PROGRAMME BOOK

The 4TH INTERNATIONAL SEMINAR OF REGIONAL NETWORK ON POVERTY ERADICATION

23 - 25 OCTOBER 2013

UNIVERSITI MALAYSIA KELANTAN
JELI CAMPUS, MALAYSIA

RENPER4

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PRESENTATION SCHEDULE

23 OCTOBER 2013 (WEDNESDAY)
SESSION 1

Chairperson : **Dr. Md. Shafiqur Rahman**
Rapporteur : **Hasifah Abdul Aziz**

Time	Titles
10.50 – 11.20	Plenary Paper: **Closed Farming System: An Alternative Poverty Eradication in Kabupaten Rejang Lebong, Bengkulu Province, Indonesia** *Sigit Sudjatmiko, Mohammad Chozin, Zainal Muktamar & Nanik Setyowati*
11.20 – 11.40	**Farming Snakeskin Gourami, *Trichogaster pectoralis*, as a Poverty Eradication Tool** *Lee Seong Wei, Salleh Kamarudin & Mustaqim Md Tajudin*
11.40 – 12.00	**The Importance of Integrated Small Ruminant: Oil Palm System for Poverty Alleviation in Bengkulu Province, Indonesia** *Dwatmadji & Tatik Suteky*
12.00 – 12.20	**An Overview of Poverty Eradication through Entrepreneurship Development in Aquaculture Industry of Red Tilapia** *Kassim Buhiran & Lee Seong Wei*
12.20 – 12.40	**Influence of Local Leadership in Poverty Eradication among the Orang Asli Comminities in the State of Terengganu, Malaysia** *Ramle Abdullah, Mohamad Hafis Amat Simin & Asmawi Ibrahim*
12.40 – 13.00	**Small Organic Fertilizer Factory Promotion in Rural Community of Northeast Thailand: Poverty Reduction and Toward to Sustainable Agricultural Development** *Phassakon Nuntapanich*

CLOSED FARMING SYSTEM: AN ALTERNATIVE POVERTY ERADICATION IN KABUPATEN REJANG LEBONG, BENGKULU PROVINCE, INDONESIA

By:

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ABSTRACT

Bengkulu is classified as an under-developed province due to high poverty percentage in Indonesia. Rejang Lebong with its basis on agriculture is part of the province that shares the high number of poverty in Bengkulu. The poverty eradication in Rejang Lebong should be focused on the rural area in which 75 percent of poverty taken place. It should be developed an alternative approach to reduce the dependency of farmers on chemical fertilizers and pesticides, the main cost of agricultural input in an-organic farming system. The aim of project is to develop a closed farming system in which entirely input of agricultural production derived from the internal villages and to compare growth and yield components of 20 genotypes of sweet corn in order to obtain genotypes suitable to organic farming. It is therefore the combination between dairy farm and vegetable farm was introduced, including the establishment of composting technology. Since 2013 the research team conducting breeding program in sweet corn. Twenty (20) varieties of sweet corn were initially evaluated its characteristics in Rejang Lebong, and also each of them will be selected for another 6 years to obtain hybrids suitable to organic farming. Results show that the production organic farming still faced obstacles particularly due to the high degree of pest and diseases occurrence. Eventually, the production is obviously under the in-organic farming (conventional) system, but as the organic vegetable products have been appreciated by consumers, the farmers still earned money due to high price and low input cost. Characteristics assessment of twenty sources genetic of sweet corn also came across an occurrence of leaves disease ((*Helminthosporium turcicum*). Genotypes of Raja, Gendis, Secada F1, King Sweet, and Talenta had better growth, higher yield and more adaptable to agro-ecosystem organic farming in high land (Kabupaten Rejang Lebong). Genotypes of Raja, Gendis, Secada F1, King Sweet, and Talenta have potential to be developed as hybrid for organic farming in high land. The program, therefore, should consistently convince the organic farmers by improving the technology in handling the plant pests and diseases.

