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INFLUENCE OF HUMAN RESOURCE AND INSTITUTIONAL CAPACITY OF FARMER GROUPS ON SUSTAINABILITY OF HYDROPONIC FARMING IN KENDARI CITY - INDONESIA

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ABSTRACT

The agricultural sector is increasingly recognized not only as a driver of economic growth for rural farmers, but also as a sector with the potential to improve the welfare of urban communities. Urban farming using hydroponic systems has become a strategy for revitalizing agriculture in urban areas, as it does not require extensive land and utilizes soil as a growing medium. Hydroponic farming is an alternative to open-field farming, especially in areas with limited agricultural land, such as urban areas. Agricultural hydroponic systems require adequate human resource capacity and institutional capacity of implementing such agricultural systems. This study examined the influence of human resource capacity and institutional capacity of farmer groups on the sustainability of hydroponic farming. This study was conducted from August to November 2025. The sample size in this study was determined using saturated sampling. The entire population, totaling 35 hydroponic farmers, served as the sample. Data collection was done through face-to-face interviews using a structured questionnaire. Data were analysed using descriptive and inferential statistics with Partial Least Square (PLS). Partial Least Square analyzed the influence between the variables examined in this study. The results showed that the human resource capacity of hydroponic farmers, the institutional capacity of hydroponic farmer groups, and the sustainability of hydroponic farming in Kendari City was in the moderate category. This means that in general, the human resource capacity of hydroponic farmers, the institutional capacity of hydroponic farmer groups, and the sustainability of hydroponic farming in Kendari City are good but need to be improved further. The research also revealed that human resource capacity significantly and positively influenced the institutional capacity of hydroponic farmers. The higher the human resource capacity of hydroponic farmers, the higher the institutional capacity of the farmer group. The human resource capacity of hydroponic farmers and the institutional capacity of farmer groups significantly and positively influenced the sustainability of hydroponic farming. The higher the human resource capacity of hydroponic farmers and the institutional capacity of farmer groups, the greater the sustainability of hydroponic farming. Therefore, in order to increase the sustainability of hydroponic farming, efforts are needed to increase the human resource capacity of farmers and the institutional capacity of farmer groups in hydroponic farming.

Key words: Human Resource, Capacity of Farmers, Institutional Capacity, Hydroponics, Agricultural Sustainability

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INTRODUCTION

The development of intensive agriculture can be achieved through hydroponics. Hydroponic farming is one of the innovations in agricultural technology that can tackle the challenges of developing intensive agriculture. A hydroponic system is an agricultural technology option that requires a relatively high cost due to expenses such as raw materials and operational equipment [1]. The use of greenhouses, irrigation systems, and other equipment is the main investment required to operate hydroponic technology. Furthermore, if the quality of the system is improved to make it more sophisticated, for example through the use of automated computer programmes, the necessary investment costs become even higher.

Kendari City is one of the places where the local government of Southeast Sulawesi, Indonesia, is working on setting up centers for developing horticultural crops using a hydroponic farming system. This shows that the future for the growth of hydroponic farming system in Kendari City, Southeast Sulawesi, is promising because there are good natural resources and support from the local government's green city program. Hydroponics not only overcomes land limitations, but also improve the efficiency of water and nutrient use. In various parts of the world, hydroponic farming systems have been proven to produce agricultural products faster, cleaner, and more productively, especially in areas with limited land or infertile soil conditions [2].

Hydroponic farming offers numerous advantages, including better use of land and water. However, one of the main obstacles to the sustainability of hydroponics lies in the sustainability of the cultivation itself; in this case, it has weaknesses that make it less innovative in practice, cause high initial costs and operational difficulties, and make it more likely to fail [3]. One of the barriers to the development of hydroponic farming is a lack of marketing which is influenced by consumer acceptance of the enterprise, and consumer acceptance is heavily influenced by the company's attitude towards its customers. An attitude is formed when an individual reacts or responds to something, and this reaction leads them to behave in a certain way towards it [4].

The sustainability of hydroponic farming is influenced by various factors. Major factors that influence the sustainability of hydroponic farming are the human resource capacity of farmers and the institutional capacity of farmer groups. The sustainability of hydroponic farming must be supported by the existence of human resources from farmers who have the capacity to plan, manage, and implement hydroponic farming. In addition, the sustainability of hydroponic farming must be supported by the institutional capacity of farmer groups that have the capacity to act as a learning platform, collaboration, and production unit for farmers who are members of the farmer group [5]. The existence of human resource capacity of

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farmers and the institutional capacity of farmer groups in hydroponic farming can support the realization of sustainable hydroponic farming.

