
A Delivery System for Adopting Package of Technology on Banana Production

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This study sought to determine the performance of Science and Technology-Based Farm (STBF) as a technology delivery system on the adoption of the Package of Technology (POT) on banana production in Cagayan Valley. This study employed descriptive-inferential method of research using questionnaire as the main tool. The four farmers who received formal training on the implementation of STBF on banana production (termed as *Magsasaka Siyentista or MS*). Civil status and number of trainings attended were found to be significantly correlated with the level of adoption of the respondents and the type of farming, crops grown and animal raised, banana farm area, and banana variety, income derived before and after the adoption of the STBF on banana were significantly correlated with the level of adoption. Moreover, the experts and the partner member agency's contribution as management support factor were found to be significantly related to the level of adoption of the respondents. The type of farming was found to be significantly related to the economic benefits of utilizing the interventions specified on the STBF on banana production. The level of adoption of the respondents was significantly correlated with the socio-economic benefits derived from utilizing the interventions on the STBF on banana production.

Keywords: Science and technology based-Farm, Adoption, Social benefits

Introduction

Over the years, several technologies have been developed to address the major concerns of the banana industry namely: production of quality fruits, availability of disease free planting materials, control of insect pests and diseases, and reduction of post-harvest losses (Pcarrd, 2010)

The Science & Technology- BasedFarm (STBF) projects on banana can be considered as an example of an agricultural technology which is a product of agricultural research. The STBF implemented an intervention on the existing farmer's practice. The effects of these interventions are compared with the

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effect of the farmer's practice. A partial budget analysis is used as a test of profitability. The different interventions include the use of tissue culture as planting materials, fertilizer and water management, cultural management including pest and disease management and post-harvest handling.

The scientific nature of STBF is intended to give attention to a science and technology based orientation on the overall management of production which includes: farming systems development, resource management orientation, community-based, complementation and integration.

Conceptual Framework of the Study

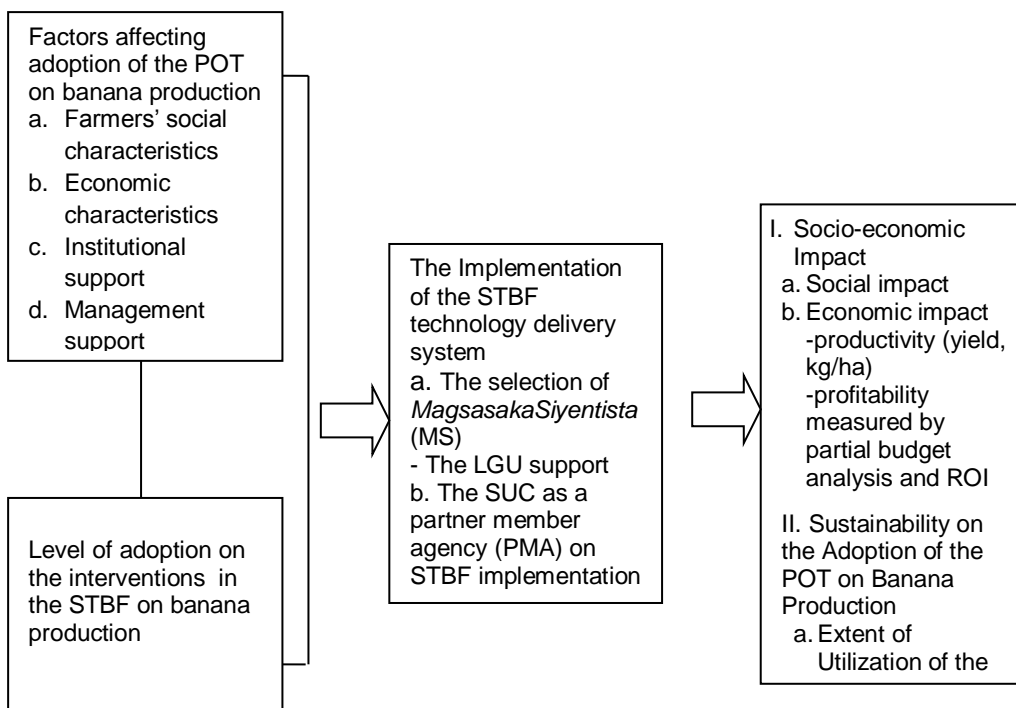


Figure 1 Conceptual framework of the study

The conceptual framework (Figure 1) anchored on the theory on diffusion on innovation (Rogers, 1995). As pointed out in the theory, the characteristics of individuals can most likely affect the adoption of an innovation.

