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The Development of Agro-Tourism-Based Area for Agribusiness Superior Product of Starfruit (Belimbing DEWA) in Sawangan District of Depok, West Java

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ABSTRACT

This study was aimed to discover the productivity rate of starfruit (Belimbing Dewa) using agro-tourism-based development concept in Pasir Putih Village, Depok City, and the influence of Land Area, Institution, Human Resource, Technology, and Information System on income, and clustering model applied by agro-tourism-based developing farms. The research result suggests that the rate of starfruit productivity is significantly high in narrow managed land area. Land area, institution, human resource, technology, and information system have simultaneously brought significant influence on their income. With reference to path analysis model, there were two clusters of high-class entrepreneur group and low-class entrepreneur group.

Key Words: Starfruit, Belimbing Dewa, agro-tourism, Pasir Putih Village

INTRODUCTION

Agriculture is one of the sectors which can contribute the development of country. In relation to this, many expectations have been put into agricultural sector which may be served as motor of Indonesian development [1]. Sustainable agricultural management is oriented for further development which is important to carry out. Agriculture no longer covers blind exploitation order of certain resource. Finally, the stability of natural resource supply constitutes better objective. In conservative point of view (Malthusianism) concerning Principle of Population (1879), the support of natural resource could not counterbalance the relatively exponential population growth [2].

The development of urban agricultural sector is the innovation in viewing land limitation and burden of agricultural development in rural area. Urban agriculture, in addition to serving as relatively attractive market share, has also competitive and comparative superiority in the concern of commodity [3]. One of the cities putting agricultural sector into greater consideration is Depok. Explicitly, regional development policy direction of Depok City has put forward the importance of agricultural development by directing urban agribusiness improvement and agricultural service. Urban agribusiness development is considered the great innovation when the orientation of settlement development has been an urban icon. Good strategy in determining proper urban agribusiness development program has become the contributing factor of urban agribusiness successfulness in Depok City. Entirely, the rate of agricultural production is good in narrow area by plantation starfruit (Belimbing Dewa), which produced 19.80 tons/ha in 2004.

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In conformity with the aforementioned description, the purpose of this research is to response the following problems: (1) How is the productivity rate of Belimbing (Starfruit) Dewa using agro-tourism-based development concept in Pasir Putih Village, Depok City, (2) How are both direct and indirect influences of aspects including Land Area, Institution, Human Resource, Technology, and Information System on income, and (3) How is clustering model applied by agro-tourism-based developing farms in Pasir Putih Village, Depok City.

RESEARCH METHOD

Respondent Withdrawl Method

The respondents of this research were starfruit farmers in Agro-tourism Area of Starfruit (Belimbing Dewa), Sawangan District, Depok City. Samples were collected based on purposive sampling approach.

Data Source and Data Collection Method

Data sources adopted in this research include primary and secondary data. In summary, data collection method was conducted through interview, questioner, and observation [4].

Data Analysis Method

a. Descriptive Analysis
Descriptive method was conducted with the purpose of deliberately providing illustration on objective condition of research object in accordance with the determined research method. In addition, this was also attempted to identify the productivity of farmers' characteristics in agro-tourism area development of Belimbing (Starfruit) Dewa in Depok City.

b. Evaluative Analysis
- Path Analyses
The further data processing technique in completing this research was conducted by using Path Analysis [5]. In path analysis method, in finding causal relationship or the influence of research variables, it is important to first calculate correlation matrix of attributed variables, including Income, Land Area, Institution, Human Resource, Technology, and Information System (Fig.1).