Human resource capacity is the ability of a person or individual to carry out their functions or authority to achieve their goals effectively and efficiently [6]. Human resource capacity is an ability that includes an adequate level of education, training, and experience from humans to complete the tasks or responsibilities given to them [7]. The human resource capacity of hydroponic farmers in Kendari City still has challenges, especially in terms of business planning capacity and resource management to achieve good farming performance. The performance of hydroponic farming in Kendari City is still in the medium category where the quantity and quality of production achieved are not in accordance with the farmers' targets [8].

The development and sustainability of hydroponic farming is also closely related to the institutional capacity of farmer groups in addition to the capacity of human resources [9]. The institutional role of farmer groups can support increasing productivity and sustainability of farming. Farmer groups that have good institutions can play a good role in supporting the empowerment of farmers in developing farming [10]. Furthermore, institutional development should transform farmer organizations into a key source of support for farmers in meeting their farming needs.

The institutional capacity of hydroponic farmer groups still experiences challenges, especially in the aspects of human resource development, work networks, and institutional innovation [11]. Based on preliminary research, researchers found that hydroponic farmer groups in Kendari City do not have a systematic human resource development program. The work network of hydroponic farmer groups in Kendari City is still limited to general public consumers who have not touched large industries [12]. Likewise, in the aspect of farmer group innovation, the dissemination of innovation in hydroponic farmer groups in Kendari City is still low. Generally, farmer groups only disseminate 2-3 innovations in each year [13].

The sustainability of a farming business is influenced by the capacity of farmers to adopt technology or innovation and the nature of the innovation [14]. The development of farmers' human resources can run in farmer groups that have advanced institutional capacity [15]. The human resource and institutional capacity of farmer groups are closely related to the sustainability of hydroponic farming [16]. Various challenges of hydroponic farming can be solved with the capacity of farmer human resources and the institutional capacity of farmer groups [17]. The capacity of farmers in carrying out agricultural businesses must always be improved and developed to be able to face global competition [18].

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MATERIALS AND METHODS

This research was carried out in Kendari City, Southeast Sulawesi Province, Indonesia, from August – November 2025. This study used a descriptive survey research design that aimed to provide an overview of certain phenomena in the population studied. The research population included individuals who had a direct connection to the research topic. The analysis unit used in the study consisted of 35 farmers who were found to be active in the hydroponic farming group in Kendari City. In research, a population is a generalized area consisting of objects or subjects that have certain qualities and characteristics that are applied by researchers to be studied and then conclusions are drawn [19]. That population represents the sum total of units of analysis whose characteristics will be assumed [20].

A sample is a subset of a population selected using a specific procedure, expected to be representative of the population. This study used a saturated sampling technique [21]. The saturated sample determination method is a sampling technique where all members of the population are used as samples [22].

This research model adopts a causal relationship approach, in which an independent or exogenous variable (X) influences a bound or endogenous variable (Y). These variables are analyzed to provide relevant insights into the research objectives. The exogenous variables in this study are: (1) the human resource capacity of hydroponic farmers (X1), including: business planning capacity, resource organization capacity, social capacity, technical capacity, and work ethics capacity, and (2) institutional capacity of farmer groups (X2) including: human resource development capacity, group role, group dynamics, work network, and group innovation. The endogenous variables in this study are hydroponic farming sustainability (Y), which includes economic sustainability, social sustainability, technological sustainability, engineering sustainability, and environmental sustainability.

The process of measuring the variables in this research was carried out in several stages. The stages of measuring the variables are: (1) determining indicators for the dimensions of the research variables, (2) after the dimensions of a variable are determined, then the measurements for each dimension are formulated, and (3) determining the level of measurement of the variable [7].

The collected research data were analysed using descriptive statistical analysis techniques, to describe data patterns and inferential statistics to test the relationship between the variables studied [23]. Descriptive statistical analysis describes the state of the capacity of farmers' human resources, the institutional capacity of farmer groups, and the sustainability of hydroponic farming.

