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### RESEARCH ARTICLE

## INTEREST-FREE FINANCING IN AGRO-INDUSTRY: CONCEPTS, THEORIES, METHODS AND RESEARCH GAPS

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#### Abstract

Interest-free financing in agro-industry is an exciting topic that has been developed by many researchers, but there is no clarity regarding the road map for future research. Therefore, formulations such as concepts, theories, methods, and research gaps, focusing on interest-free financing in agro-industry, are essential. This literature study was conducted using a systematic literature review method. The data used are secondary data from textbooks, theses/dissertations, conference papers, journals, scientific articles, and working papers. This study resulted in the formulation of the theory, concepts, and methods studied in the form of an explanation of 8 sub-topics of research gaps supported by references and explanations of state of the art. They are making it easier for researchers who have the same interest in developing and looking for novelties with the topic of interest-free financing research in the agro-industry.

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#### Introduction:-

The agro-industry is an industry that produces products whose main components come from animals or plants (Sukardi 2011). In other words, agro-industry is an agricultural sub-system that requires capital (costs) from the start of its establishment until it operates. Also, the use of capital in an agro-industry is an activity to create added value. Moreover, in facing the current VUCA world era, agro-industry players are challenged to plan, manage, and evaluate capital to produce a sound financial performance to win the competition.

However, managing business capital in agro-industries is relatively complicated compared to non-agro-industrial business capital management. More than 40% of business actors state that they have capital constraints, higher than other problems ([BPS] Badan Pusat Statistik Republik Indonesia 2019). This is due to agricultural products' nature and characteristics, availability and continuity, and fluctuating prices.

By definition, financing means funding that one party provides to another party to support planned investments, whether done alone or by an institution (Muhammad 2005). Business capital can be obtained from two sources, namely own capital and external capital such as investors, banks, non-bank credit providers, government grants, CSR (Corporate Social Responsibility) funds, zakat funds, infaq, sadaqah, and managed waqf by the BAZNAS institution (Badan Amil Zakat Nasional)(Kementerian Koperasi dan UKM RI 2016).

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Based on the type, financing is classified into interest financing and interest-free financing(Sukardi 2019). The fundamental difference between interest-bearing financing and interest-free financing is in the manner and process of obtaining results (Orgianus 2005). As an illustration, the yield on interest financing is calculated based on the loan interest rate. Meanwhile, the proceeds from interest-free financing are based on profit and loss sharing (PLS). Another difference is that if the business experiences a loss for interest-free financing, the value of the loss is divided based on the ratio (proportion) of the risk. Meanwhile, in interest-bearing financing institutions, risks are handled based on collateral owned by the entrepreneur. So it can be concluded that there is still a gap between interest financing and interest-free financing.

Based on this explanation, the research topic of interest-free financing in agro-industry needs to be continuously developed and strengthened based on the principles' theories and concepts. This study's writing is a literature study that aims to produce formulations in the form of concepts, theories, methods, and research gaps by focusing on the topic of interest-free financing in agro-industry. This systematic literature review method consists of 3 stages: planning, critical review, and formulation of concepts, theories, methods, and research gaps. This systematic study's benefits are apart from being a literature study, but also providing in-depth knowledge and providing an overview of the research roadmap according to the topic being studied.

**Method:-**

**Study Stages:**

A systematic literature review is defined as a process of identifying, assessing, and interpreting all research evidence in order to provide answers to specific research questions (Kitchenham dan Charters 2007). This systematic literature review consists of planning, the critical review process, and the formulation and formulation of the literature obtained. The planning stage includes identifying the topic of study and compiling a systematic review of the literature. Furthermore, the critical review stage is collecting and analyzing data and interpreting it to become knowledge that helps in the formulation and formulation process. The last stage is the formulation and formulation of concepts, theories, methods, and research gaps. Also, research evidence is scientific writing that comes from sources that can be confirmed. The stages of a systematic literature review can be seen in Figure 1.