Key words Rejang Lebong, poverty, compost, closed system farming

BACKGROUND

Data from Bengkulu Statistic Bureau Office show that poverty degree of the Bengkulu Province in 2013 of about 327.350 people (18,34% of the population). There is an increase of about 5.44 % from the year of 2012. The data also indicate that most of the poverty has been found in the rural area, i.e. almost three times higher than poverty in the urban area. In Kabupaten Rejang Lebong, one of the 9 kabupaten in Bengkulu province, the poverty level is about 17.31% of the total population in this area (Anonym, 2013). Meanwhile, the economic in Kabupaten Rejang Lebong rely on an in-organic agricultural system, particularly vegetable production that mostly concentrated in rural area. These facts pointed out that the Kabupaten Rejang Lebong should increase the capacity of the farmers to produce vegetables economically so that the poverty level could be alleviated.

Problems encountered by in-organic farmers are the scarcity and or expensive agricultural inputs and also has a negative impact on health and environment (IFPRI, 2002; Lal, 2006; Las *et al.*, 2009). In addition, the successes in an in-organic farming heavily depend on chemical fertilizers and pesticides (Welch and Graham, 1999). Moreover, community understanding on negative impact of inorganic farming comes to awareness of the community to consume and produce healthy agriculture product without use of agrochemical, either fertilizer or pesticide. However, understanding of farmers on the organic farming was very limited. To solve these problems, therefore, farmers should be educated to acknowledge the ancient farming system that only relies on internal resources (Dirjen BPPHP, 2001).

Another problem faced by organic farmers is the scarcity of seeds suitable to organic farming agroecosystem. Most of seeds available in the market are those for in-organic farming. Therefore, it is urgent to obtain seeds for organic farming. Poehlman and Sleper (1995) suggested that seeds suitable to the area should be initiated by combining genetic resources which are available either in the area or from outside.

There are three proposed activities which are considered able to eradicate the poverty level in Kabupaten Rejang Lebong i.e. by reducing the dependency on chemical inputs of agriculture, introducing vegetable seeds suitable to organic farming and to the

specific high land (Rejang Lebong) climate, and improving the postharvest technology and marketing.

The objectives of the study were to obtain an efficient closed system farming to support an alleviation poverty program of vegetable farmers in Kabupaten Rejang Lebong, Bengkulu province of Indonesia and to compare growth and yield components of 20 genotypes of sweet corn in order to obtain genotypes suitable to organic farming.

MATERIAL AND METHOD

The researchers of the University of Bengkulu in collaboration with the branch of Bank Central of Indonesia in Bengkulu, Science Institute of Indonesia (Lembaga Ilmu Pengetahuan Indonesia, LIPI), and the Directorate General of Higher Education of Indonesia developing sustainable agricultural project focused on organic farming system using input resources such as seeds, fertilizers (compost and manures) and organic pesticides from internal village, known as closed farming system. An area of 6500 m2 was set as a pilot project in which 2000 m2 was used as an animal farmhouse including an area for producing compost and manure, vermi-compost, and organic pesticides. The rest of the land was used for vegetable production.

Ten (10) dairy cows were introduced from Balai Besar Pembibitan Ternak Unggul Sapi Perah Baturaden Purwokerto, Central Java of Indonesia. The dairy cows were brought into the farmers in order to maintain an optimum milk production. These technologies include sanitary of the animal house system, dairy cow health, and creating an alternative dairy cow feed.

Meanwhile, zero waste technology of dairy milk production is established by composting raw material from litter or waste from dairy cows forages and cows manure mixed with effective microorganisms, following with established procedures of compost production technology. The cows urine was also processed using aerated technology to become liquid fertilizer and pesticides. Furthermore, vermi-compost was introduced to the farmers by utilizing soil worm (*Lumbricus rubilus*) to chop the manures produced by

dairy cows. Vermi-compost is known as a high quality of compost composing rich variety of mineral.

