

Farmer readiness for adopting stevia cultivation (a case study at District of Pasir Jambu, Regency of Bandung)

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Abstract. Recognized as a complementary for conventional sugars made from cane, coconut, corn, and palm, as well as a substitute for synthetic sweetener, recently stevia has accepted significant attention in order to fulfill increasing demand for sweeteners in Indonesia. Stevia has several advantages, among other is having 200-300 times sweetness level compared to cane sugar with low-calorie level. In Indonesia, stevia was introduced from Japan, Korea and China, and has been cultivated in several areas, among other is in West Java, particularly at District of Cikajang (Garut), District of Pangalengan (Bandung) and District of Ciwidey/Pasir Jambu (Bandung). Introducing new commodity and/or technology has usually faced constraints and sometimes rejection. However, considering the potentials and increasing demand for it, stevia cultivation widespread need to be stimulated. This paper describes several conditions of farmer community at District of Pasir Jambu in terms of their readiness to adopt stevia cultivation in their land. Community readiness model was used to guide the structure of thinking in data collection process at farmer level in order to compose possible best intervention based on farmer aspiration and condition. In addition, several references from previous research reports, journal articles as well as government reports were used to sharpen analysis of data and information collected from the field.

1. Introduction

Demand towards natural sugars has increased in line with the growth of food and beverage industries and increasing household consumption. Even though Indonesian natural sugar production tends to increase in the period of 2012-2016 [1], hitherto its availability has not been able to fulfill national sweetener needs. This situation fostered food and beverage industries to use synthetic sweetener, which is not only to meet the demand but also in order to cut their cost of production.

People apprehension towards the use of synthetic sweeteners, in addition to increasing cases of diseases caused by excessive sugar consumption have stimulated the search for low-calorie natural sweetener sources. One of the sources is stevia. Stevia has potential to be a low-calorie natural sweetener, a complementary for sugar from cane, coconut, corn, and palm, as well as a substitute for synthetic sweeteners. It has 200-300 times sweetness level compared to cane sugar [2]. In addition, stevia has other advantages, such as strong root for protecting land from erosion and able to cope with drought. From health viewpoint, several benefits of consuming stevia are reducing hypertension, will not causing caries, rich with vitamins that are not available in synthetic sweeteners, contain antioxidants, reducing diabetes, and curing stomach ache [3].

In Regency of Bandung, a farmer group that constantly cultivates stevia since 2010 is Mulyasari Farmer Group, located in Village of Cibodas, District of Pasir Jambu. Recently about 2 hectares of farmers' land cultivated stevia, produced about 500-600 kg stevia leaves in every two weeks after 40



days planting. The demand of stevia to this farmer group increased, but they could not fulfill it. Farmer hesitancy to cultivate stevia is presumed as the main factor of this situation. The financial aspect is also a “classical” problem faced by farmers. In addition, less support from local government to develop this commodity worsen farmer (group) inability.

Notwithstanding, as the main actor in the development of stevia, the farmer is also having the most important role in the success of this process. This role must be started by farmer readiness to develop, which represents several aspects, from an ability to make a decision, to cultivate on the farm, to organize themselves in terms of farm management and marketing, and other capacities. According to Behar and Hydaker [8], the concept of “community readiness” offers a vital influence to improve the planning and implementation process for communities. Knowing important factors to the successful implementation should “help communities assess their own strengths and weaknesses”. Furthermore, they go on to say that this understanding could “support technical assistance efforts by helping to determine areas of focus and strengthen areas of weakness”.

Considering the previous statements, inquiries toward farmer readiness are important prior to implementing activities. High farmer readiness level is expected to be more successful to achieve activity’s goals. In this context, the goal is to cultivate stevia successfully at farmer level.

2. Method

The research implemented descriptive qualitative design, used a case study at Mulyasari Farmer Group, which cultivate stevia, located at Village of Cibodas, District of Pasir Jambu, Regency of Bandung. Qualitative method is frequently an interpretative method, because the result data usually resulted from field data interpretation [5], while case study is a descriptive technique, the object is now, only one case (community, family, or individual) and deep explorative in nature [6].

Primary and secondary data were used in this research. Primary data were obtained by interview with farmer group members and informants and through observations. Purposive sampling to group patron, management, and members was implemented. Secondary data were obtained from report documentations, journals, and related government institutions. Descriptive analysis data was used; refer to the identification of characteristics of human groups, things or events. In short, qualitative descriptive involves conceptualization process and results in the formation of classification schemes [4].

In order to conceptualize and guide structure of thinking in data collection, community readiness model was used. Community readiness model integrates communities’ culture, resources and level of readiness to address the issues more effectively [11]; developed to provide communities with a theoretical framework, a process, and specific tools to facilitate readiness [8]; it also can be used for specific and certain situations of a community [9].