The theory also points out the mode of technology dissemination in the form of communication channels used in the adoption process through information, education and communication materials. The experts, PMA and

LGU project serve as the communication channels on the diffusion of the interventions. All these factors are assumed to influence the adoption of the MS and adopters on the interventions of STBF production on banana production.

Materials and methods

This study explored the performance of science and technology-based farm (STBF) as a technology delivery system on the adoption of the POT on banana production.

This research study employed descriptive-inferential method of research using questionnaire as the main tool. Quantitative and qualitative methods of research were used and data gathered from survey were supplemented with information gathered from the four *Magsasaka Siyentista* who were tapped to implement the STBF on banana production.

The study was conducted in the different sites of the STBF on banana project in the region. STBF on Cavendish production was in Ocapon, Villaverde, Nueva Vizcaya; STBF on lakatan production is on Cajel, Diffun, Quirino; STBF on latundan production was in Sta Maria, Alfonsolista, Ifugao and ths STBF on saba production was in Angadanan, Isabela. A total of 70 respondents from the four study sites were used in the study. The following were the findings of the study:

Results and Discussions

Level of adoption on the POT of Banana Production through the STBF Technology as Delivery system

The STBF for banana production was implemented to fill in the gaps between the existing practices of the MS and banana growers and the recommended practices on banana production. The gaps had been identified reduced resistance of the plants to diseases particularly Banana Bunchy Top Virus (BBTV) and low productivity and profitability of banana production. The gaps included non-utilization of tissue culture- derived planting materials; nutrient and water management. Hence, through the STBF, the interventions recommended to be adopted by the MS include; “the use of tissue culture-derived planting materials,” “regular application of the recommended fertilizer,” watering of the banana plants particularly for lakatan,” desuckering and maintenance of proper number of a plants in a mat,” “regular weeding;” “deleafing of infected leaves;” “proper planting distance;” “proper time of

debudding;” ” propping of banana plants bearing fruits;” “ bagging of the fruits,” and the “use of ethryl for uniform yellowing and ripening of the fruits.”

As a result, the most adopted intervention was “regular weeding” which recorded a mean rating of 3.19 with a qualitative description of “high level of adoption.” It is however noted that banana growers in the four areas of the project regularly weeded their banana plantations even before the implementation of the STBF. Accordingly, the respondents regularly weed their banana farm for higher production and income because of their daily high expenses.

Moreover, deleafing of infected leaves (3.16); proper time of debudding (2.84); and desuckering, (2.84) obtained lower quantitative mean ratings, but were still within the qualitative rating of “high adoption level”. These interventions were continuously adopted by banana farmers’ respondents. The regular practice of the said interventions does not require additional inputs. As expressed by the respondents, desuckering is advantageous because this can be a source of income. The “use of tissue culture-derived planting materials” (2.19), regular application of recommended fertilizer (2.29), watering of lakatan plants when needed (2.29), practice propping of lakatan plants (2.37), practice bagging of lakatan fruit (2.19), use of ethryl for uniform yellowing and ripening of lakatan fruits (2.11) obtained a qualitative rating of “low adoption level.” The low level of adoption on these interventions can be attributed to the observation that only the MS utilized the said interventions. Almost all of these interventions require inputs such as tissue culture-derived planting materials, fertilizers, bagging materials and ethryl. The MS were actually provided such provisions.

Moreover, the use of ethryl had not been utilized by the adoptors because they sell their banana produce unripe. If ever ripe bananas are sold in the market, the traditional madre cacao leaves are used as ripening agent.