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Structural equation modelling (SEM) is a statistical analysis method used to test and evaluate the relationships between latent variables and observable variables derived from existing theories [24]. The structural model consists of several stages, namely: (1) formulation of a theory for the structural model, (2) analysis of an external model, (3) analysis of an internal model and (4) hypothesis testing [25].

In this study, the inferential statistical method known as Partial Least Squares (PLS) was used to examine the relationship between the variables being studied. Partial Least Square is a type of Structural Equation Modeling (SEM) that focuses on variance or components to build the model. Partial Least Squares Structural Equation Modeling (PLS-SEM) is used to create or develop a theory, especially for making predictions. Partial Least Squares helps to see if there is a link between latent variables, which are underlying concepts that cannot be measured directly [26].

The PLS-SEM analysis consists of two sub-models, namely the measurement model or outer model and the structural model or inner model. The measurement model or outer model shows how each indicator block relates to its latent variable. Evaluation of the measurement model was done through the analysis of confirmatory factors by testing convergent and discriminant validity. Meanwhile, the reliability test is carried out in two ways, namely Cronbach's Alpha and Composite Reliability. The evaluation of the structural or inner model aims to predict the relationship between latent variables. The structural model or inner model shows the relationship or strength of estimation between latent variables or constructs based on substantive theory. The inner model analysis in this study includes Path Coefficient, R-Square (R^2), and hypothesis testing [27].

RESULTS AND DISCUSSION

A. Demographic Characteristics

Demographic characteristics refer to the data collected to describe the respondents ini study. In this study, the demographic characteristics included age, education level, and length of experience in hydroponic farming. Table 1 shows that the majority of respondents, 33 people (94.29%), were in the productive age category. The age difference among farmers has implications for their ability to manage agricultural businesses. The working capacity of young farmers tends to be different from that of older farmers. Similarly, in terms of openness to agricultural innovation, there is a difference in the level of acceptance between young farmers and older farmers. The results of the research by Widianti [28] show that farmers of productive age have high motivation in carrying out their farming.

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Table 1, also indicates that, all respondents had an adequate level of education. In fact, the majority of respondents, 30 (85.71%), had completed higher education at the bachelor's level (S1). This indicates that farmers in the research area had a good educational background. An adequate level of education will help farmers manage their farms optimally. Research by Timisela [29] also explains that farmers' education has a positive influence on increasing and developing farm production.

Farmer experience reflects the length of time they have been running a hydroponic farm. Twenty-nine farmer respondents had more than five years of farming experience. Farming experience indicates that the longer a farmer operates, the more knowledge and skills they acquire. This knowledge and skills positively impact farmer productivity and income. This finding is in line with an earlier finding that showed that farming experience was positively correlated with farmer productivity and income [30].

B. Human Resource Capacity of Hydroponic Farmers

Human resource capacity is the ability of individuals to carry out the tasks and responsibilities assigned to them with adequate education, training, and experience [20]. The measurement of the human resource capacity of hydroponic farmers is measured by looking at the farmer's capacity including business planning, resource organization, social aspects, Technical and work ethic [31].

Table 2 indicates, the human resource capacity of hydroponic farmers in Kendari City is categorized as moderate. This indicates that hydroponic farmers already possess sufficient business planning, resource organization, social, technical, and work ethic capacity for managing their farms, although improvements are still needed. Farmers' human resource capacity plays a vital role in maintaining the sustainability of hydroponic farming businesses [32]. Human resource capacity is an individual competence in an institution that is able to carry out its duties, functions, and authority in achieving goals effectively and efficiently [33].

C. Institutional Capacity of Hydroponic Farming Farmer Groups

Institutional capacity refers to an institution's ability to carry out its functions effectively, efficiently, and sustainably, to achieve mutually determined goals [34]. The institutional capacity of hydroponic farmer groups in this study includes: group capacity in human resource development, group roles, group dynamics, work networks, and group innovation.

Table 3 indicates that the capacity of farmer groups of hydroponic farmers in Kendari City is categorized as moderate. This suggests that farmer groups still need to improve their capacity by developing human resources, group roles, group dynamics, networks, and farmer group innovation. The institutional capacity in the

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group can support the activeness and sustainability of the group in serving group members [35]. Successful implementation lies in comprehensive institutional capacity, which encompasses political, managerial, and resource expertise and skills [36]. This capacity facilitates performance that results in either tangible or intangible positive outcomes and helps in anticipating upcoming changes. Institutional capacity in an organizational institution supports the organization to be able to carry out its duties, functions, and authorities in achieving goals effectively and efficiently.