The process of community readiness model development is (1) identify the issue, (2) define the community, (3) conduct key respondent interviews, (4) score interviews to determine level of readiness and (5) develop strategies based on level of readiness and conduct workshops or trainings [10]. Moreover, Plested et al. [11] categorized stage of community readiness (from low to high) into (1) No Awareness, (2) Denial/Resistance, (3) Vague Awareness, (4) Preplanning, (5) Preparation, (6) Initiation, (7) Stabilization, (8) Confirmation/Expansion, and (9) High Level of Community Ownership. In order to assess farmer readiness, four deep interviews with farmer group leader, a farmer group member, a cooperative management, and a local government leader have been conducted.

3. Results and Discussion

3.1. *Stevia cultivation in Regency of Bandung*

Stevia was introduced in Regency of Bandung in 2005. It used stevia seeds originated from Vietnam, involving four demonstration plots at Districts of Pasir Jambu, Pangalengan, Banjaran, and Cikalong. Since 2010, stevia has been developed intensively at District of Pasir Jambu, particularly at Village of

Cibodas. Initially, it was planted in 15-hectares of land, with hundreds of farmers involved. However, it decreased significantly into only two hectares, which is used for plasma stock, and only 25 farmers involved. According to farmer group leader, this plasma stock is different from its first introduced. It is a new variety of stevia seed, developed independently by farmers. They named the variety “Cibodas Manis 3” (CM3), named after the village.

At District of Pasir Jambu, development of stevia is facing several obstacles, among others first, hitherto stevia development has not been received sufficient attentions and responses from policymakers. It is indicated by a very limited amount of government based research and budget on stevia development. Even, at the national level, only due to demands from large industries, such as Sidomuncul, Martha Tilaar, and Jamu Jago, stevia has been cultivated in several places in Java. Second, in Regency of Bandung, particularly at District of Pasir Jambu, stevia was developed in communities that familiar with and common to a tea plantation. Without intensive and serious approaches and assistances, this could result in a difficulty to disseminate technology and to raise culture for stevia cultivation. Third, as large industries processing stevia do not exist, stevia cultivation will face a challenging situation. Hitherto, stevia produced by Pasir Jambu farmers has only been sold to certain communities (herbal and organic consumers), even though so far “local” demand always exceeds supply, and to a cooperative that processed it into several processed foods. Developing new consumers has also faced challenges as stevia taste is different from other sweeteners such as cane sugar or palm sugar. Hence, for several reasons, stevia has been mixed with other synthetic sweeteners such as xylitol, which is actually unhealthy to consume. With several potential processed product diversifications in further industries, such as for food, cosmetics, and pharmacy, so far farmers still only produced stevia-based food raw materials. Fourth, at farmer level cultivating stevia actually requires a large amount of money, in particular for seed provision. Therefore, existing stevia farmers saw this situation as an opportunity and recently they also started to produce stevia seeds instead of final stevia products.

Since 2016, Indonesian government released a regulation stating stevia can be used for food. Since then, demand towards stevia increased, it is even getting stronger since a commercial sweetener product has been released a sweetener with stevia on national television. In addition, increasing demand of stevia overseas, such as from Japan, the US and European Union [12] also plays an important role of farmer attractiveness to cultivate stevia. Further information stated that next year, the Regency of Bandung administration through Office of Agriculture, Plantation, and Food Plant promotes the development of stevia in broader Regency of Bandung areas, in particular at Districts of Kertasari and Ciparay.

Further development of stevia in Pasir Jambu will require several requirements, namely, first, processed industries based on stevia product must be available and ready for accepting stevia produced by farmers. So far, only one cooperative received stevia and processed it into sweet tea products with several tastes. Second, in order to keep stevia plasma for next cultivation, the government should help the farmer to register farmer stevia variety for intellectual property rights (IPRs) and plant variety protection. This breeding process could be served as a type of participation plant breeding (PPB). Third, the government should provide regulation and support stevia to develop. The dominance of other sources of sugar, such as cane, coconut and palm should be complemented by “new” other sources such as stevia. It is political in addition to technical and economic considerations. Hence, the government indeed plays a very important role.

3.2. *Farmer readiness to cultivate stevia*

Since has been introduced at District of Pasir Jambu, stevia cultivation has never been refused and rejected by farmers. Almost all members of farmer groups located at District of Pasir Jambu recognize stevia and have the ability to cultivate. However, at the location, from about 600 members of farmer groups, only about 25 farmers cultivating stevia and coffee, the others cultivate coffee and other commodities. Decreasing cultivated land and production in the past were mainly resulted from the disability of market to absorb production as well as high cost needed to cultivate.