Socio Economic Benefits on the Adoption of the POT on Banana Production as Affected by the STBF Technology Delivery System

Social Benefits. Social benefits of the project were measured using 13 indicators. The ratings obtained on the different indicators of social benefits used in this study were quite low which obtained a qualitative rating of “agree” only.

This means that the MS and adoptors had not fully harnessed the potentials of the STBF on banana production in terms of social benefits indicators used in the study.

Economic Benefit. Economic benefit of the project on the MS was measured using economic indicators and partial budget analysis of using the set of interventions included in the implementation of the STBF project on banana production focus on productivity and profitability.

The overall mean of 2.66 was obtained that corresponds to a qualitative description of “agree”

An adaptor from Quirino was able to purchase a vehicle. He is now using the vehicle to transport his product to the market. Moreover, during the interview, he proudly mentioned that his earnings for a month in selling banana fruit, is in fact higher than the salaries of his daughters employed as medical technologist and nurse, respectively.

In general however, similar to the social benefits, the economic benefits of using the interventions on banana production has not been fully attained by the MS and adopters.

Productivity Measure. A partial budget analysis was used to measure the productivity of banana production using the STBF interventions. Partial analysis emphasizes data on added cost and added return. Secondary data was used taken from the expert’s report on the partial budget analysis.

Table 1 Partial budget analysis for the STBF banana production

Banana variety	1 st Cycle		2 nd Cycle	
	Added cost	Added return	Added cost	Added return
Lakatan	PhP 140,000.00	PhP 237,160.00	PhP 40,000.00	PhP 250,800.00
Cavendish	PhP 42,227.00	PhP 17,000.00		
Latundan	PhP 41,362.00	PhP 76,800.00		
Saba	PhP 37,362.00	PhP 78,000.00		

For Lakatan production, the first cycle of production, added cost in utilizing the interventions amounted to Php140,000.00/ha; added return amounted to Php237,160.00. The computed net income obtained was Php 97,160.00.

In the second cycle, added cost amounted to Php 40,000.00. The added cost covered expenses on fertilizer, labor for the weeding, and fuel for the water pump. The recorded added return was Php250,800.00 obtaining a net income of PhP210,880.00.

In the third cycle of production, there was no recorded production for Lakatan. This was because banana plantations were devastated by the typhoon that visited the region and the attack of BBTV. Lakatan plants are prone to BBTV infection. (Temanel *et al.*, 2011). In order to save some of the remaining Lakatan trees, one of the MS mentioned that he transferred his banana plants to another location in order to continue the 3rd cycle of production. However, at the fruiting stage of the banana plants, another typhoon visited the area and devastated almost all banana plants in the province including the MS farms of Quirino.

In the case of *cavendish*, the partial budget analysis done resulted to a negative income due to the incidence of a fungal disease called sigatoka. This is a leaf fungal disease that affects the yield and quality of the fruit. Cavendish variety is very susceptible to Sigatoka disease. The leaf area is the target of the pathogen, hence food manufacturing of the plants were affected and resulted to very small fruit yield. (Temanel *et al.*, 2011). Likewise, a typhoon visited the province during the fruiting stage of the cavendish plants. As a result, the potential yield of cavendish in Nueva Vizcaya was not attained. Only an average of six kilogram per bunch was harvested which was below the expected yield of 15 kg per bunch. The cavendish plants were also infected with BBTV disease that worsened the condition and the plants were no longer able to recover.

The partial budget analysis for latundan obtained an added cost of Php 41,362,000; with added return of 76,800.00 were realized. Net returns amounted to Php 35,348.00 for the 0.05 hectare latundan plantation.

The STBF on *saba* production, recorded an added cost amounted to Php 37,362.00, with an added return of Php78, 000.00. Net impact is Php 46,368.00 for the first cycle of production, saba compared to latundan and lakatan had a longer period of production growth. However, towards the 2nd cycle of harvest, the plantation was devastated by typhoon.