D. The Sustainability of Hydroponic Farming

The sustainability of hydroponic farming in this study encompasses economic, social, technological, technical, and environmental aspects. Business sustainability is a business consistency that has a sustainability system involving approaches, increments, and continuation to protect ongoing businesses and business development.

This can be seen from many important factors that support each other, namely economic, social, technological, technical and environmental sustainability. Sustainable agriculture is very necessary for supporting hydroponic agriculture development. Sustainable agriculture is a system of land management and food production that meets current needs without damaging the environment or compromising the ability of future generations to meet their own needs [37]. Sustainable agriculture is an agricultural process that aims to maximize agricultural production and meet fiber needs while ensuring that resources and ecosystems are preserved for future generations. It emphasizes environmental health, economic profitability, and social equity [38, 39]. Sustainable agriculture must also emphasize efficient financial management, appropriate marketing strategies, and the ability to adapt to market changes, all of which are crucial factors for the sustainability of agricultural enterprises, including hydroponic businesses in Kendari.

Outer Model Analysis

The relationship between each indicator block and its latent variables is displayed by the measurement model, also known as the outer model. Convergent and discriminant validity tests using confirmatory factor analysis were used to evaluate the measurement model. The reliability test was carried out in two ways, namely by Cronbach's alpha and composite reliability [40]. The outer model was a measurement model used to assess the validity and reliability of the model, including measurement model parameters (convergent validity, discriminant validity, composite reliability, and Cronbach's alpha) as parameters for the accuracy of the prediction model [41]. The results of the measurement model (outer model analysis),

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including discriminant validity, composite reliability, and Cronbach's alpha for the indicators of the variables under study, are presented in Figure 1.

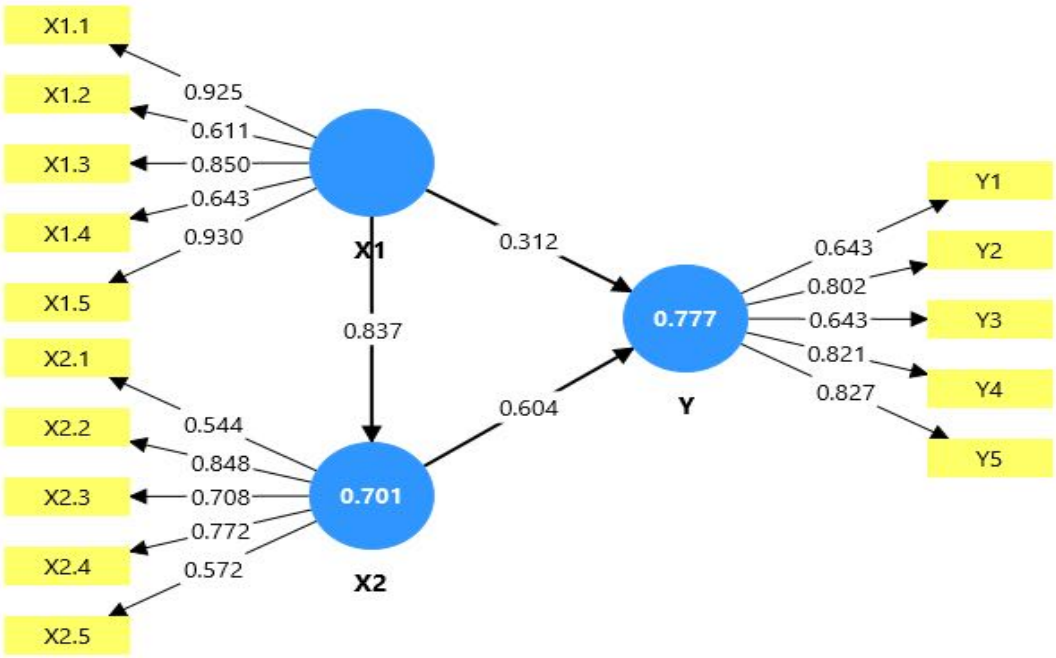

Figure 1: Outer Model Analysis Results

Table 5 shows that all variable indicators of human resource capacity, institutional capacity of farmer groups, and sustainability of hydroponic farming are in the category of valid and reliable. In this study, instruments or indicators that have a loading factor value above 0.5 are still maintained as research indicators. The loading factor between 0.40 and 0.70 must still be considered to be maintained as a research instrument. An outer loading value of 0.5 to 0.6 can be considered sufficient for convergent validity requirements [42].

