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Urban Agroindustry through Extension Utilization Based on Vegetable Plant

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***Abstract* – One solution to strengthening the economy of the community is the optimal utilization of the yard, the cultivation of vegetable crops is a good alternative to overcome the increasingly limited yards. The existence of agro-industry as a continuation of processing agricultural products until now there are still obstacles in terms of continuity of availability of raw materials. With more intensive yard management, it is hoped that it will guarantee the availability of existing agro-industrial raw materials, especially vegetable crops as supporting agro-industrial raw materials. The objectives of the study were (1) to identify the potential of home garden utilization for vegetable crops as agroindustry raw materials, (2) to analyze the priority of vegetable crops as agroindustry raw materials, (3) to analyze the added value of vegetable crops. Data were analyzed by descriptive methods carried out in several regions that empower vegetable crops as a provider of agro-industrial raw materials, while data analysis methods use exponential comparison methods (MPE) and value-added analysis methods. The results obtained from the study are (1) Identification of the types of vegetable crops that are planted in supporting gardens as agroindustry raw materials 7 types of vegetable plants that can be used as raw materials for agroindustry namely Tomato, Chilli, Spinach, Celery, Kale, Carrots, Cucumbers (2). After the MPE test, each research area has excellent priority on the types of vegetables as different raw materials (3)). Vegetable plants that are processed into processed products can find out the highest value-added ratio is processed into Sledri Chips by 80.24%, Kangkung Chips by 78.35%, Spinach Chips by 77.37%, Tomato Sauce by 42.40% and Chilli Sauce is 29.01%.**

***Keywords* – Agroindustry, Vegetableplants, Urban, Yard.**

I. INTRODUCTION

With the optimal utilization of the yard, it can support the development of agro-industry through the continuous availability of agro-industrial raw materials so that with the available raw materials in the appropriate amount and time, sufficiency requires to produce sustainably [1]. The types of plants that can be developed in the yard include; fruit plants, vegetable crops and medicinal plants. Higher value added to agricultural products can undoubtedly play a role in increasing economic growth [2]. Significant economic growth, of course, has an impact on increasing the business field and the income of the people whose end is to improve the welfare of the community [3]. One of the functions of the yard as a source of income and improvement of nutrition because the yard can provide additional income if managed properly [4]. By planting a variety of plants can reap two benefits at once, namely to be utilized by the family and the excess can be sold, especially when used as a raw material for agro-industry so that the yields of these crops gain added value by being processed products [5]. Businesses in the yard if managed intensively following the potential of the yard, in addition to meeting household consumption needs, can also contribute to income for the family [6].

The existence of agro-industry at this time is increasingly expected to play a role in improving the family's economy, as well as driving the industrialization in the region. Many hopes are accumulated in the agro-industry, but its success is determined more by the potential [7]. With the utilization of the yard, it is expected to be a provider of agro-industrial raw materials so that empowerment of the yard can improve the entrepreneurial spirit of the community and increase the income of families with commodities that support agro-industry as processed products [8].

In general, the obstacles faced by agro-industries are: a). Availability of raw materials that are not continuous, (b) processing that uses simple technology so that it does not last long, (c) limited craftsman capital for the supply of raw materials, (d) marketing is only done locally, because craftsmen cannot expand the market because they do not the existence of production continuity [9].

From the above problems, then in an effort to overcome the availability of raw materials so that continuity is maintained, it is necessary to pay attention to the development of urban agro-industry through the empower--ment of commodities that support them by utilizing yards around the house to create an adequate structure of business and agro-industry [10]. The purpose of this study was to identify the potential of home garden utilization for vegetable crops as raw material for agro-industry, analyze the priority of vegetable crops as raw materials for agro-industry, and analyze the added value of vegetable crops as processed products.

In connection with this, the initial stage carried out in the study is to examine the potential of yard used as agro-industrial raw materials, starting from the type or variety of vegetable plants used, the potential of vegetable crops that can be developed, so that the handling of the upstream sector will increase the supply of raw material [11], another important thing in this study is the feasibility of local resource commodities that are used as raw materials for agro-industry, so that it will be known the added value (value added) of a raw material into processed products.