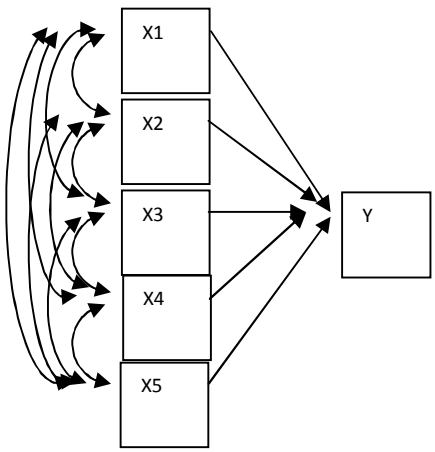

Fig. 1: Path analysis method

Based on the above-mentioned diagram, the conclusion can now be drawn, Land Area (X_1), Institution (X_2), Human Resource (X_3), Technology (X_4), And Information System (X_5) are included into exogenous variables, each of which has correlative interconnection. On top of that, those exogenous variables, collectively as X_1, X_2, X_3, X_4 and X_5, have certainly impact on endogenous variable of Y (Income).

- **Non- Hierarchical Solution of Two Clusters**

This analysis will discuss *Clustering* process of data cluster using K-means method, by processing all objects (cases) simultaneously. This process begins with the determination of total cluster, if determined, 2 or 3 clusters or others will then be formed.

RESULTS AND DISCUSSION

The Productivity of Belimbing (Starfruit) Dewa and Correlation between Variable and Frequency

The research result on 60 respondent of farmers shows that net income is Rp. 72,220,000 or averagely Rp. 1,203,667 per month. It indicates that the income rate still generates positive contribution for society. Total planted area of 104,778 m2 can produce 580,420 kg. Based on the data, it can be concluded that the productivity of Belimbing (Starfruit) Dewa is 5.53. Such productivity is still insufficient if compared with the managed area.

With regard to the data concerning Belimbing (Starfruit) Dewa productivity, the frequency of total income is eventually discovered. By managing Belimbing (Starfruit) Dewa business, there are 16 people listed to have income, ranging from Rp. 750,000,- to Rp. 1,000,000,-. Meanwhile, the lowest income is ranging from Rp. 100,000,- to Rp. 200,000,- only 1 person. The farmers with the highest income earns Rp. 6,000,000,- only 1 person.

Based on the research result, it suggests that most of farmers carry out the activities totally related to agricultural institution. There are 10 divisions of farmer carrying out institutional activity, and 15 are involved in agricultural institution. These activities are expected to provide positive content in developing Belimbing (Starfruit) Dewa in Sawangan, Depok City.

In conclusion, the allocation or the employment of Labors (Human Resource) is 3 persons in the highest portion. And, the lowest portion, on the other hand, respectively consists of 8, 10, 11, and 12 people for 1 frequency of each. The total technology usage is, at the highest level, 16, 22, and 24 units of technology with total frequency of 6 respondents. However, the usage of technology is averagely limited in Depok City. The technology will teoritically be valuable in the effort of improving Belimbing (Starfruit) Dewa productivity. In summary, the highest usage of information system media is 32 frequencies, and the lowest usage is 9 models with totally 4 frequencies.

Direct and Indirect Influence of Land Area (X_1), Institution (X_2), Human Resource (X_3), Technology (X_4) and Information System (X_5) on Income.

In path analysis method, in finding causal relationship or the influence of research variables, it is important to first calculate correlation matrix of attributed variables, including Income, Land Area, Institution, Human Resource, Technology, and Information System. Based on correlation testing calculation above, the correlation among variables can be figured out (Table 1).

