*Macrobrachium rosenbergii*) in environmentally friendly biofloc-aquaponics Ponds" was prepared as a result of research and has been published to help increase students' understanding of agribusiness courses in the Biology Education Study Program, Faculty of Mathematics and Natural Sciences Education and Information Technology (FPMIPATI), PGRI University Semarang. The research method used is R and D. The design of the textbook that was developed aims to attract students' attention in learning, making it easier for lecturers to master the teaching and learning process. Therefore, valid teaching materials are needed. The results of the research show that validation by validators resulted in the validation of teaching material media of 97.5% and validation of teaching material of 96.67% so it was declared in the very good category and suitable for use in learning. This textbook can make it easier for students to understand Agribusiness material, especially about raising giant prawns (*Macrobrachium rosenbergii*) in environmentally friendly biofloc-aquaponics ponds. Furthermore, the publication of this book is also hoped to motivate lecturers to continue writing according to their respective expertise to add to the scientific knowledge at PGRI University Semarang.

Keywords: textbook, agribusiness, biofloc-aquaponics

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1. Introduction

Agribusiness is a combination of two words, namely agri or agro, which means agriculture, and the word business. In other words, Agribusiness is a course that studies agriculture or fisheries as well as business in modern agricultural management.The biofloc-aquaponics system, included in modern agriculture, is an alternative method that can solve wastewater quality problems in fish farming. The biofloc-aquaponics system is a combination of the biofloc method and the aquaponics method. Based on research [2], the biofloc system combined with the aquaponics system can reduce water changes in the cultivation system so that it is more environmentally friendly. In

the biofloc-aquaponics system, the waste produced by fish will be recycled and used into fish supporting feed with the help of probiotics, so less fish food is used, and it is also efficient in water use.

According to Piaget [9], knowledge is formed according the activation of the people in dealing with the issues/problems, materials, or new environment. Teaching materials have an important role to support the learning process. According to [6] teaching materials have characteristics, namely (1) teaching materials contain systematic knowledge; (2) teaching materials are in accordance with the curriculum and learning objectives; (3) teaching materials direct students to understand the material. Agribusiness textbook on "Rearing Giant Prawns (*Macrobrachium rosenbergii*) in Environmentally Friendly Biofloc-Aquaponics Ponds" for seventh semester students of the Biology Education Study Program was developed to help increase students' understanding regarding the material on cultivating giant prawns in environmentally friendly Biofloc-Aquaponics ponds in this course.

2. Method

Research on the rearing of giant prawns (*Macrobrachium rosenbergii*) in environmentally friendly biofloc-aquaponic ponds can be implemented in learning in the form of teaching materials for the Agribusiness course. The research method used is the R and D model. ADDIE, as the name suggests, is a model that involves model development stages with development steps/phases including: Analysis, Design, Development or Production, Implementation or Delivery and Evaluations. The teaching materials that will be implemented in this research aim to help students describe: Potential for developing giant prawns, introduction to giant prawns, environmentally friendly biofloc-aquaponic ponds, techniques for growing giant prawns. Students will also discuss to answer the questions provided in the Teaching Materials. Through material analysis activities, it is hoped that students will be able to find concepts in the material. Valid data for Agribusiness Teaching Materials were analyzed using quantitative descriptive by calculating the total validation score. The score criteria for validation sheet data on Teaching Materials are as follows: Score 4: Very Good; Score 3: Good; Score 2: Poor; Score 1: Very Poor. The data obtained from the data collection results were then analyzed using percentage data analysis techniques using the following formula [1] : P = $nN \times 100$ = ... % Description: P = Assessment n = Number of scores obtained N = Total maximum score. Next, the percentage assessment data obtained is converted into descriptive quantitative data using the following validity criteria (Table 1):

TABLE 1: Validity Criteria for Quantitative Descriptive Assessment Data.