II. METHOD

A. *Place*

The study was conducted in four regions, namely Ngawi, Madiun, Magetan and Madiun, East Java, Indonesia. The research respondents are the community that empowers the yard with various kinds of vegetable plants that are used as a provider of agro-industrial raw materials. The selection of the study area is intentional (purposive) with the consideration that the area is the capital of each regency/city, Mejayan District for Madiun District, Ngawi

District for Ngawi Regency, Magetan District for Magetan Regency and Taman, Kartoharjo and Manguharjo Districts for Madiun City. Determination of respondents was done by purposive random sampling, that is, each of the Capital Districts taken 20 random samples.

B. *Methode*

The method used in this research is descriptive analysis method, which analyzing one object in the present time. The method used in analyzing the data is exponential comparison method (MPE) which is one of the methods used in deciding the quantification in depth in a specified scale, and in this method scoring is used in the selection available. The steps that need to be done in MPE are: 1) determine the alternative decision, 2) organizing the criteria that will be evaluated, 3) determining the relative importance level of each decision using a specified conversion scale that corresponds with the objectives wanted to be reached. 4) Putting on rating on each alternative decision value [12]. The formula used in calculating each decision is as follows:

$$\text{Total Value (TNi)} = \sum_{j=1}^{m} (\text{Vij})^{\text{Bj}}$$

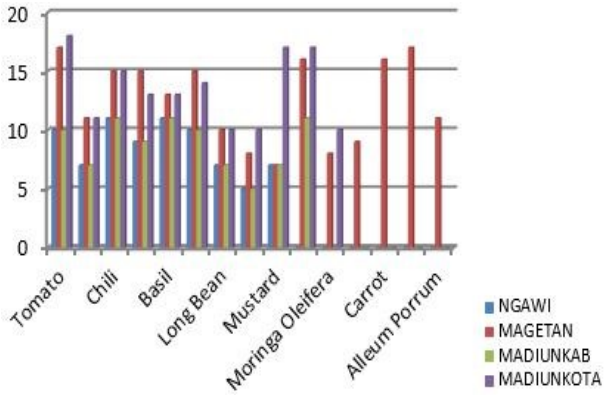
Where the sign means:
TNi = Alternate Total Value i.
Vij = Relative importance scale of the criteria j on decision I, that can be stated with ordinal scale (1, 2, 3, 4, 5).
Bj = The importance scale of criteria decided, stated with weight.
m = The amount of conclusion criteria.

In this study, the opinions of selected experts are relevant experts who come from practitioners, relevant government institutions, academics or researchers and actors/ entrepreneurs of agro-industry. In determining the alternative decision on the selection of agro-industry development potential, the three highest priorities were used for the types of vegetable crops cultivated in the yard in each research area. Whereas to analyze the added value using the Value-Add Analysis method using the Hayami method which is useful to find out how much-added value is contained in one kilogram of processed products [13].

III. Result and Discussion

A. *Identification of Plants Vegetables grown in the yard.*

From the survey results that have been carried out at the study site, it can be seen that vegetable crops grown in the yard in the Ngawi, Magetan, Madiun and Madiun Regencies are 15 types of plants. The number of vegetable crops planted is very dependent on the climate of an area so that each research area has many different types of plants. Then after inventorying and identifying the opinions of experts on the basis of criteria for selecting fruit development potential, which includes land area, production, type of crop, ease of cultivation, attractiveness of the community to plant, storability, continuity of availability, from 15 types of vegetable plants that support as agroindustry raw materials into 7 types of vegetable plants. In the graph below shows the number of responde--nts and the type of vegetable planted in the yard.



Graph 1. Number of Respondents and Types of Vegetable planted in the yard

From the graph above it can be seen that the number of tomatoes, chilli, eggplant, spinach, kale, carrot, celery planters in Magetan district shows a large amount, this is because the Magetan regency is very suitable for the current climate. While in the City of Madiun vegetables planted in the yard were very many, namely tomato, chili, mustard, kale, this was because in the City of Madiun the RPL (Sustainable Food House) program had begun to succeed, and every yard was cultivated vegetables with verticulture and planted in a polybag (pot). Whereas in Madiun and Ngawi Regencies it can be seen that many vegetable crops that are cultivated are tomato, chilli, basil, spinach and kale.