In terms of productivity, adoptors of the STBF have different production depending on the variety they produced. For Lakatan an average of 1.9 mt per ha, latundan was a lil bit lower which is 1.2 mt per ha, for Cavendish its 2.5 mt per ha and for saba its 8.2 mt per ha.

Profitability. Return on investment (ROI) was used to assess the profitability of banana production using the STBF intervention (Table 2). As shown in the result, saba recorded an ROI 124.10%, the highest among the four varieties of banana. This was followed by latundan (85.46%) and lakatan (69.40%). The high ROI of saba production motivated banana growers to plant this variety. Tending the saba variety does not require a lot of effort, time and money, and yet a profitable hgh venture. The low net income derived from

the Cavendish variety is due to its market price. Traders buy this variety at 6.00/kg. In terms of its acceptability, Filipinos prefer to eat the lakatan and latundan compared to this one

Table 2 Cost and return analysis of banana production

Variety	Gross Income	Production Cost	Net income	ROI
<i>Lakatan</i>	118,580.00	70,000.00	48,580.00	69.4%
<i>Saba</i>	78,000.00	37,362.00	46,368.00	124.10%
<i>Latundan</i>	76,800.00	41,362.000	35,348.00	85.46%
Cavendish	30,000.00	28,962.00	1,038	3.58%

Extent of Utilization of Package of Technology in Banana

In this part of the study, the package of technology (POT) refers to the STBF interventions on the production practices in banana farming composed of three major components namely: a) tissue culture-derived planting material; b. production management focus on nutrient, water management, pest & disease management, proper planting distance & desired number of plant population in a mat; and c) post-harvest technology with emphasis on bagging of fruits and technology on ripening.

Extent of utilization was measured by determining the number of recommended practices continuously utilized by the respondents based on the above mentioned components. Extent of utilization differs from the level of utilization since the former focus on the continuity of usage while the latter focus on the degree of utilization during the implementation of the STBF on banana production.

Generally, only 26.66% of the recommended practices were utilized by the respondents. Out of the 15 recommended practices in the POT, only four were continually utilized with minor modifications namely: deleafing of infected banana leaves; weeding of the banana plantation; desuckering of the banana plants; and debudding of male buds. Debudding on the other hand, entails removal of the male buds when false hands appear.

Result of the study further shows that practices under the STBF project that were no longer utilized included: “tissue culture-derived planting materials;” “triangular planting distance;” “watering the plant; regular fertilizer application;” “control of aphids;” “removal of infected banana plants; bagging of fruits;” “propping of fruits;” “using dried leaves as foam for fruit when harvesting;” “applying of ethryl for uniform yellowing and ripening;” “applying of alum on fruit to prevent post-harvest pest & diseases” like crown rot, a fungal post-harvest disease which blacken the crown portion of the fruit.

Only 2.85% of the respondents followed these recommendations religiously while two out of the four MS in banana are continually utilizing the interventions in the STBF on banana production.

Relationship between factors affecting level of adoption and socio-economic benefits of adopting the intervention on the STBF on banana production

Social Factors versus Level of Adoption and Socio-Economic Benefits

The following discussions will present the relationship between of the different social characteristics of the respondents and their level of adoptions and socio-economic benefits on adopting the interventions in the STBF on banana production (Table 3a).

Table 3a Correlation analysis between the social factors and level of adoption, socio-economic benefits of banana production through the STBF technology

Social Factors	Level of adoption		Social benefits		Economic benefits	
	r	p	r	p	r	p
Age	-0.011	0.930	-0.106	0.381	-0.045	0.713
Sex	0.045	0.710	0.153	0.205	0.013	0.917
Civil Status	0.232*	0.053	0.198	0.101	0.157	0.194
Number of family members	0.004	0.977	0.004	0.973	-0.000	0.995
Religion	-0.067	0.579	-0.063	0.602	0.096	0.427
Educational attainment	0.145	0.233	0.074	0.574	0.078	0.517
Organizational Membership	0.103	0.398	0.193	0.110	0.063	0.605
Ethic Affiliation	-0.030	0.808	0.053	0.663	0.088	0.467
Number of Trainings Attended	0.220*	0.067	0.256*	0.032	0.001	0.993

* Significant at $\alpha 0.05$

Civil Status. Correlation values obtained (p-value =0 .053, r- value= 0.232) indicate a significant relationship between civil status and level of technology adoption. This finding implies that civil status had a motivation factor on the adoption of the STBF on banana production.

