

## Good agricultural practices for potato breeding technology in Jambi

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### ABSTRACT

*Potatoes are an important vegetable commodity and high economic value. Based on the various constraints and information available, potato farming begins with the availability of quality and healthy seeds in order to produce higher productivity, in sufficient volume and available every season, therefore farmers can plant it on time. One of the supporting elements to support potato production is the use of premium quality seeds. Seed is a technology component that significantly increases potato production, therefore new varieties are prioritized on improving yield, resistance to pests and diseases, also high adaptation to local area agroecosystems. To realize these expectations, it is very necessary to produce high quality of potato seeds to support potato self-sufficiency. AIAT contributed and realized on increasing the availability of high quality seeds by conducting good agricultural practice (GAP) using Potato Seed Technologies. This study was conducted in Kayu Aro, Kerinci Regency, from August to December 2017. The target of 25 tons of potato seeds was achieved properly and sustainably for long time period for this areas.*

**Keywords:** potato, seed, Jambi, good seed technologies.

### INTRODUCTION

One of the agricultural commodities where demand and market will continue to increase is vegetable commodities (Asandhi and Gunadi, 1989; Stalham and Allen, 2001). In countries that have achieved food self-sufficiency, vegetable crops are the main key as a commodity that can be used to increase marketing and trade opportunities, increase community nutrition, and increase farmer's income (Jim et al 2005; Johnson et al 2008). In Indonesia, potatoes are grouped in vegetable commodities and are one of the commodities that are given priority in vegetable research and development programs.

Aside from being a vegetable plant, potato can potentially be developed as a source of carbohydrates and as a substitute for major food crops (Beukema, 1977; Temmerman et al, 2002). In the future, potatoes are expected to become alternative food diversification programs for rice substitutes and support national food security (Ewing and Keller, 1982; Wolfand Oijen, 2002).

Indonesia's potato productivity is still low compared to other potato-producing countries, only 16-20 tons/ha, whereas according to the research results the potential production can reach up to 30-35 tons/ha (Badan Pusat Statistik (BPS) dan Direktorat Jenderal Tanaman Hortikultura, 2017). An alternative method that can be done to increase potato productivity is by agriculture intensification. Intensification can be done by applying agricultural innovation technology through field experiment in order to improve land quality, adaptive to climate change, and improve cultivation techniques (Unlu et al, 2006; Vieira et al, 2016). Intensification can also be done with production inputs efficiency and support for the utility of superior potato seeds that are specifically distributed from preferred production centers (Wolf, 2002; Warnita, 2007). Production of potato seedlings for G1 and G2 can be done at the Potato Seed Center. It can supply the seed demand requested by farmers around Kerinci area or in the nearby surrounding highlands. It is very necessary to produce potato seeds to help farmers in obtaining quality seeds in order to support potato self-sufficiency. AIAT Jambi was helped and realized for increasing the availability high quality seeds by conducting GAP Potato Seed Technologies activities in Kayu Aro, Kerinci Regency.

## MATERIALS AND METHODS

The assessment carried out with participatory approach activities through some stages of: (i) coordination with relevant agencies and other stakeholders, (ii) data collection, information and problems of farming activities, (iii) organizing and analyzing data, (iv) determining methods and dissemination materials, (v) implementation of activities, (vi) data analysis and media dissemination (vii) reporting on the implementation of activities. Activities were carried out from September 2017 to February 2018 which is located in potato seeding center, Kayuaro, which belongs to Jambi Local Agriculture Office.

The scope of activities includes: (a) propagation of superior potato seeds, (b) demonstration, (c) distribution of superior potato seeds. Supporting activities such as facilitate agricultural input production. Research constituents used were: new or famous potato seeds varieties, organic fertilizers (Urea, KCl, SP-36), inorganic (manure, straw) and insecticides to control pests/diseases of plants and other materials that are considered important.

The supporting cultivating tools used included: (1) potato cultivation equipment consisting of tractors, hoes, machetes, shovels, rakes, buckets, drums, water supply hoses, plastic bags, ropes, knives, stakes; and (2) a set of computers. Stages of activities include: coordination with relevant agencies and other stakeholders, data collection, information and problems of farming

activities, implementation of activities, data analysis on the effectiveness of seed distribution and reporting on the implementation of activities.

**RESULTS AND DISCUSSION**

The initial activity was coordinating and meeting directly at the Potato Seed Center (BBIK) Kayu Aro office. Head and staffs of local Agricultural institution in Kerinci and BBIK welcomed this seeding activity and agreed directly to survey the land to be planted with this potato. It was followed by discussion for planning and accelerating the application of potato seeds activity at that time. After the meeting, team continued directly visit field experiment for potato planting as stated by the project.