B. *Priority types of Vegetable that are Planted in the Yard*

Various types of vegetable that have been planted in home yards in the study area are Ngawi Regency, Magetan Regency, and Madiun Regency. From the study area, showed that the types of vegetable planted by the community in each yard are different, this indicates that the potential of each research area for vegetable crops is different. Following priority the type of vegetable planted in the yard after the MPE test was obtained the results shown in table 1.

From Table 1 it can be seen that each research area has the potential of different vegetable crops, in Ngawi the highest potential vegetable crops are tomato plants, followed by second priority were chilli, and tthe third is the Spinach. While for Magetan Regency and Madiun Regency a priority with highest potential vegetable crops grown in the garden is chilli, following number two in Magetan is a because of the celery, because the requirement to grow the plant's celery to live is on a plateau, then to the third priority potentials in Magetan is the tomato. In Madison County and the City of Madison can be seen prioritize potential to 2 is plant spinach, while the priority of the potential for 3 to Madiun is a plant tomato while the City of Madison is vegetable kale, it is because the program Sustainable Food House conducted in Madiun already running good so that many vegetable crops are grown using polybags or verticulturally.

Tabel 1. Priority of types of vegetable planted in yard.

Vegetable Name	Priority of types of Vegetable in research areas							
	Ngawi		Magetan		Madiun-Reg		Madiun Kota	
	MPE Value	Priority	MPE Value	Priority	MPE Value	Priority	MPE Value	Priority
Tomatto	192625739	1	47388467	3	29097760	3	29097760	4
Chilli	42522449	2	93233323	1	39217504	1	39217504	1
Celery	0	0	78634006	2	0	0	0	0
Sipanach	37435677	3	37435677	4	37435677	2	37435677	2
Carrot	0	0	32752749	5	0	0	0	0
“Kemangi”	23803096	4	24959530	6	19269515	5	19269515	5
Eggplant	6940865	6	13035545	7	10387765	7	10387765	8
“Sawi”	4477346	9	3986198	8	6944001	8	11012550	7
“Jeruk Purut”	0	0	3101333	9	0	0	9279659	9
Cucumber	5369118	8	2931024	10	5369118	10	5369118	11
“Kenikir”	6476984	7	2473681	11	12099487	6	12099487	6
pea	6940868	5	1926839	12	6940868	9	6940868	10
“Kangkung”	0	0	1891758	13	19528293	4	30451540	3
“kelor”	0	0	1039765	14	0	0	0	0
“Prei”	0	0	446841	15	0	0	0	0

Source : Primary data

C. *Priority of Agro-Industry Development with Vegetable Raw Materials.*

In the development of agro-industry in the study area, it is necessary to pay attention to processed products that can be used in each raw material derived from vegetable plants in each research area. Priorities that can be identified for the development of agro-industry can be seen from the opinions of experts consisting of: agro-industry entrepreneurs, academics, and related agencies. The following priorities are the selection of Agroindustry development potential after the MPE test in accordance with the potential of vegetable crops in each research area can be known as follows:

Sustainable Food Houses carried out in Madiun City have run well so that many vegetable crops are grown using polybags or verticulture.

A). *Ngawi Regency*

Table 2. Priority of Agroindustry development with MPE for raw vegetables.

No	Types of Processed Products	Potential Priorities for Agro-Industry Development with Raw Materials for Vegetable Plants					
		Tomatto		Chilli		Spinach	
		MPE Value	Priority	MPE Value	Priority	MPE Value	Priority
1	“Pecel” sauce	0	0	157952494	1	0	0
2	Fresh material	134245457	2	151723836	2	81835394	1
3	So Spices	0	0	43648717	3	0	0
4	Sauce	160164197	1	39310881	4	0	0
5	Spinach Crispy	0	0	0	0	55696870	2
6	“Manisan”	58330993	3	0	0	0	0
7	Juice	57475995	4	0	0	0	0
8	“Sari Buah”	6944557	5	0	0	0	0

Source : Primary Data.

From the table above, it is known that in Ngawi regency, the priority of agricultural development potential with tomato raw materials can be processed into sauce is the first and second priority. The tomato vegetable plants are sold primarily or fresh, and the third priority can be processed into sweets, juices and juices. fruit/ syrup. Whereas Agroindustry with the highest raw material of chilli priority is the potential for development to be processed into Sambel Pecel, the next priority is more fresh peppers sold, and then the other process is as Seasoning and as Sambal sauce. Other Vegetable Plants that support agro-industrial raw materials in Ngawi Regency are Spinach plants; namely, the highest priority potentials are sold fresh as vegetable dishes while other preparations are as spinach chips.