Score	Value (%)	Information
4	76 - 100	Excellent
3	56 - 75	Good
2	40 - 55	Not Good Enough
1	0 -39	Bad

Source : Arikunto, (2013)

3. Result and Discussion

Material analysis was carried out to consider what material would be provided in the teaching materials for the Agribusiness course. The steps in the preparation of book is setting the title of teaching materials, setting the learning objectives, establishing the outline or concept of learning materials, developing the material based on basic concepts, and re-examining the draft of teaching materials produced [8][10]. Next, this research carried out a validation test to determine the suitability of the teaching materials being developed. These teaching materials are validated by 2 validators who are experts in their fields, namely validator 1 and validator 2 as media experts and material experts. Validation is carried out in 2 stages if in stage 1 the teaching materials are not yet suitable for use. The aspects that are considered when validating teaching material media are the size of the teaching material, the cover design of the teaching material, and the design of the content of the teaching material. Then, to validate the material, we will pay attention to the appropriateness of the content, appropriateness of presentation, and assessment of the language used in the teaching materials. Based on the validation results by validator 1, the validation results for stage 1 teaching material media were 67.5% and stage 1 teaching material validation results were 68% so that they were declared in the good category and suitable for use in learning. Even though it is classified as "Good", the teaching materials developed are still subject to revision based on input for improvements from validators (media experts and material experts). This aims to improve and perfect teaching materials. The revisions that must be made include: 1) The color of the title of the teaching material does not contrast well with the background color, 2) The numbering of subtitles in the teaching material needs to be paid attention to, and 3) Literature references must be added. Next, stage 2 validation was carried out by validator 1, obtaining media expert validation results of 88.75% and material expert validation of 80% so that it was declared in the very good category and suitable for use in learning without revision. The results of validation by validator 2, obtained media

expert validation results of 97.5% and material expert validation of 96.67% so that they were declared in the very good category and suitable for use in learning.

The results of the research were implemented in teaching materials for the Agribusiness course in the Biology Education Study Program, semester VII. Learning is done with an approachscientific using a learning model Discovery Learning. Students are expected to be able to collect data and analyze the development potential of giant prawns, introduction to giant prawns, environmentally friendly biofloc-aquaponic ponds, and techniques for growing giant prawns. Through the learning teaching materials developed, it is hoped that students will be able to master the expected competencies. The cover of the teaching materials that have been produced can be displayed in Figure 1

Figure 1: Cover of Agribusiness Teaching Materials.

The results of this research can be used as a reference in understanding agribusiness, especially in the material on growing giant prawns (*Macrobrachium rosenbergii*) in Environmentally Friendly Biofloc-Aquaponic Ponds, where students can analyze the content of this learning teaching material and can increase students' knowledge regarding the importance of the potential for developing giant prawns, introduction to giant prawns, preparing environmentally friendly biofloc-aquaponic ponds, and techniques for growing giant prawns.

Regarding the environmentally friendly concept according to [3]; [4] the application of a biofloc system combined with an aquaponics system will reduce water changes

in the cultivation system so that this technology is environmentally friendly. The feed used is also less than other conventional systems. The benefits and advantages of this system save pellet feed, tilapia fish growth is more uniform, the fish are healthy and agile and can reduce fish pests/diseases. Furthermore, according to [5], apart from these benefits, several other advantages of the environmentally friendly biofloc-aquaponics system are that it can save land, because at high seed stocking, the appearance of the pond is more beautiful, especially if you use a round pond, management of feed, water and the layout is easier, not as complicated as an earthen pond and the feeding time is more efficient. Meanwhile, Megasari [7], stated that aquaponics can be described as a combination of aquaculture cultivation systems (fish cultivation) and hydroponics (plant/vegetable cultivation without soil). This system adopts an ecological system in the natural environment, where there is a mutualistic symbiotic relationship between fish and plants

4. Conclusion

Agribusiness textbook on “Rearing Giant Prawns (*Macrobrachium rosenbergii*) in Environmentally Friendly Biofloc-Aquaponics Ponds” provided results of validation of teaching material media of 97.5% and validation of teaching material material of 96.67% so that it was declared in the very good category and suitable for use in learning Agribusiness courses.

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