In this study, result shows that there were more married-adopters than single-adopters. This can be possibly attributed to the fact that adoption of the interventions would improve productivity and profitability, hence better income can be generated that will help provide the need of their respective families.

Economic Factors versus level of adoption and socio-economic benefits

The following discussions present the relationship of the different economic factors or categories of the respondents on their level of adoptions and socio-economic benefits on adopting the interventions in the STBF on banana production.

Table 3b Correlation analysis between the economic factors and level of adoption, socio-economic benefits of banana production through the STBF technology delivery system

Economic Factors	Level of adoption		Social benefits		Economic benefits	
	r	p	r	p	r	p
Major source of income	0.135	0.319	-0.043	0.723	0.086	0.479
Type of farming as source of income	0.237*	0.031	-0.326*	0.006	-0.253*	0.035
Crops grown and animal raised	0.121*	0.019	0.037	0.761	-0.059	0.629
No. Of years in banana farming	-0.003	0.983	-0.030	0.805	-0.050	0.680
Banana farm area & banana variety	0.200*	0.030	-0.196	0.103	-0.197	0.102
Tenure status	0.149	0.219	0.097	0.423	0.229	0.057
Type of labor	-0.200	0.096	-0.292*	0.014	0.157	0.195
Hiring rate	0.063	0.602	-0.092	0.446	-0.029	0.139
Income derived before the STBF adoption	0.200*	0.046	0.255*	0.033	-0.178	0.139
Income derived after the STBF adoption	0.178*	0.045	0.188*	0.043	0.007	0.957

* *Significant at α 0.05*

no significant relationship to the type of farming that these adoptors in STBF on banana were engaged in.

Type of farming. Type of farming is significantly affected the level of adoption and to the socio economic benefits derived in adopting the interventions of the STBF on banana production.

As seen in Table 6b, the correlation value obtained were $r=0.237$, $p=0.031$ for the level of adoption and value $r=0.326$, $p=0.006$ for the social benefits.

As noted in this study, corn farming was very common among the respondents. With corn farming, as short term crop, can provide immediate income to the family while implementing on the STBF on banana production.

Crops grown and animals raised. The correlation values, of $r=0.121$, $p=0.019$ indicates a significant relationship between crops grown and animals raised and level of adoption on STBF on banana production. This implies that when a farmer has other crops grown aside from banana and/or even raised animals, these may hasten his decision to adopt a technology being introduced to him. This finding supports the study of Buenaventura (2011) on community-based participatory action research project, that adoption of technology was influenced by the type of farming they are engaged with.

Banana farm area and banana variety. Banana farm area and banana variety used were influential in the respondents' level of adoption on the STBF on banana production as shown by the computed value of $r=0.200$, $p=0.030$. This conforms to the study of Yaron et.al (1996), who demonstrated that a small land area may provide an incentive to adopt a technology especially in the case of an input-intensive or land saving technology. The high susceptibility and occurrence of dreaded fungal and viral disease of some banana varieties like lakatan, latundan and Cavendish, make the cultural management labor intensive. The MS on cavendish experienced the attack of sigatoka disease. Her farm area planted to Cavendish was $\frac{1}{4}$ ha which resulted to a negative ROI.

Type of labor. The computed value of $r= -0.200$, $p=0.096$ between type of labor and level of adoption revealed no significant relationship whether the respondents hire, use their own family members or a combination of hiring and having family members working on banana farm, did not affect their decision to adopt the interventions of STBF on banana production.

The computed values $r -0.292$ and p value of 0.014 indicates significant relationship between type of labor and social benefit of utilizing the interventions on banana production. Involvement of family members in tending banana production created a positive effect on building camaraderie and better relationship and furthermore fostering the value of working together for a common good.