The model reliability test uses the composite reliability test, which is strengthened by Cronbach's alpha. The section used to evaluate the dependability of indicators on a variable is called composite reliability [43]. The Cronbach's alpha value can be used to augment reliability tests with composite reliability. A variable can be declared reliable or fulfill Cronbach's alpha if it has a Cronbach's alpha value > 0.6 [44]. Latent variables can be said to have good reliability if the composite reliability value is greater than 0.6. The composite reliability coefficient must be greater than 0.7 even though a value of 0.6 is still acceptable [45]. The internal consistency test is not absolute to do if construct validity has been met, because a valid construct is a reliable one; otherwise, a reliable construct is not necessarily valid [46]. A composite

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reliability value of 0.6 – 0.7 and a Cronbach's alpha value of > 0.7 is considered to have good reliability [47].

Inner Model Analysis

Inner model analysis is the next test after conducting a measurement model (outer model) in smart PLS analysis. In the internal analysis of this model, the results of the analysis of the influence between endogenous variables (human resource capacity and group institutional capacity) on exogenous variables (hydroponic farming sustainability) can be obtained. The results of the structural model analysis (inner model analysis), comprising the testing of path coefficients, R-square, and research hypotheses, are presented in Figure 2.

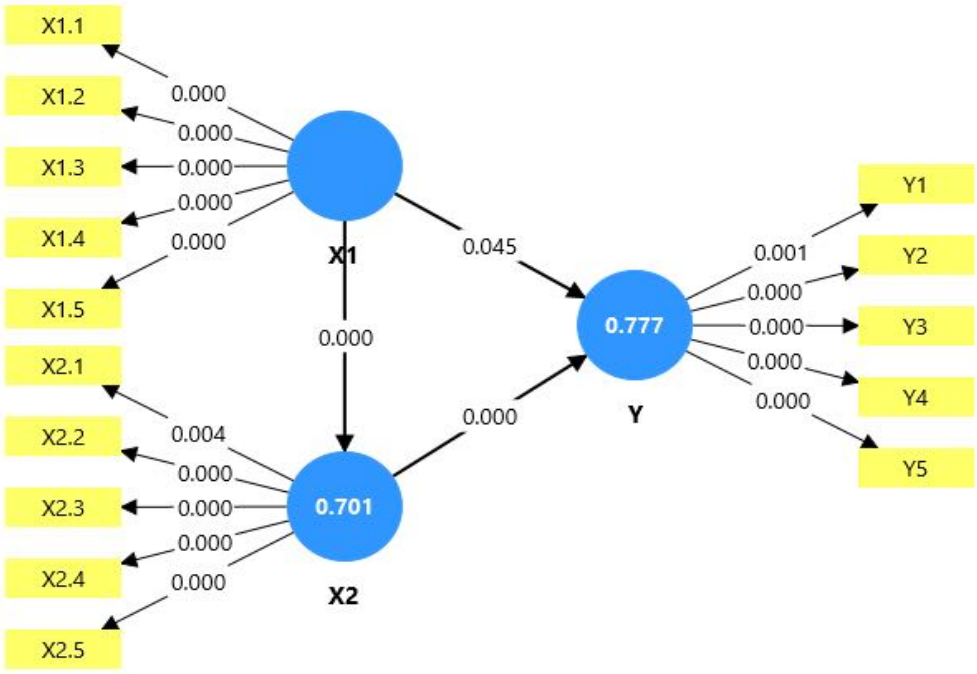

Figure 2: Inner Model Analysis Results

Test of Path Coefficient

The evaluation of path coefficients is used to demonstrate the direction in which independent variables affect dependent variables. An independent variable has a unidirectional effect on a dependent variable if the path coefficient value is positive. The independent variable has the opposite effect on the dependent variable if the path coefficient value is negative.

Table 6 shows that all constructs in this model have positive path coefficients. This indicates that there are differences in the level of impact between variables in a contract; the stronger the influence of an independent variable on a dependent

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variable, the higher the path coefficient value of one independent variable on the dependent variable. According to Wetzels *et al.* [26], the path coefficient value of a construct indicates the strength and direction of the relationship between variables. The stronger the relationship between the independent variable and the dependent variable, the higher the path coefficient value of one of the independent variables to the dependent variable [48].