B). *Magetan Regency*

Table 3. Priority of Agroindustry development with MPE for raw vegetables.

No	Types of Processed Products	Potential Priorities for Agro-Industry Development with Raw Materials for Vegetable					
		Chilli		Celery		Tomatto	
		MPE Value	Priority	MPE Value	Priority	MPE Value	Priority
1	“Pecel” sauce	158115786	1	0	0	0	0
2	Fresh material	151890744	2	73455230	1	83121897	2
3	So Spices	43645095	3	0	0	0	0
4	Sauce	39520255	4	0	0	93347310	1
5	Celery Crispy	0	0	47148388	2	0	0
6	“Manisan”	0	0	0	0	58185249	3
7	Juice	0	0	0	0	57475995	4
8	“Sari Buah”	0	0	0	0	6944557	5

Source : Primary Data

From the table above it can be seen that the priority of vegetable crops grown in the yard as agro-industrial raw materials in Magetan Regency is Chilli, celery and Tomato. For chilli plants used as agro-industrial raw materials processed into processed products, the highest priority can be used as raw material for "pecel" sauce, then the second priority for the production of chilli is only sold in fresh form and as the third priority is chilli processed as finished ingredients and the next priority as Saos. The next vegetable plant used as raw material for agroindustry is celery plant, processed into celery chips, besides it is sold in fresh form. The other vegetables planted in the yard used as raw material for Agro-industry are Tomatoes which are processed as sauce, then many are sold in fresh form, then the priority of other processed products is "Manisan", juice and "Sari Buah".

C). *Madiun Regency*

Table 4. Priority of Agroindustry development with MPE for raw vegetables.

No	Types of Processed Products	Potential Priorities for Agro-Industry Development with Raw Materials for Vegetable					
		Chilli		Spinach		Tomatto	
		MPE Value	Priority	MPE Value	Priority	MPE Value	Priority
1	"Pecel" sauce	158115786	1	0	0	0	0
2	Fresh material	151890744	2	115440090	1	186082046	1
3	So Spices	55867381	3	0	0	166455653	2
4	Sauce	43603950	4	0	0	0	0
5	Spinach Crispy	0	0	77569003	2	0	0
6	"Manisan"	0	0	0	0	58185249	3
7	Juice	0	0	0	0	57475995	4
8	"Sari Buah"	0	0	0	0	6944557	5

Source : Primry Data

From the table above it can be seen that the priority of vegetable crops grown in the yard as an agro-industrial raw material for the Madiun Regency is chillies, spinach and tomatoes. For chilli plants used as agro-industrial raw materials processed into processed products, it can be seen that the highest priority is used as raw material for pecel sauce, then the second priority for the production of chilli is only sold in fresh form and as the third priority is chilli processed as sauce and the next priority as seasoning So. The next vegetable crop used as raw material for agro-industry is Spinach, Spinach has the highest priority in selling in fresh form, while the next priority is processed into Spinach Chips. The other vegetable crops.

D). *Madiun City Region*

Table 5. Priority of Agroindustry development with MPE for raw vegetables

No	Types of Processed Products	Potential Priorities for Agro-Industry Development with Raw Materials for Vegetable					
		Chilli		Spinach		Kale	
		MPE Value	Priority	MPE Value	Priority	MPE Value	Priority
1	"Pecel" sauce	114462794	1	0	0	0	0
2	Fresh material	71975731	2	114353216	1	117407985	1
3	Sauce	39442494	3	0	0	0	0
4	So Spices	18631406	4	0	0	0	0
5	Spinach Crispy, Kale	0	0	38508362	2	39471470	2

Source : Primary Data

From the table above it can be seen that the priority of vegetable crops grown in the yard as an agro-industrial raw material for the Madiun Regency is chillies, spinach and tomatoes. For chilli plants used as agro-industrial raw materials processed into processed products, it can be seen that the highest priority is used as raw material for "pecel" sauce, then the second priority for the production of chilli is only sold in fresh form and as the third priority is chilli processed as sauce and the next priority as seasoning So. The next vegetable crop used as raw material for agro-industry is Spinach, Spinach has the highest priority in selling in fresh form, while the next priority is processed into Spinach Chips. The other vegetable crops that are planted in the yard are used as raw materials for Agro-industry. Tomatoes which are the first priority are sold in fresh form, then the priority is processed as Soos, then the other priority products are "Manisan", Juice and "Sari Buah.