Recently, there is a plan from Regency of Bandung administration to develop District of Pasir Jambu, particularly in Village of Cibodas into a tourist destination. It is planned to develop forestry educational tourism. The government has improved several infrastructures such as road, accommodation and sanitation facilities, as well as supports from certain offices in Regency of Bandung. Moreover, this district is going to be developed as a center for several community-based agriculture developments in Regency of Bandung, which will conduct training, provide apprenticeship and carry out researches, which are not only for farmers from Bandung but also opened for farmers from all over Indonesia. Among several commodities to be developed, stevia is one of the advantage commodities which receives special attention.

Based on community readiness assessment to adopt stevia cultivation at District of Pasir Jambu, Regency of Bandung, overall farmer readiness score is 6.46. This score shows that community is on “initiation” stage, which means that “enough information is available to justify efforts, activities are underway”.

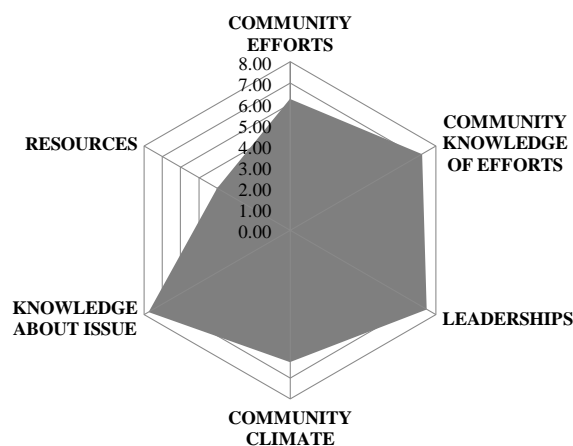


Figure 1. Farmer readiness assessment results to adopt stevia cultivation at District of Pasir Jambu

Moreover, based on a model developed by Plested et al. [11] detail score of every assessment component can be depicted in Table 1.

Table 1. Farmer readiness assessment components to adopt stevia cultivation at District of Pasir Jambu

Components	Score	Definition
Community Efforts	6.25	Efforts (programs/activities) have been implemented
Community Knowledge of Efforts	7.25	There is evidence that the community has specific knowledge of local efforts, including contact persons, clients involved, etc.
Leadership	7.25	Leaders are supportive of continuing basic efforts and are considering resources available for self-sufficiency
Community Climate	6.25	The attitude in the community is “this is our responsibility” and is now beginning to reflect modest involvement in efforts
Knowledge about Issue	7.75	Community members have knowledge of, and access to, detailed information about local prevalence
Resources	4.00	The community has individuals, organizations, and/or space available that could be used as resources
Average	6.46	Enough information is available to justify efforts. Activities are underway

Table 1 shows that farmer knowledge about the issue is the highest score in this assessment. This score supports the issue that actually, stevia has been recognized and pretty familiar with a farmer in

the location. It is also supported by a local leader who gives serious attention to cultivating stevia, which is indicated by a high score as well. Farmers also identified that several efforts have been conducted. Even though still at a very beginning involvement, farmers put stevia development as an important part of their life. Due to a small development of stevia, so far only small amount of resources has been used to cultivate stevia. However, the farmer is actually willing to provide their resources if stevia development will be extended.

3.3. Development strategies

Based on community readiness assessment to adopt stevia cultivation at District of Pasir Jambu Regency of Bandung, three weaknesses components identified, namely resources, community efforts and community climate. Hence, importunate strategies to implement are to increase quality and quantity of these three components. Several strategies to overcome these weaknesses can be formulated as can be seen in Table 2.

Table 2. Development strategies to cultivate stevia at District of Pasir Jambu

Components	Stevia Cultivation	
	Score	Strategies
Goals of Community Development	6.46	Provide community-specific information
Corrective Actions		<ul style="list-style-type: none"> • Plan publicity efforts associated with start-up development of stevia cultivation in community • Attend meetings to provide updates on progress of the potential and development of stevia in community • Search for additional resources and potential funding to develop stevia in location • Begin some basic evaluation efforts, in particular, related to farmer involvement in developing stevia • Insist government (local, regional) give further attentions and responses related to stevia development in the location • Collect information related to the gap between farmer and buyer expectation related to stevia (processed) products

Table 2 shows that actually, development stevia at District of Pasir Jambu has significant potential to deliver. Internally, farmer's community is adequately ready to adopt stevia development. Better organization and management will easily attract farmers to involve. Government attentions and responses (at local as well as regional/national) through supportive policies (including financial source provisions) will help the development rate very much. Politically, the government should encourage alternative sweetener sources development, in addition to "conventional" sources. Similarly, certain industries involvement and collaboration with farmers will also increase the adoption process significantly.

4. Conclusion

Farmer readiness to cultivate stevia at District of Pasir Jambu, Regency of Bandung is at "initiation" stage, which is actually having sufficient information to be further developed. In order to increase farmer (group) capacity (quantity and quality), several strategies can be implemented, in particular, related to management and organization of farmers, government policy supports, and involvement of related industries.

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