R- Square

Variance Analysis (R-Square) or determination test is carried out to find out the magnitude of the influence of each independent variable on the dependent variable by looking at the R-Square value. Coefficient determination (R-Square) is used to measure how much an endogenous variable is affected by other variables. The higher the score, the better the prediction model of the proposed research [49].

Table 7, shows that the R-Square for the impact of the variables of institutional capacity of hydroponic farmer groups (X2) and human resource capacity (X1) on the sustainability of hydroponic farming (Y) is 0.777. This indicates that the institutional and human resource capacities of hydroponic farmer organizations have a 77.7 % impact on the sustainability of hydroponic farming [50].

Analysis Hypothesis

To test hypotheses, the value of the original sample estimates (O) was examined to ascertain the direction of the association between variables, and the t-statistics (T) and P-value (P) were examined to ascertain the significance level of the relationship. A positive relationship is shown by an original sample value near +1, and a negative relationship is indicated by a value near -1. A t-value of more than 1.96 or a P-value that is smaller than the significance level (< 0.05) indicates that a relationship between variables is significant [38].

Table 8 shows that the P-values of all tested variable relationships are less than 0.05. Since each of the three hypotheses in this study has a P-value less than 0.05, all hypotheses in this study are acceptable. Table 8 indicates that: (1) the institutional capacity of hydroponic farmer groups is significantly positively impacted by the capacity of farmers' human resources; (2) the sustainability of hydroponic farming is significantly positively impacted by the capacity of farmers' human resources; and (3) the sustainability of hydroponic farming in Kendari City is significantly positively impacted by the institutional capacity of farmer groups.

1. The Influence of Human Resource Capacity on Institutional Capacity Farmer Groups

Table 8 shows that the hypothesis test of the influence of human resource capacity on the institutional capacity of hydroponic farmer groups has a P-value = 0.000 <

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0.05. This shows that the capacity of farmers' human resources has a significant positive effect on the institutional capacity of hydroponic farmer groups. Increasing the capacity of farmers' human resources will increase the institutional capacity of farmer groups [39]. Good farmer knowledge and skills will improve farmers' ability to develop farmer group institutions towards advanced farmer groups. The dynamics of farmer groups are influenced by the capacity of human resources of farmer group members.

2. The Influence of Human Resource Capacity on the Sustainability of Hydroponic Farming

Table 8 shows that the P-Values for the hypothesis test on the impact of human resource capacity on hydroponic farming sustainability are 0.000 < 0.05. This demonstrates that hydroponic farming's sustainability is significantly enhanced by farmers' human resource capacity. Increasing the capacity of farmers' human resources will increase the sustainability of hydroponic farming. The good knowledge and skills of farmers will improve farmers' ability to develop managed farming [40]. A well-developed farming system shows the farming industry's sustainability. The presence of strong human resource capability among farmers is one of the variables that affect farming's sustainability. Farmers' knowledge and abilities are the main capital in managing and fostering farming towards sustainable farming.

3. The Influence of Institutional Capacity on the Sustainability of Hydroponic Farming

Table 8 shows that the p-value for the hypothesis test on the impact of group institutional capacity on hydroponic farming sustainability is 0.000 < 0.05. This demonstrates that the group's institutional capability significantly improves hydroponic farming's sustainability. Increasing the institutional capacity of farmer groups will increase the sustainability of hydroponic farming. The farming will develop well if supported by farmer groups that have good institutions [8]. The developed farmer groups are dynamic farmer groups. Dynamic farmer groups can encourage farmer group members to improve their farming so that farmers' income can increase.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

The human resource capacity of hydroponic farmers, the institutional capacity of hydroponic farmer groups, and the sustainability of hydroponic farming in Kendari City were in the moderate category. This means that in general, the human resource capacity of hydroponic farmers, the institutional capacity of hydroponic farmer groups, and the sustainability of hydroponic farming in Kendari City are good but

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need to be improved further. The human resource capacity and institutional capacity of the farmer group are significantly and positively influenced by the sustainability of hydroponic farming. The higher the human resource capacity and institutional capacity of the farmer group, the greater the sustainability of hydroponic farming. Therefore, to increase the sustainability of hydroponic farming, efforts are needed to increase the human resource capacity of farmers and the institutional capacity of farmer groups in hydroponic farming. To strengthen the human resource capacity of hydroponic farmers, the government or authorities need to support the capacity of farmers by providing training on business planning capacity, resource organizing capacity, social capacity, technical capacity, and work ethics capacity. To strengthen the institutional cafarmer group, the government and other stakeholders should sassistance regarding on capacity building in providing assistance regarding human resource development, group roles, group dynamics, networking, and innovation.