The activity continued with field preparation, planning for production inputs finding and planting plans. Planting, maintenance and harvesting are carried out by applying the IAARD technology recommendation as well as by improving potato cultivation techniques that were usually carried out by local farmers. A good cultivation pattern of potato seed was obtained according to the specific GAP location of upland land in Kayuaro, Kerinci. A brief description of GAP can be seen in Table 1.

Table 1. GAP Potato seed cultivation in Kayu Aro, Kerinci

Areas : 1 ha  
 Planting date : September 28<sup>th</sup> 2017  
 Soil Type : Andosol  
 Elevation : 1.527,8 m Above Sea Levels

Activities	Application Date	Explanations
Seed preparations	18 August s/d 15 September 2017	Search information on availability of high quality of potato seeds
Soil tilled, application for liming and manure	30 August 2017 15 September 2017	Land cleaning, by spraying land with Herbicides, Lime application (5 tons) and manure application (10 tons).
Making Beds, Basis Fertilizers Application and Tapped Mulching with each planting hole	19 September 2017	Bed measuring 1 m on the surface and 20 cm high with a long contour and land pattern. Basic Fertilization application: NPK = 300 kg Urea = 200 Kg TSP = 200 Kg KCl = 100 Kg Installation of mulch when hot and land surface was given water capacity (watering)

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<b>Activities</b>	<b>Application Date</b>	<b>Explanations</b>
Planting and applying soil pesticides	28 September 2017	Planting distance was 70 cm X 30 cm. Planting 1 seed per hole After the holes was close by soil then given pesticides to prevent soil pests prevalence.
Giving organic fertilizers	2 October 2017	First spraying and repeating for 2 weeks
Second fertilizer application	15 October 2017	NPK = 100 Kg Urea = 100 kg KCl = 50 Kg The method of giving the fertilizers by liquid form and previously stirred with water in a drum
Weeding activity	15 October 2017	By chemical/herbicide
Third fertilizer applications	15 November 2017	NPK = 100 Kg KCl = 75 Kg The method of giving the fertilizers by liquid form and previously stirred with water in a drum
Potato Care actions	More than three month	Pest and disease control was carried out periodically and was adjusted to the type of pest attack and the type / dosage of the drug that will usually be used by farmers
Harvest	27 January 2017	Leaves of potato stems as a whole have dried up/brownish, spraying and cleaning the plants on the ground before harvesting for the next planting season
Post-Harvest	10 February 2018	Transportation to the warehouse uses waring sacks and transport vehicles. Seed was treated in storage with fungicides and other pesticides. Then left for more than 3 months until the seeds are ready to flow and ready to plant with the appearance of prospective shoots. If in the storage, seed has not yet appeared, continue placed before planting in the field.

After the planting process with the purpose of seeding was done well, then proceed continued with storage in the warehouse to break the seed dormancy period. At that moment, sorting was done well and sorting out if there were seeds that are attacked by disease or seed performance not normal were separated or discarded (Tekalign and Hammes, 2005; Onder et al, 2005). Selected seedlings were distributed to farmers adjusted to the results of surveys (CPCL) and clarifications from the local agriculture Institution. Following seed potatoes distribution (Table 1).

Table 1. Distribution and number of farmers who received potato seeds

Farmers	Potatoes (Kg)	Areas (Ha)	Villages	Districts
Nine farmers	16.000	8	Bendung Air Timur, Sanger, Sanger Tengah, Pasar Sungai Tanduk, Koto Tengah, Sungai Bendung Air, Tanjung Bungo	KayuAro
Two farmers	2.000	1	Kebon Baru, Sako Duo,	KayuAro Barat
Three farmers	4.000	2	Telun Berasap, Pauh Tinggi, Bengkolan Dua	Gunung tujuh
One Farmer	1.000	0.5	Mukaimudik	Siulak
Two Farmers	2.000	1	Sungai Bermas, Siulak Kecil	Siulak Mukai

Activities that must be carried out after the 100% widespread distribution is to supervise the seed with a plan that is suitable for the farmers' needs to ensure that the seeds are planted in the proper location of the respective farmers. Adjustment is done by considering the condition of each farmer's land so that the planting time varies and the distribution time also differs.

## CONCLUSIONS

1. Potatoes are an important horticulture plant in Kerinci Region, especially in some districts. The main obstacle is the seed that always depends on the potato production area in Java, accordingly the price of seeds becomes more expensive.
2. Efforts to produce potatoes at Kayu Aro location have been carried out on the study activities by BPTP Jambi with APBNP 2017. Funding of 25,000 Kg of potato seed production can be achieved well and potatoes have been 100% well distributed in 5 Districts with 18 farmers. Monitoring efforts need to be made to ensure the growth of potatoes goes well so that harvests can be obtained satisfactorily and achieve optimal targets.

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