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TECHNO-MANAGERIAL STUDY ON VERMICOMPOSTING TECHNOLOGY UTILIZATION AND ITS IMPACT ON THE FOUR BUSINESS FUNCTIONS OF SELECTED USERS IN LAGUNA

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INTRODUCTION

Vermiculture or the science of breeding and raising earthworms was introduced in the Philippines in the late 1970's (Guerrero, 1979) and gained popularity in the 1980's (Tan, 1985). It started when Dr. Rafael D. Guerrero, the Executive Director of PCAMRD became interested with the technology because of the need for alternative high-protein feeds for fish. In the 1980's, the dissemination of the technology was focused on boosting worm production basically for fishmeal, however, the cost of worms was still too high and becoming too expensive as feeds for the fishermen and hatchery owners because during that time the cost of commercial feeds was still comparatively low.

The environment-friendly method of vermicomposting became popular again in recent years because it provided the opportunity for worm raisers to produce a good source of protein for feeds and at the same time convert farm and household wastes into organic fertilizers or vermicompost.

Vermicompost or vermicast is an odorless, organic material containing adequate quantities of nitrogen, phosphorous and potassium (NPK) and several micronutrients, which are essential for plant growth. It became popular with organic farmers because it helps plants grow faster and more vigorous even without the application of commercial fertilizer (<http://www.jains.com>).

Although, the vermiculture industry collapsed in 1984 due to the absence of an appropriate technology according to Tan (1985), producers of organic fertilizers and commercial farms are

now utilizing the technology to produce high quality bio-organic fertilizers and highly demanded organically-produced high value crops.

The three institutions in Laguna which were identified by the author as actively involved in the extension of the technology to farmers are the: Bureau of Plant and Industry; Philippine Council for Marine Research and Development (PCAMRD); and Philippine Business for Social Progress – Center for Rural Technology Development (PBSP-CTRD).

NATURE OF THE STUDY AND METHODOLOGY

This paper is basically a techno-managerial assessment study, which was conducted taking into consideration the technology transfer and acceptance and internalization process viewed within the perspective of the process involving the source of the technology, the channel and the receiver (Depositario, undated).

Objectives of the Study

General objective: To assess the current situation of vermicompost use and its impact on the operations of the users.

Specific objectives:

1. To identify and describe the method of vermicomposting;
2. To describe the process involved in the adoption of vermicomposting;
3. To assess the impact of vermicompost use in the four business functions: production, marketing, personnel and finance; and
4. To present recommendations on how to improve the current practice of vermicompost utilization.

Research Design

Profile of institutions involved in the technology dissemination as well as the adoptors of the technology, the processes pertaining to the dissemination method and the vermicomposting process were presented using the descriptive research design.

Evaluative research design was applied to determine the effects and/or impact of the technology and its end product utilization on the four business functions of the technology adoptors.

Respondents and Sampling

The respondents of the study were representatives from the BPI, PCAMRD and PBSP-CTRD including the adoptors of the technology in the province of Laguna. Through purposive sampling, seven individual users were identified.

Sources and Methods of Data Collection

Primary data were obtained through personal interviews of the representatives of each institution as technology disseminators regarding their form or method of technology extension. The same procedure was also employed for the technology adoptors considering the change in their operations with the inclusion of the vermicomposting process. Impact on the four business functions of vermicompost use was evaluated through the users perception.

Secondary data were gathered from brochures, handbooks, books, journals, unpublished undergraduate and graduate business research reports and articles from the World Wide Web, references from PBSP-CTRD, PCAMRD, BPI and UPLB Main Library.

Method of Data Analysis

Qualitative data analysis was applied using the respondents' experiences, suggestions and comments regarding the use of vermicomposting technology. Analysis was made on a situational basis or per case evaluation basis. Frequency analysis was also applied for the distribution of the attributes of the respondents.

The Likert scale method was used to determine the impact of vermicomposting to the production, marketing, personnel, and finance as perceived by the respondents. A rating scale of 1 to 5 was used, with 5 being the highest level and 1 as the lowest level (5 – very high; 4 – high; 3 – moderate; 2 – low; and 1 – no impact).