C. *Added value Analysis of the vegetable*

After the priority of developing agroindustry by using MPE from several research areas is known, it is necessary to analyze the added value of the type of processed product which is the highest priority. Added Value from raw materials with plants Vegetables into processed products analyzed include Tomato Sauce, Chilli Sauce, Spinach Chips, Sliced Chips, Kangkung Chips are presented in the following table:

Table 6. Analysis of added value from raw vegetable plants.

NO	Output, Input and Value	Tommao sauce	Chilli sauce	Spinach Crispy	Celery crispy	Kangkung crispy
1	Output result (kg/production process)	50	30	26	20	22,5
2	Raw material input (kg/production process)	80	65	45	48	55
3	Labor input (HOK/kg/production process)	6	4	3	4	5
4	Convertion factor (kg output/kg raw material)	0,625	0,462	0,578	0,417	0,409
5	Labor coefisien (HOK/kg raw material)	0,075	0,062	0,067	0,083	0,091
6	output value(Rp/kg)	42000	38000	65000	85000	70000
7	Average wage for labor (Rp/production process)	20000	25000	20000	25000	20000
	Income and Profit					
8	Price of raw material inputs (Rp/Kg)	15000	12000	6000	5000	4000
9	Another inpun contribution (Rp/Kg)	120	450	2500	2000	2200
10	Output value(Rp/Kg)	26250	17538	37556	35416,67	28636,36
11	**Added value (Rp/Kg)**	**11130,0**	**5088,46**	**29056**	**28416,67**	**22436,36**
	Added value ratio (%)	42,40	29,01	77,37	80,24	78,35
12	Wage of labor (Rp/Kg)	1500	1538	1333,33	2083,33	1818,18
	Labor section (%)	13,48	30,23	4,59	7,33	8,10
13	Profit (Rp/Kg)	9630	3550	27722,22	26333	20618,18
	Profit section (%)	36,69	20,24	73,82	74,35	72,00
	Reply Services for Production Factors					
14	Margin (Rp/Kg)	11250	5538	31555,56	30416,67	24636,36
	a. labor income (%)	13,33	27,78	4,23	6,85	7,38
	b. another input contribution (%)	283,02	1551,02	3231,36	2492,67	2807,94
	c. Profit (%)	85,60	64,10	87,85	86,58	83,69

Source : Primary data analysis

From the table above shows that each raw material from vegetable plants can be a product that has different added value. This can be seen from the raw material of tomatoes used as tomato sauce with an added value of Rp 11130, - with a value added ratio of 42.40% of the raw material processed. Whereas the raw material of Chilli which is used as chilli sauce product has added benefit of Rp.5088.46 / kg, with a value-added ratio of 29.01%. As for Spinach raw materials used as Spinach Chips products added value of Rp.29056, - / kg with a value added ratio of 77.37%. Whereas celery vegetable raw materials can be made using celery chips to obtain an added value of Rp. 28416.67 / kg with an added value ratio of 80.24%. As for raw materials from kale vegetable plants can be used as kale crispy products to obtain added value of Rp.22436.36 / kg, with an added value ratio of 78.35%.

IV. Conclussion

From the research that has been done can be concluded as follows:

1. Vegetable which are identified as many as 15 types, of which 7 types of vegetable plants can be used as raw materials for agro-industries, namely tomatoes, chillies, spinach, sledri, kale, carrots, cucumbers.
2. Superior crop vegetables in Ngawi Regencyare Tomato, Chili, Spinach; in Magetan Regency are Chili, sledri, Tomato and in Madiun Regencyare Chilli, Spinach, Tomato. As for Madiun city, the superior vegetable crops are Chili, Spinach, Kale,
3. Plants Vegetables produced are processed into Tomato Sauce, Chilli Sauce, Spinach Chips, Sliced Chips, Kangkik Chips, each of which creates added value of Rp. 1130, - / kg, Rp. 5088,46 / kg, Rp. 2,9056, - /kg, Rp. 28416, 67/ kg, Rp22436, 36/ kg.

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