Contrary to the effect of social benefits of the type of labor, its economic effect did not show a significant relationship as revealed by the computed r value of 0.157 and p value of 0.195 . Type of labor did not affect the economic benefit

Income derived before the adoption of STBF. The correlation values before the adoption of the STBF ($r=0.200$, $p=0.046$) revealed significant relationship between income derived before the adoption of STBF and level of adoption. This means that income derived from adopting the technology is a

factor that influences the adoption of the adoption of the interventions on the STBF on banana production. This findings support the study of Fernandez-Cornejo (1996) that a higher percentage of total household income coming from the farm through increased yield tends to correlate positively with adoption of new technologies. The finding was noted in terms of the relationship between income derived before the adoption of the STBF and the social benefits.

Income derived after the adoption of STBF. The correlation values after the adoption of the STBF ($r=0.178, p=0.045$) revealed significant relationship between income derived after the adoption of STBF and level of adoption. This means that income derived from adopting the technology is a factor that influences the adoption of the adoption of the interventions in the STBF on banana production. The computed value of $r=0.188, p=0.043$ for the social benefits revealed a significant relationship. However, as a result of the computed value of $r=0.007, p=0.957$, it was noted a non-significant relationship between economic benefit and income derived after the adoption of the intervention on the STBF on banana production.

Experts' contribution versus level of adoption and socio-economic benefits

The succeeding discussions present the correlation analysis between experts' contribution and the level of adoption and the socio-economic benefits derived from adopting the STBF on banana production (Table 3c)

Technical skills. A positive correlation coefficient ($r=0.584$) indicates a highly significant relationship between the technical skills of the experts of the STBF project to the level of adoption on the intervention of the STBF on banana production. The result implies that technical skills on banana production is a contributory factor to the level of adoption of the technology on STBF on banana production. This means that the experts were able to provide the necessary technological information on the interventions in the STBF on banana production. The expert's technical skills provide a good motivation to the decision of the respondents' adoption to the interventions on STBF on banana production.

Table 3c Correlation analysis between institutional and management support and level of adoption, social and economic benefits of adopting STBF on banana as technology delivery system

Institution-Management Support	Level of adoption	Social Benefits	Economic benefits
A- Experts' Support	r-values	r-values	r-values
- Technical skills	0.584**	0.613**	0.508**
- Communication skills	0.574**	0.615**	0.514**
- Management skills	0.585**	0.614**	0.512**
B- PMA Support			
- Conduct of trainings	0.568**	0.597**	0.499**
- Technical Assistance	0.567**	0.605**	0.506**
- Input assistance	0.563**	0.602**	0.508**
- Marketing Assistance	0.546**	0.587**	0.492**

**Highly significant at α 0.05

Communication skills. The computed value of $r= 0.574$ implies a highly significant relationship between the experts' communication skills and the level of adoption in utilizing the interventions on STBF on banana production. This means that the higher the experts' communication skills the higher the level of adoption of respondents in the interventions on STBF on banana production. This findings conforms with the study of Battad *et al.* (2003) which states that communication in extension work particularly on technology adoption, is purposive because experts communicate the agricultural technology to achieve desirable changes in behaviour.

Likewise, the positive correlation coefficients values of ($p= 615, p= 514$) for social and economic benefits respectively implies a highly significant relationship between the variables. This means the efficiency on communication skills can be contributory to the social and economic benefits in banana farming. This implies that the experts were able to communicate the interventions to the MS and adoptors, hence greater level of adoption, and higher level of adoption can provide better social and economic benefits.

Management skills. The computed p values of 0.587, 0.614 and 0.512 implies that the experts' management skills influence the level of adoption and the social and economic benefits of utilizing the interventions on STBF on banana production. Result conforms to what has been posted on the treasury

publication (2014) that management skill is a determinant on technology adoption which lead to positive socio-economic benefits.

Partner Member Agency (PMA) supports versus level of adoption and socio-economic impact or benefits

The PMA support was measured along areas on: 1) training courses conducted; 2) technical assistance; 3) input assistance; and 4) marketing assistance.