Table 1. Correlation Testing Among Sub Variables

Correlation	Correlation Coefficient	Category	Probability	Conclusion
Income (Y) Land Area (X_1) (r_{yx1})	0.940	Closely Correlated	0.000	**Significant**
Income (Y) with Institution (X2) (r_{yx2})	0.812	Correlated	0.000	**Significant**
Income (Y) with Human Resource (X3) (r_{yx3})	0.934	Closely Correlated	0.000	**Significant**
Income (Y) with technology (X4) (r_{yx4})	0.920	Closely Correlated	0.000	**Significant**
Income (Y) with Information System (X5) (r_{yx5})	0.823	Correlated	0.000	**Significant**
Land Area (X1) with Institution (X2) (r_{x1x2})	0.728	Correlated	0.000	**Significant**
Land Area (X1) with Human Resource (X3) (r_{x1x3})	0.904	Closely Correlated	0.000	**Significant**
Land Area (X1) with technology (X4) (r_{x1x4})	0.888	Correlated	0.000	**Significant**
Land Area (X1) with Information System (X5) (r_{x1x5})	0.819	Correlated	0.000	**Significant**
Land Area (X2) with Human Resource (X3) (r_{x2x3})	0.822	Correlated	0.000	**Significant**
Institution (X2) with technology (X4) (r_{x2x4})	0.748	Correlated	0.000	**Significant**
Institution (X2) with Information System (X5) (r_{x2x5})	0.672	Relatively Correlated	0.000	**Significant**
Human Resource (X3) with Technology (X4) (r_{x3x4})	0.895	Correlated	0.000	**Significant**
Human Resource (X3) with Information System (X5) (r_{x3x5})	0.753	Correlated	0.000	**Significant**
Technology (X4) with Information System (X5) (r_{x4x4})	0.714	Correlated	0.000	**Significant**

Path Analysis Equation

In determining research variable influence, the value of path coefficient may entirely be obtained by summing all exogenous and endogenous variables. Path coefficient value (based on estimation) of variables, including Land Area, Institution, Human Resource, Technology, and Information System on Income are processed by using SPSS 13 and LISRELL 8.5 aiding software. The following Table 2 is the processing result.

Table 2: Coefficient of dependent variable for income (Y)

Model		Standardized Coefficients
		Beta
1	Land Area (X1)	.319
	Institution (X2)	.119
	Human Resource (X3)	.208
	Technology (X4)	.265
	Information System (X5)	.137

where path coefficients are as follows: $\rho_{yx1} = 0.319$, $\rho_{yx2} = 0.119$, $\rho_{yx3} = 0.208$, $\rho_{yx4} = 0.265$, $\rho_{yx5} = 0.137$. Thus, path analysis equation formed is as follow:

$Y = \rho_{yx1} X_1 + \rho_{yx2} X_2 + \rho_{yx3} X_3 + \rho_{yx4} X_4 + \rho_{yx5} X_5 + \varepsilon$

$Y = 0.319\ X_1 + 0.119\ X_2 + 0.208\ X_3 + 0.265\ X_4 + 0.137\ X_5$

Path Analysis Diagram

The value of path coefficient is represented by path diagram output result by using LISREL 8.50 software. The cost of path coefficient of all variables is illustrated in the following Figure (Figure 2).

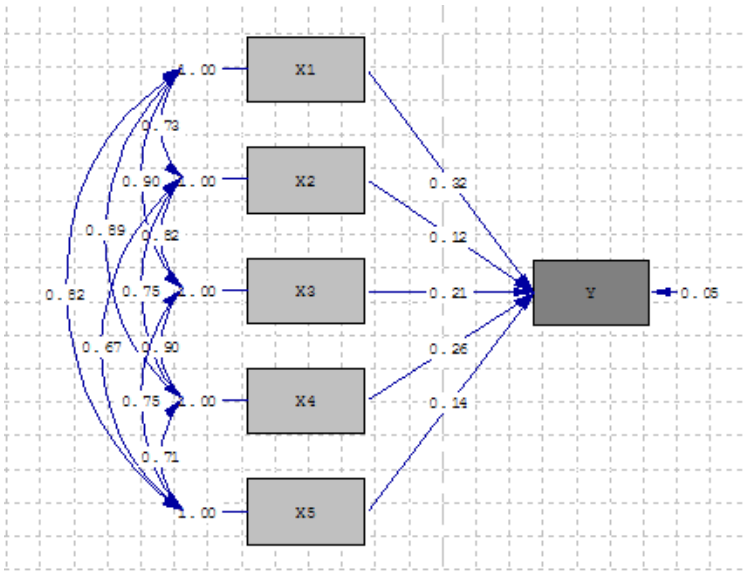

Figure 2. Path Analysis Diagram

Based on the above-mentioned diagram, the conclusion can now be drawn, Land Area (X_1), Institution (X_2), Human Resource (X_3), Technology (X4), And Information System (X_5) are included into exogenous variables, each of which has correlative interconnection. On top of that, those exogenous variables, collectively X_1, X_2, X_3, X_4 and X5, have certainly impact on endogenous variable of Y.