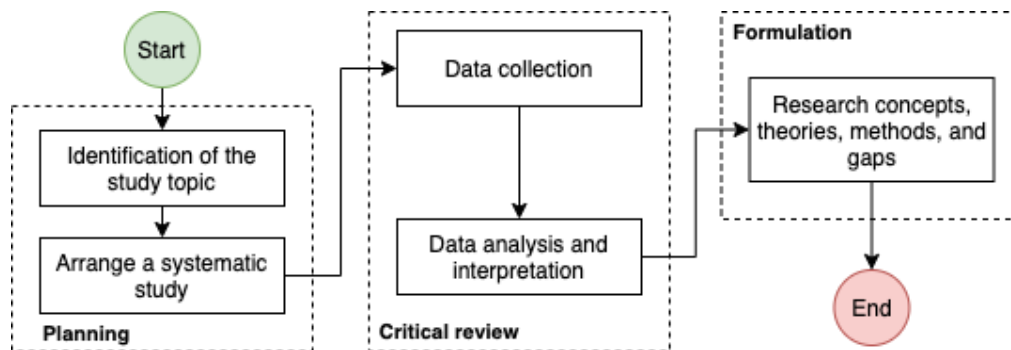


Figure 1:- Stages of systematic literature review.

**Research questions and objectives:**

The research questions in this literature review aim to maintain the focus of the discussion. RQ1 is prepared to explain the concepts and theories of interest-free financing in agro-industries. RQ2 to describe the method of modeling the interest-free financing system in the agro-industry. Meanwhile, RQ3 aims to formulate a research gap with the topic of interest-free financing in the agro-industry. The research questions and objectives of the systematic literature review are presented in Table 1.

Table 1:- Research questions in a systematic literature review.

ID	Research questions	Objectives
RQ1	How is the development of the concept and theory of interest-free financing in agro-industry?	Explain the concepts and theories of interest-free financing in the agro-industry.

RQ2	How is the development of the modeling method of the interest-free financing system in the agro-industry?	Describe the method of modeling the interest-free financing system in the agro-industry.
RQ3	What is the research gap with the topic of interest-free financing in the agro-industry?	We are formulating research gaps with the topic of interest-free financing in agro-industries.

### Search process and data collection:

The process of searching and collecting data through a digital database (online) in this systematic literature review consists of selecting search sources, selecting keywords, selecting search results, selecting search results relevant to the topic of study, and finalizing search result options. Furthermore, data sources came from online and offline databases. The online databases are sourced from Google Scholar, Emerald Insight, Science Direct (Elsevier), IEEE Xplore, EBSCO, CABI, Gale Cengage, ProQuest, Thomson's Web of Science, and IPB Repository. Meanwhile, the offline database comes from the LSI Bogor Agricultural University library using the IPB library intranet network access (<http://172.17.54.232>). The types of study materials include textbooks, theses/dissertations, conference papers, journals, and working papers. Also, the search keywords used are agro-industry financing system, interest-free financing, and financing modeling. Publication data of search results and data collection before analysis were first collected and organized using Mendeley software. The stages of searching and collecting data through a digital database can be seen in Figure 2.

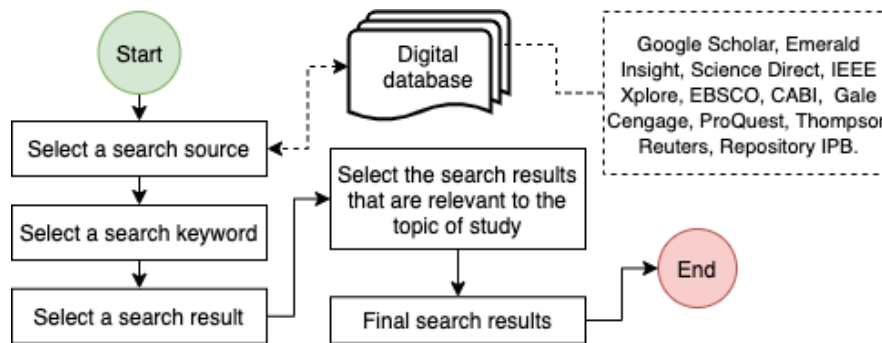


Figure 2:- Stages of the process of searching and collecting data.