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AUTHOR DISCLOSURE STATEMENT

The authors declare no conflict of interest.

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Table 1: Demographic Characteristics of Hydroponic Farmer Respondents in Kendari City

Respondent Identities	Quantity (Person)	Percentage (%)
Age (Years)		
Productive (25 – 55)	33	94.29
Fully Productive (> 55)	2	5.71
Amount	35	
Education (Level)		
Senior Secondary Education	5	14.29
Higher Education	30	85.71
Amount	35	
Length of Farming (Years)		
Inexperienced (1 – 5)	6	17.14
Experienced (> 5)	29	82.86
Amount	35	

Source: Primery Data Analysis (2025)

Table 2: Human Resource Capacity of Hydroponic Farmers in Kendari City

Indicators	Average Score	Category
Business planning capacity	3.7	Moderate
Resource organizing capacity	3.5	Moderate
Social capacity	3.7	Moderate
Technical capacity	3.6	Moderate
Work Ethics Capacity	3.7	Moderate
Average	3.6	Moderate

Source: Primery Data Analysis (2025)

Table 3: Institutional Capacity of Hydroponic Farmer Groups in Kendari City

Indicators	Average Score	Category
Human resource development	3.7	Moderate
Group roles	3.7	Moderate
Group dynamics	3.6	Moderate
Networking	3.7	Moderate
Group innovation	3.5	Moderate
Average	3.7	Moderate

Source: Primery Data Analysis (2025)

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Table 4: The Sustainability of Hydroponic Farming in Kendari City

Indicators	Average Score	Category
Economic	3.7	Moderate
Social	3.6	Moderate
Technological	3.7	Moderate
technical	3.7	Moderate
Environmental	3.6	Moderate
Average	3.6	Moderate

Source: Primery Data Analysis (2025)

Table 5: Results of Measurement Model Test Analysis (Outer Model)

Variable	Indicators	Loading Factor	Composite Realibility	Cronbach's Alpha	AVE
Human Resource Capacity (X1)	X1.1	0.925	0.912	0.855	0.646
	X1.2	0.611			
	X1.3	0.850			
	X1.4	0.643			
	X1.5	0.930			
Institutional Capacity of Farmer Groups (X2)	X2.1	0.544	0.832	0.737	0.500
	X2.2	0.848			
	X2.3	0.708			
	X2.4	0.772			
	X2.5	0.572			
Sustainability of Hydroponic Farming (Y)	Y.1	0.643	0.842	0.812	0.566
	Y.2	0.802			
	Y.3	0.643			
	Y.4	0.821			
	Y.5	0.827			

Source: Primary Data Analysis (2025)

Table 6: Results of Path Coefficient

Construct	Path Coefficient
Human Resource Capacity (X1) Institutional Capacity of Farmer Groups (X2)	0.837
Human Resource Capacity (X1) Sustainability of Hydroponic Farming (Y)	0.312
Institutional Capacity of Farmer Groups (X2) Sustainability of Hydroponic Farming (Y)	0.604

Source: Primary Data Analysis (2025)

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Table 7: R-Square

Construct	R Square	R Square Adjusted
Institutional Capacity of Farmer Groups (X2)	0.701	0.692
Sustainability of Hydroponic Farming (Y)	0.777	0.763

Source: Primery Data Analysis (2025)

Table 8: Analysis Hypothesis

Construct	Original Sample (O)	Sample Mean (M)	T Statistics (|O/STDEV|)	P Values
Human Resource Capacity (X1) -> Institutional Capacity of Farmer Groups (X2)	0.837	0.856	27.860	0.000
Human Resource Capacity (X1) -> Sustainability of Hydroponic Farming (Y)	0.817	0.834	18.327	0.000
Institutional Capacity of Farmer Groups (X2) -> Sustainability of Hydroponic Farming (Y)	0.604	0.609	4.066	0.000

Source: Primery Data Analysis (2025)

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