Conduct of Trainings. The conduct of trainings by the PMAs significantly influenced the adoption on the interventions in the STBF on banana production. Banana growers, as respondents of this study strongly agreed on the importance of trainings in their decision to adopt the interventions in the STBF on banana production. The result of the study further implies that, the more trainings conducted, the higher the level of the adoption on the interventions on STBF on banana production.

Technical assistance. The result then indicates that the level of adoption on STBF on banana production was significantly correlated with technical assistance provided by the partner member agency. The technical assistance provided were in the form of visits to the MS to assess the condition of the project and provide technical skills of the MS on the intervention in the STBF on banana production. This means that the provision of technical support to the MS and adoptors would result to better social and economic benefit derived from banana production.

Input assistance. The institutional support through provision of sufficient inputs, relative to the implementation of the STBF project on banana positively influenced the level of adoption on STBF project as revealed by the computed p value of 0.563. Results indicate that input assistance contributed to the decision of the respondents to adopt the interventions in the STBF on banana production. The provision of inputs motivated MS and adoptors to adopt the interventions on the STBF on banana production.

Marketing assistance. The computed values of $p=0.546$ showed significant and positive relationship between marketing assistance and level of adoption on the intervention in the STBF on banana production and this means that with the provision on marketing assistance, the MS were motivated to adopt the interventions on the STBF on banana production. The motivation is an offshoot of the assurance to the MS and adoptors that once the banana produced a good yield they will be assisted in the marketing of their products. The marketing assistance offered contributed to the decision of the MS and adoptors to adopt the interventions on banana through STBF projects.

Relationship Between the Level of Adoption and Social Benefits on STBF on Banana Production .

In this study it is safe to say that the higher the level of adoption the greater social and economic benefits.

The level of adoption was found to have a highly significant relationship with the economic benefits on the utilization of the STBF on banana production as indicated by the computed $r = 0.665$ and p -value of 0.000 . This indicates that the economic benefits obtained from the utilization of interventions on the STBF on banana production is related to the level of adoption. The higher the level of adoption the better economic benefits that can be derived in banana production. The result conformed with the study of Blacksburge (2002) mentioning that programs producing significant gains can motivate people to participate more fully. Farmers must perceive that there is really benefit in a particular technology. Economics benefits tend to correlate positively with adoption of new technology.

Conclusion

In the light of the above findings, the following conclusions and implications were drawn:

1. The production of banana using the interventions specified in the STBF on banana production particularly in *saba*, *latundan* and *lakatan* was a profitable venture except when there were calamities that greatly damage the plantation. Non-utilization of some of the interventions by the adoptors like the use of tissue-derived culture planting materials, fertilizer application, the use of ethryl as fruit ripening enhancer were attributed to the high cost of these inputs.
2. The consistent support of experts with high communication, technical, and management skills as well as support of institutions like the PMA and LGU greatly contributed to the level of adoption of a technology.
3. Cultural management practices such as weeding, deleafing and desuckering did not require costs hence they were sustainably utilized.
4. Socio-economic factors like civil and marital status, number of trainings attended, type of farming, variety of the crop and area planted by the adoptors were contributory to the level of adoption of new technology.

5. Social benefits of the technology greatly influenced the level of adoption of the STBF on banana production.

Recommendations

Based on the findings, of this study, the following recommendations are forwarded:

1. Banana production had been observed intercropped with corn, an STBF on banana intercropped with corn production be developed. Corn is a short term crop hence an immediate source of income while waiting for the harvest of banana fruits.
2. Massive use of tissue-culture derived planting materials should be greatly encouraged to avoid the occurrence of BBTV and *sigatoka* diseases.
3. Technical backstopping and marketing assistance should continually be done in banana production particularly cavendish, *lakatan* and *latundan*.
4. The *magsasaka siyentista* is an effective conveyor of new technologies hence must be continually be a part of technology dissemination.
5. Proper record keeping should also be taught among banana growers to establish the partial budget analysis in banana production for them to appreciate the added inputs and income in banana farming.

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