### Critical Review Process:

The critical review process consists of five activities: summarize, synthesize, compare, look for differences, and criticize. The explanation is as follows: (1) summarize is a technique of reviewing by rewriting the source in its sentence (paraphrase); (2) synthesizing is a review technique by combining several sources into a new idea; (3) compare is a technique of reviewing by looking for similarities between several works of literature & concluding; (4) looking for inequalities (contrast) is a technique of reviewing by finding differences between several kinds of literature & concluding; and finally (5) criticize is a technique of reviewing by providing opinions and arguments against the sources being read.

### Results and Discussion:-

#### Interest-Free Financing in Agro-Industry:

Agro-industry is a sub-system in the agricultural system and requires financing from the start-up to its operation. In general, financing comes from the essential word cost, and if it is defined, it means money spent to carry out (establish, do, and so on) something (Kamus Besar Bahasa Indonesia 2019). Furthermore, sources of financing come from internal sources (own capital, individual savings) and external sources (loans from families or financial institutions) ([BPS] Badan Pusat Statistik Republik Indonesia 2019). Also, financing is classified into interest financing and interest-free financing. Furthermore, the most striking difference between the two is the mechanism for calculating the results of operations. Interest financing is based on interest rates, while interest-free financing is based on profit sharing and loss sharing principles. More details on the difference between profit sharing and interest are presented in Table 2.

**Table 2:-** The difference between profit sharing and interest.

Profit sharing		Interest rate	
1	The determination of the amount of risk or the profit-sharing ratio is made at the contract's time based on the agreement.	1	Interest is determined at the time of the contract with the assumption that it is always profitable.
2	Profit-sharing risk is based on the benefits earned.	2	The percentage is based on the amount of money (capital) lent.
3	Profit-sharing depends on the profit of the project being carried out. If the business loses money, the losses will be shared by both parties.	3	Interest payments remain as promised regardless of whether the project is carried out profit or loss.
4	The profit share amount will increase as the revenue increases.	4	The amount of interest payments does not increase even if the amount of profit is doubled.
5	No one doubts the validity of profit sharing.	5	All religions, including Islam, doubt the existence of Interest.

Agricultural businesses full of risks and uncertainties require more flexible financing, especially in the distribution of profits or losses in doing business (Sutawi 2008; Ashari dan Saptana 2016). This indicates that the interest-free financing scheme can be developed and implemented in the agricultural system because it is by the characteristics of agricultural businesses full of risks and uncertainties. On the other hand, interest-free financing is an effort to support agricultural development in increasing farmers' income by increasing farm productivity and value-added products and distributing agricultural products.

Based on the explanation above, it can be concluded that interest-free financing in the agro-industry is a way of obtaining and using costs (capital) through a mutual agreement between the owner of the capital and the business owner with a mechanism for calculating business results based on the principle of profit-sharing and loss sharing from each end of transactions in an agro-industrial activity. In this literature review, the topic of interest-free financing is focused only on the agro-industry. In other words, interest-free financing can be made for all activities related to agro-industry in the agricultural system. Table 3 below shows the activities and constraints in an agricultural system that have the potential to be developed into an interest-free financing scheme.

**Table 3:-** Activities and constraints in the agricultural system.

Sub-system	Activity	Constraints and Problems
Agro-input	Land clearing	Big expense
	Procurement of Inputs (Fertilizer and Seeds)	Requires capital at the start
	Procurement of Tools and Machines	The big expense and requires capital at the start
Farm	Cultivation	Big risk
	Harvest	The certainty of quantity and quality
Agro-industry	Opening of processing plants	Big expense
	Procurement of processing equipment	Big expense
	Processing	Big expense
Agro-marketing	Marketing	Price certainty
Agro-supporting	Technology transfer	Big expense
	Human Resource Development	Big expense
	Asset protection	Big risk