Varieties of vegetable such as carrot, beans, tomatoes, hot chili, cucumber, and sweet corn were cultivated using closed farming system i.e. without using input from outside of the villages. Farmers were showed to practice growing the vegetables without using external input especially chemical fertilizers and pesticides.

Experiment to compare 20 genotypes of sweet corn was established using Randomized Complete Block Design with 3 replication, totaling of 60 experimental units (plots). Each plot (sized 2.5 m x 4 m) was divided into 4 rows with spacing of 70 cm. The corn seed was planted in a hole with spacing of 20 cm, so the plant spacing was 20cm x 70 cm. Compost was applied at planting time with doze of 30 ton/ha. Liquid organic fertilizer was also applied at 35 days after planting and tassel time.

RESULT AND DISCUSSION

The pilot project was initiated in 2010 by establishing dairy milk farm consisted of five (5) female dairy cows and in 2012 was introduced another five (5) female dairy cows. By August 2013, the cow population was seventeen (17), including two newborn and five of 1 year old offspring. The dairy farming system produces approximately 300 kg of wet manure per day (87.5% is water) and was managed properly as a raw material of compost. Within one month the production of manure compost is about 1.14 ton/month. Commonly the vegetable farmers apply 15 ton manure compost/ha, therefore, the developed system can support organic farming approximately 750 m2 per month. The compost using litter of dairy cow forages also has a potential source of organic fertilizer. It only takes less than 6 weeks of composting for the product to be ready for application. At present the farm is able to produce compost of about 250 kg/month. In addition, the production of vermin compost per month was about 100 kg, and this organic fertilizer has been valued in the market.

To introduce the closed farming system to the farmers, a group of 10 vegetable farmers with at least two year experience of conducting semi-organic farming cultivation were selected as pilot project participants. Each farmer was arranged to cultivate different commodities to reduce the high risk of over-supply product. The results showed that all of the vegetable production in organic farming system in average was still under the an-organic farming system (Table 1).

Table 1. Average vegetable production of organic and an-organic farming system in Kabupaten Rejang Lebong of Indonesia

Comodity	Organic Farming (ton/ha)	Inorganic Farming (ton/ha)	Percentage
Carrot	12	14	85.7
Cucumber	10	20	50.0
Sweet Corn	4.5	8	56.3
Tomato	3	7	42.9
Hot Chili	6	10	60.0
Beans	1	4	25.0

It is found in the field that the organic farming facing various obstacles due to high incidence of weeds, pests and diseases in the field. The biological pesticides were not able to control the infestation unless spray more regularly. This was of course brought about the decrease in the production of the vegetables. Carrot gives lowest yield difference between organic and in- organic farming (14.3% difference) while tomato gives the highest difference (57.1%). However, with the high price of organic product and low input cost therefore farmers still earn the money.

The techniques on organic farming still need to be improved to boost the production per hectare. Farmers will obtain more income if the production is close to the an-organic system due to low cost input and high price of the product. In the 2 years. It was shown that most of farmers selected as pilot project participants started to understand how to cultivate vegetables using organic farming. In the long run, it is expected that higher yield of vegetables cultivated using this system will be achieved.

The next step of the project is to provide vegetable seeds which are suitable to the Rejang Lebong environment. At present, farmers produce their own seeds or buying from the agricultural shop, and this will not be able to boost the production.

Since 2013 the research team conducting breeding program in sweet corn. Twenty (20) varieties of sweet corn were initially evaluated its characteristics in Rejang Lebong, and also each of them will be selected for another 6 years to obtain hybrids suitable to organic farming. At the same time breeding program is also carried on some potential and high value vegetables. It is expected within 6 to 7 years to come, vegetable farmers will have their own high quality seed to guaranty the high production of vegetable applying organic farming system.

Table 2. Growth and yield component characteristics of twenty genetically potential sweet corn cultivated in Rejang Lebong of Indonesia.