The following is the influence of total five variables on Income

Total Influence: $\rho_{yxi} + \sum \rho_{yxi} \cdot r_{xixj} \cdot \rho_{yxj}$

Total Influence of X: = 0.101761 + 0.027635608 + 0.059982208 + 0.07506708 + 0.035792757 = 0.300238653

Total Influence of X_2: =0.014161 + 0.027635608 + 0.020346144 + 0.02358818 + 0.010955616 = 0.096686548

Total Influence of X_3: =0.043264 + 0.059982208 + 0.020346144 + 0.0493324 + 0.021457488 = 0.19438224

Total Influence of X_4: =0.070225 + 0.07506708 + 0.02358818 + 0.0493324 + 0.02592177 = 0.24413443

Total Influence of X_5: =0.018769 + 0.035792757 + 0.010955616 + 0.021457488 + 0.02592177 = 0.112896631

Thus, total influence of X_1, X_2, X_3, X_4, X_5 = 0.300238653 + 0.096686548 + 0.19438224 + 0.24413443 + 0.112896631 = **0.948338502**

This result is close to the result of Determination Coefficient ($R^2_{yx1x2\ x3x4\ x5}$), 0.946 as described in Table 3. Predictor (Constant), Information System (X5), Institution (X2), Technology (X4), Land Area (X1), Human Resource (X3).

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate
1	.973[a]	.946	.941	294530.910

As shown in Model Summary (Table 3), one path analysis model has value of correlation coefficient (R) of 0.973, value of determination coefficient (*R Square*) of 0.946 (94.6%). 94.6% of R Square value shows that exogenous variables including Land Area (X_1), Institution (X_2), Human Resource (X_3), Technology (X_4) and

Information System (X_5) have impact on change of Income (Y) variable of 94.6%. And the rest (100% - 94.6% = 5.4%) constitutes the probability of other aspects which have influence on the change of Income (Y) variable. This is in conformity with error value emerging in the aforementioned path, amounting of 0.054 or 0.05.

Non- Hierarchical Solution of Two Clusters

In hierarchical procedure, prior to cluster analysis, standardization is first made for all Income variables (Y), Land Area (X_1), Institution (X_2), Human Resource (X_3), Technology (X_4), and Information System (X_5). The standardization is important to carry out on account of the fact that unit and value of every variable is varied and thus having similar and comparable scale. Furthermore, the standardized variables are referred to as ZY, ZX_1,ZX_2, ZX_3, ZX_4 and ZX_5.
Final result of non-hierarchical solution of two clusters has members with varied number in which cluster 1 consists of 4 persons, and cluster 2 has 56 persons (Table 4).

Table 4: Mean Values Cluster

Cluster	ZY	ZX1	ZX2	ZX3	ZX4	ZX5	Total Cluster
1	3.22115	3.27452	2.72188	3.26959	2.96478	3.07393	4
2	-0.2301	-0.2339	-0.1944	-0.2335	-0.2118	-0.2196	56

As shown in Table 4, significant difference emerges between clusters 1 and 2 for variables Y, X_1, X_2, X_3, X_4 and X_5. This clearly shows that clusters 1 and 2 are included into a very significant different group.
It is proven that cluster 2 for all variables of X_1, X_2, X_3, X_4 and X_5 comprises of mean values higher than those contained in cluster 1, in which cluster 1 only consists of 4 persons, while cluster 2 has 56 persons. Consequently, the conclusion can now be drawn that cluster 1 can be categorized into high-class entrepreneur and cluster 2 is categorized in low-class entrepreneur.