#### **Agro-Industry Financing System Modeling Method:**

Systems modeling is an interdisciplinary study that aims to assist organizations and businesses in decision making. The process begins with understanding the complexity of problems in the real world, simplifying it into a model using various methods and approaches, and finding a solution formulation. System modeling

methods develop so fast with many variations, such as the Soft System Methodology (SSM) method, Interpretative Structure Modeling (ISM) (Saptono *et al.* 2010), system approach, Strategic Assumption Surfacing and Testing (SAST) (Susilo *et al.* 2011), Unified Modeling Language (UML), Fuzzy FMEA (Fitriana dan Djatna 2012), DFD (Data Flow Diagram), ERD (Entity Relationship Diagram) (Arkeman *et al.* 2013), Business Model Canvas (Sukardi dan Munggaran 2014), Decision Tree Classifier Method (Djatna dan Luthfiyanti 2015), Green Supply Chain Operation Reference (GSCOR), Fuzzy ANP (Analytic Network Process), Genetic Algorithm (GA) (Yuswanto *et al.* 2016), System Development Life Cycle (SDLC) (Fadhil *et al.* 2017), Process-Oriented Analysis (POA), Value Flow Diagram (VFD), Resource Flow Diagram (RFD) (Fadhil *et al.* 2018), Extreme Programming Method (Rachmaniah dan Sebastian 2018) and others. Specifically, the financing modeling method for agro-industry is presented in Table 4.

**Table 4:-** Research on financing modeling in agro-industry.

Authors	Comodities	Objectives	Method	Research Contribution	Category
(Orgianus 2004)	Potato agro-industry	Produce a competitive profit-sharing model between banks/investors/Islamic financing institutions and small and medium agro-industry entrepreneurs.	Analytical Hierarchy Process (AHP), Incorporation theory on the theory of opportunities, heuristic techniques.	Produce a development model for competitive results sharing between various parties resulting in a win-win collaboration.	Interest-free financing
(Widyananda 2007)	Sugar agro-industry	Produce engineering and institutional financing systems to optimize the sugar industry.	AHP, Interpretive structural modeling (ISM), Material Requirement Planning (MRP)	Produce a financing system development model and institutions for the optimization of the sugar industry.	Interest-bearing financing
(Indrawanto 2007)	Essential oil agro-industry	Produce an expert management system evaluation model of the feasibility of small business financing of essential oil agro-industry.	AHP, Artificial Neural Network (ANN), Fibonacci techniques, Inverse Transfromation Method	Produce an evaluation model of the feasibility of financing small-scale essential oil agro-industry with computer-based sharia patterns.	Interest-free financing
(Martini <i>et al.</i> 2010)	Sugarcane agro-industry	Select and study fuzzy financial feasibility indicators, develop fuzzy economic feasibility models, and implement fuzzy financial feasibility models in the bioethanol industry as a sugarcane derivative product.	Fuzzy Investment, Fuzzy NPV, Fuzzy IRR, Fuzzy B/C Ratio	To produce the leading indicators in determining the fuzzy financial feasibility and the fuzzy financial feasibility computation model for sugarcane-based industries, especially the bioethanol industry.	Interest-bearing financing

(Orgianus <i>et al.</i> 2011)	Dairy Agro-industry	Produce a more objective and fair engineered profit sharing ratio (syirkah) between entrepreneurs and investors.	Yanbagher method, AHP.	The determination of the profit-sharing ratio for each business that has a different pattern, with the calculation of the profit-sharing value depends more on the capital participation and the profits it earns.	Interest-free financing
(Wulandari 2013)	Pepper agro-industry	Generate a risk management model for pepper agro-industry investment.	Fuzzy FMEA, Fuzzy Risk Value, Vulnerability Analysis, AHP.	Produce an improved risk identification process, risk assessment, and further analysis as a complement in risk management for the feasibility of investing in the pepper agro-industry.	Interest-bearing financing
(Jupesta dan Lakitan 2014)	Palm oil agro-industry	Describe innovative financing for oil palm smallholders in Indonesia.	Descriptive analysis	Development of innovative financing models involving financial institutions, cooperatives, partner companies and farmers.	Interest-bearing financing
(Udin 2014)	Rice based agro-industry	Determine the best technology to obtain a rice mill unit's investment profile, simulate a divestment pattern, and produce a smart decision-making system for investment.	System approach, Fuzzy AHP, Fuzzy Investment	Produces a combination of aspects of agro-industrial development, increased rice production and increased farmer income, designed with a divestment pattern.	Interest-bearing financing
(Cahyani 2017)	Sugar agro-industry	Generate a yield prediction model and a productivity model for results. Also, it produces recommendations for strategies to increase productivity for the	System approach, multiple linear regression, production function approach, ISM, SWOT-AHP.	Provide an overview of productivity appraisal and recommendations for strategies by implementing productivity	Interest-free financing