Genotif	Variabel													
	TT	JD	DB	UBJ	UBB	UP	PTKOL	DTKOL	BTKOL	BBTKOL	JBARIS	JBIJI	Hasil	Hijauan
Billy sweet	119.93 c	11.27 a	1.91 b	66.80 a	69.90 a	74.47 a	20.25 b	4.56 b	211.13 c	136.33 d	14.27 c	33.27 b	5.07 b	5.71 c
Radja	168.40 a	11.40 a	1.75 c	60.73 c	63.87 c	68.87 b	20.87 b	5.29 a	294.13 b	184.73 b	12.93 d	32.17 b	7.23 b	8.15 b
Gendis	155.87 a	11.07 a	1.97 b	59.47 c	63.37 c	68.83 b	20.97 b	5.40 a	311.93 b	225.00 a	14.27 c	40.76 a	10.52 a	9.85 a
Sweet boy golden	135.00 b	10.53 b	1.91 b	62.80 b	66.23 b	71.13 a	20.02 c	4.62 b	236.67 c	154.60	14.27 c	35.72 a	5.28 b	4.76 c
London	144.07 a	11.13 a	1.86 b	60.67 c	64.40 c	69.33 b	21.14 b	4.88 b	264.00 b	180.20 b	13.20 d	38.08 a	7.74 b	8.47 b
Secada F1	158.67 a	11.93 a	2.14 a	65.53 a	67.37 b	72.00 a	22.53 a	5.66 a	364.00 a	245.07 a	18.27 a	38.98 a	11.33 a	8.18 b
Jambore	148.40 a	11.27 a	1.97 b	59.93 c	63.60 c	68.77 b	22.81 a	5.05 a	300.60 b	215.73 a	14.13 c	42.02 a	9.62 a	9.85 a
New Kencana	118.13 c	9.93 c	1.54 c	60.60 c	62.47 c	67.07 b	17.15 d	4.23 a	151.87 d	114.20 d	11.60 e	32.03 b	3.95 b	4.47 c
Virginia 2	118.80 c	10.00 c	1.68 c	60.27 c	63.63 c	69.27 b	17.84 d	4.35 c	168.40 d	123.07 d	12.53 d	29.24 b	3.69 b	5.71 c
OR Holli	145.13 a	10.73 b	1.67 c	61.53 c	64.93 c	69.90 b	18.79 c	4.43 c	191.20 c	132.80 d	13.73 c	35.13 a	5.40 b	6.33 c
Cosmos F1	144.93 a	10.93 a	1.73 c	60.60 c	62.17 c	67.90 b	19.54 c	5.27 a	275.73	204.07 b	14.27 c	31.89 b	6.99 b	5.38 c
Sweet boy	143.47 a	10.80 b	1.80 c	61.20 c	63.83 c	68.70 b	19.91 c	4.73 b	232.27 c	173.40 c	13.87 c	38.70 a	5.80 b	4.33 c
Elma	124.27 c	10.47 b	1.58 c	65.60 a	68.07 b	72.80 a	16.73 d	4.31 c	160.47 d	105.73 d	15.33 b	25.87 b	2.84 b	7.67 b
King sweet	156.93 a	11.07 a	1.79 c	62.27 c	64.87 c	69.93 b	19.67 c	5.26 a	260.00 b	168.93 c	13.07 d	30.81 b	6.38 b	11.38 a
Talenta	152.47 a	11.00 a	2.23 a	61.33 c	64.70 c	69.60 b	23.81 a	5.40 a	358.33 a	236.40 a	13.47 c	36.88 a	13.27 a	4.36 c
Bonanza F1	135.27 b	10.93 a	1.91 b	64.00 b	66.77 b	71.27 a	21.61 b	5.05 a	279.27 b	193.07 b	15.20 b	35.57 a	5.52 b	5.75 c
Bimmo	138.00 b	10.67 b	1.68 c	63.87 b	67.43 b	72.10 a	18.87 c	4.63 b	199.93 c	127.93 d	14.13 c	31.06 b	4.57 b	7.67 b
Saigon	152.47 a	10.67 b	2.00 b	60.73 c	64.30 c	69.27 b	20.94 b	5.16 a	287.93 b	192.00 b	13.73 c	42.32 a	9.19 a	8.33 b
Sweet vaganza	165.80 a	11.27 a	1.85 b	60.13 c	64.50 c	68.87 b	22.12 a	5.21 a	285.27 b	163.67 c	13.60 c	35.88 a	9.44 a	7.56 b
Lambada F1	159.20 a	11.47 a	1.86 b	63.07 b	63.57 c	68.60 b	20.69 b	5.36 a	307.73 b	232.47 a	15.33 b	36.82 a	10.28 a	3.75 c