<u>Testing Variable</u>

This is aimed to know whether variables which have formed those clusters have difference for each cluster. This may be seen in the following ANOVA output testing.
Principally, the bigger the F value of certain variable is and the significant value is below 0.05, the bigger the difference of the variable will be in the three formed clusters.
Hypotheses proposed are as follow:
H_0 : Variable does not significantly influence the difference of every cluster.
H_1 : Variable significantly influenced the difference of every cluster.
The testing procedure goes along the following conditions:
If Sig. > 0.05, then H_0 is acceptable.
If Sig. > 0.05, then H0 is denied.
The following is the result of testing:

a. Significance testing of Income (Y) Variable:
   It indicates that the value of significance in column Sig is **0.000** or probability below **0.05** (**0.000** < **0.05**). Hence, H_0 is denied and it can be concluded that income variable has significant influence on the difference of every cluster. In other word, income value in cluster 1 is significantly different from that in cluster 2.

Based on the testing above, we can conclude that all variables including income, land area, institution, human resource, technology, and information system significantly influence the difference of every cluster formation.

The above-mentioned values are closely related to standardization process of the previous data, with reference to the value z, under the following conditions:

- Negative value represents data below total average
- Positive value represents data above total average

In determining the characteristic of every cluster, the following equation is employed:

$$X = \mu + z \cdot \sigma$$

Where in:

X = Sample Mean (in this case, the average of variable in certain cluster)

μ = Population Mean

σ = Deviation standard

z = standardized value in ***Final Cluster Centers***

The followings are the calculation result:

Characteristic of Cluster 1 :

- Income Mean = 1203667 + (3.22115 x 1217371.393) = 5125002.863
- Land Area Mean = 1746.30 + (3.27452 x 1718.940) = 7375.003409
- Institution Mean = 9.97 + (2.72188 x 2.951) = 18.00226788
- Human Resource Mean
- Technology Mean = 22.30 + (2.96478 x 8.247) = 46.75054066
- System Information Mean = 3.08 + (3.07393 x 1.925) = 8.99731525

Characteristic of Cluster 2 :

- Income Mean = 1203667 + (-0.23008 x 1217371.393) = 923574.1899
- Land Area Mean = 1746.30 + (-0.23389 x 1718.940) = 1344.257123
- Institution Mean = 9.97 + (-0.19442 x 2.951) = 9.39626658
- Human Resource Mean = 2.70 + (-0.23354 x 2.309) = 2.16075614
- Technology Mean = 22.30 + (-0.21177 x 8.247) = 20.55353281
- System Information Mean = 3.08 + (-0.21957 x 1.925) = 2.65732775

Based on the calculation above, it obviously shows that the character of cluster 1 is different from cluster 2. Mean value of every variable is higher in cluster 1 than that in cluster 2. For income variable, mean value of cluster 1 is 5125002.863 and cluster 2 is 923574.1899. In cluster 1, land area mean is 7375.003409, while cluster 1 is 1344.257123. For institution variable, mean value in cluster 1 is 18.00226788 and 9.39626658 for cluster 2. Human Resource Mean in cluster 1 is 10.24948331 and 2.16075614 in cluster 2. In cluster 1, technology mean is 46.75054066, while in cluster 2 the mean value is 20.55353281. Finally, for information system variable, mean value in cluster 1 is 8.99731525 and 2.65732775 in cluster 2.

Conclusion

Based on this research, it can be concluded that the development of Agro-tourism-Based Area for Belimbing (Starfruit) Dewa is innovation for government in making the advantage of various potentials existing in Depok City, exactly in Sawangan District. With reference to track analysis model, the correlation coefficient (R) is 0.973 and coefficient of determination (R Square) is 0.946 (94.6%). Thus, R Square value of 94.6% shows that by applying track analysis model, exogenous variables, including Land Area (X1), Institution (X2), Human Resource (X3), Technology (X4), and Information System (X5), have indeed influence on the change of Income (Y) variable amounting 94.6%. In addition, based on the calculation, it clearly shows that the character of cluster 1 is significantly different from cluster 2. Mean value of every variable in cluster is bigger than that in cluster 2.

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