		results.		sharing to increase production, yield and profit-sharing between farmers and companies.	
(Moh'd <i>et al.</i> 2017)	Clove agro-industry	Produce an appropriate model to overcome the clove industry's financial challenges due to high-interest rates and collateral factors.	Review, synthesis of the existing financing model.	A pilot review that empirically investigates the financing challenges facing the clove industry.	Interest-free financing
(Yulianto <i>et al.</i> 2020)	Tapioca agro-industry	Produce an interest-free financing model to increase the competitiveness of the tapioca agro-industry.	System approach, Financial Balance Diagram (FBD), Partnership Nisbah Agreement (PNA), Green Productivity Method.	The development of an interest-free financing model and an interest-free feasibility assessment instrument to improve the competitiveness of the tapioca agro-industry and to be able to be applied with benefits for the welfare of the community and to create value while maintaining the environment.	Interest-free financing

In interest financing, the most widely used modeling method is Fuzzy Logic. Meanwhile, interest-free financing is more varied in using the modeling method. On the other hand, the systems approach method can help build a research framework on the two research topics. However, the method of modeling the interest-free financing system will continue to evolve based on future conditions.

#### **Research Gaps in Interest-Free Financing in Agroindustry:**

The big idea of this research begins with the question, "How to eliminate the element of interest in every transaction that occurs in every agro-industrial activity?". This question is not without reason, and the reasons for the argument have been explained in the previous sub-chapter regarding the weaknesses of interest financing. Also, borrowers will pay more and bear more burdens, and lose collateral when experiencing bankruptcy. The representation of the interest rate financing system of the problem under study is presented in Figure 3.

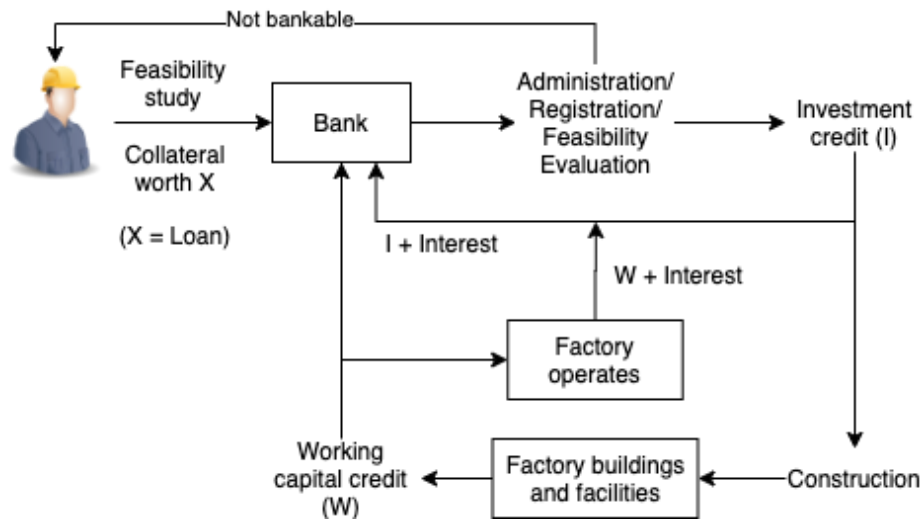


Figure 3:- Interest-bearing financing representation of the problem under study.