TT : Tinggi Tanaman JD : Jumlah Daun DB : Diameter Batang UBJ : Umur Bunga Jantan UBB : Umur Bunga Betina UP : Umur Panen
PTKOL : Panjang Tongkol DTKOL : Diameter Tongkol BTKOL : Berat Tongkol Berkobot BBTKOL : Berat Tongkol Tak Berklobot
JBARIS : Jumlah Baris Biji JBIJI : Jumlah Biji/Baris Hasil : Hasil Tongkol/Petak Percobaan Hijauan : Berangkasan/petak Percobaan

Twenty genetic sources of sweet corn were evaluated its growth and yield characteristics in an organic farming system. The area has been used for organic farming since 2009, but its surrounded area still carried out an-organic farming. The result show that more than 75% of the population were infested by "hawar daun" (*Helminthosporium turcicum*) introduced by neighboring sweet corn field. In result, the growth of the plants were stunted, most of the leaves showed a high degree of lesion distributed throughout the leaves surface. Control measures have been taken using organic pesticide but only reduce the disease.

From Scott-Knott analysis, it is shown from Table 2 that there is significant difference among 20 genotypes of sweet corn, indicating that each genotype gives difference response to high land agro-ecosystem as well as to organic farming. Genotypes of Radja, Secada F1, King sweet, Gendis, Talenta, relatively had high vigor of plant with plant height more than 150 cm. Genotypes with higher number of leaves include Raja, Gendis, Secada F1, King Sweet, Talenta, Lambada F1, Billy Sweet, Sweet Faganza, London, Jambore (number of leave more than 11). In addition, Genotypes with rod diameter more than 1.75 cm include Raja, Gendis, Secada F1, King Sweet, Talenta, Billy Sweet, Sweet Boy Golden, London, Jambore, and Sweet Boy. Genotypes of Sweet vaganza, Secada F1, Jambore, and Talenta had longer cob as compared to other genotypes, indicating that the genotypes has potential to have high yield.

Table 2 also shows that each genotypes gives difference effect on harvest period. Genotypes of Radja, Sweet vaganza, Lambada F1, King Sweet, Gendis, Talenta, Saigon, Jambore, OR Holli, Cosmos F1, London, Sweet boy, Virginia 2, and New Kencana relatively had shorter harvest period. In addition, weight of corn cob without husk was heavier for genotypes of Raja, Gendis, Secada F1, Jambore, Cosmos F1, Talenta, and Bonanza F1. Higher yield was obtained by genotypes of Gendis, Secada F1, Jambore, Talenta, Raja, and London as compared to other genotypes.

In general, genotypes of Raja, Gendis, Secada F1, King Sweet, and Talenta has better performance as compared to other genotypes and have potential to be develop as hybrid.

CONCLUSION

1. The development of closed farming system provides an alternative for poverty eradication in Kabupaten Rejang Lebong.
2. The technique of vegetable production by using organic farming still needs to be improved.
3. Genotypes of Raja, Gendis, Secada F1, King Sweet, and Talenta had better growth, higher yield and more adaptable to agro-ecosystem organic farming in high land (Kabupaten Rejang Lebong).
4. Genotypes of Raja, Gendis, Secada F1, King Sweet, and Talenta has potential to be developed as hybrid for organic farming in high land.

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