Interest-free financing is an alternative system of options other than interest financing. Therefore, interest-free financing research in the agro-industry can be developed at the theoretical and application levels. For this reason, this topic is divided into eight sub-topics of development, including (1) system modeling; (2) investment feasibility instrument; (3) productivity; (4) interest-free financing institutions; (5) inter-subsystem financing in the agricultural system on an interest-free basis; (6) risk management; (7) an interest-free financing decision-making system for agro-industries; and (8) financial technology. Details of research gaps with the topic of interest-free financing in agro-industries are presented in Table 5. For other purposes, this research gap can be a research roadmap that can be used by other researchers who have the same interest in the topic of interest-free financing.

Table 5:- Research gaps on interest-free financing in agro-industries.

Sub-Topics	State of the art	Future Studies	Supporting References
System modelling	The interest-bearing financing model does not fit the characteristics of an agricultural system that is full of risks and uncertainties.	Produce an interest-free financing model design along the chain of sub-systems in the agricultural system.	(Purnomo 2012); (Ashari dan Saptana 2016); (Sukardi 2019); (Eriyatno <i>et al.</i> 2019); (Eriyatno dan Kolopaking 2019)
Investment eligibility instrument	The default on interest-bearing loans is caused by miscalculations based on projections, and the appraisal of the feasibility of interest-free investments has not been developed and formulated in an analytical framework.	Produce an interest-free business feasibility assessment instrument for business sustainability.	(Sundararajan 2011); (Padangaran 2013); (Purnamasari 2014); (Sukardi 2019); (Yulianto <i>et al.</i> 2020)
Productivity	The concept of productivity is not only an economic aspect but also an environmental aspect of sustainability and also winning the competition.	Produce an agro-industrial competitiveness strategy formulation based on cost efficiency and environmental sustainability.	(Indrasti dan Fauzi 2009); (Marimin <i>et al.</i> 2015); (Machfud 2017); (Indrasti 2017); (Cahyani 2017)
Interest-free institutional	The agricultural revitalization program through providing a	Produce an institutional model design for interest-free financing	(Widyananda 2007); (Saptono <i>et al.</i> 2010);



financing	source of financing for farmers and small businesses has not been running optimally, due to weaknesses of existing financing institutions.	in the agro-industry that is integrated between sub-systems in the agricultural system.	(Moh'd <i>et al.</i> 2017); (Prayoga 2018)
Inter-subsystem financing in an interest-free agricultural system	Sub-system activities in the agricultural system have many constraints and financing problems.	Produce a financing model design along with the sub-system in the agricultural system through the concept of interest-free financing.	(Orgianus <i>et al.</i> 2011); (Furqon 2014); (Hejazziey 2015)
Risk management	In the agricultural system, there is a condition that the more upstream the potential risk is. The potential for business failure will be even more significant if it is not managed correctly. On the other hand, a long trade system will affect revenue.	Produce a risk balancing model design based on interest-free financing for business sustainability and staying safe in times of crisis.	(Wulandari 2013); (Hilal 2014); (Syarifuddin 2015); (Asrol <i>et al.</i> 2020)
The interest-free financing decision-making system	The risks and uncertainties in the agro-industry in the future are very high. Therefore new techniques and planning are necessary for the basis of decision making.	Produce an adaptive decision-making system design through the integration of the concept of interest-free financing and computer applications.	(Indrawanto 2007); (Muslich 2010); (Marimin dan Maghfiroh 2010); (Marimin <i>et al.</i> 2013); (Udin 2014); (Marimin 2017)

### Conclusion:-

Based on the literature study conducted, the theory and concept of interest-free financing in agro-industry is based on a memorandum of understanding between the owner of the capital and the business owner agro-industrial activity without including an element of interest in each transaction. Also, the method of modeling the interest-free financing system in agro-industry continues to develop, but on the other hand, not many have developed an interest-free based financing feasibility instrument. The research gap with the topic of interest-free financing in agro-industry is divided into eight sub-topics, each of which is equipped with state of the art, making it easier for other researchers who have the same interest conduct development research on the topic of interest-free financing in agro-industries.

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