Scope and Limitation of the Study

The study covered the four technology adopters in three different municipalities of Laguna and one respondent from each of the three institutions such as BPI, PCAMRD and CRTD which were involved in the dissemination and utilization of the technology.

SUMMARY OF FINDINGS

Profile of the Respondents

There were seven vermicompost users interviewed. Out of the seven, about 57.14% were individual users and 42.86% were institutional users (such as CTRD, PCAMRD and BPI).

Institutional Respondents

BPI and Vermi Action Center under the supervision of PCAMRD were both government institutions operating for 11 years and 7 months, respectively, while CTRD is a non-government organization that had been in existence for 26 years.

Individual Respondents

There were four individual respondents, who were married with three to six dependents . All were above 45 years old, well-educated and college degree holders, with one pursuing a Ph.D. degree (Table 1).

Table 1. Profile of the individual vermicomposting users

Respondents	Attributes					
	Age	Sex	Civil Status	No. of Dependents	Educational Attainment	Occupation
R1	61	M	M	4	College	Entrepreneur
R2	56	M	M	6	College	Entrepreneur
R3	49	F	M	3	Ph.D. Candidate	Private employee
R4	45	M	M	3	College	Entrepreneur

Note: Sex: M = male; F = female; Civil status: M = married.

Vermicomposting Characteristics

Table 2 shows that out of the 7 respondents, approximately 42.86% were using vermicompost in their farms for less than a year. On the other hand, about 28.57% were using the technology for about one to two years and about 28.57% were using it for about 3 to 4 years.

Vermicomposting Practice and Type of Operation

It was found out that all the respondents produced vermicompost for their own farm consumption. They used vermicompost in the farm in combination with inorganic fertilizer.

In terms of level of operation, majority (or 71.43 %) were classified as medium scale type or those that use the pig-pen type of production space, where the compost was evenly scattered with thickness of about 3 to 4 inches containing 10 to 50 kilograms of worms. Only one (14.29%) can be classified as small scale or those with lesser amount of worms, with only one to ten kilograms of worms. There was also only one large scale producer (14.29%) that uses 30 to

40 bins measuring 1 m x 2 m, with about 4 kilograms of worms in each bin. Farm practices for each scale of operation are further compared in Table 3.

Table 2. Characteristics of respondents

	Frequency	Percentage
Type of organization		
Institution	3	42.86
Individual	4	57.14
Years of vermicomposting usage		
Below 1 yr.	3	42.86
1 to 2 years	2	28.57
3 to 4 years	2	28.57
Level of operation		
Small scale	1	14.29
Medium scale	5	71.43
Large scale	1	14.29
	N = 7	

Table 3. Farm practices by type of operation

Description	Type of Vermiculture Operation		
	Small Scale	Medium Scale	Large Scale
General practice	Collection of household waste, segregation, decomposition (aerobic and anerobic, preparation of worm beddings, addition of worms and harvesting	Collection of household waste, segregation, decomposition (aerobic and anerobic, preparation of worm beddings, addition of worms and harvesting	Collection of household waste, segregation, decomposition (aerobic and anerobic, preparation of worm beddings, addition of worms and harvesting
Quantity of worms needed	1 to 10 kgs	10 to 50 kgs	50 to 200 kgs
Number of laborers	1	more than 1	more than 1
Equipment requirement	pots/ drums/ pig pen	Worm bins/ pig pen	Worm bins
Area	5 square meters	5-20 square meters	20 square meters and above

Vermicompost Production and Utilization

Based on the survey, all of the respondents produced vermicompost solely for their own fertilizer needs. However, the farm owners did not rely on it solely. As shown in Table 4, they were still utilizing inorganic fertilizer in combination with vermicompost, with crop utilization merely at a low of 12.5% to a high of 50%.

Table 4. Production and utilization of vermicompost

	Frequency	Percentage
<i>A. Source</i>		
Self-production	7	100.0
Other suppliers	0	0.0
Total	7	100.0
<i>B. Utilization</i>		
Personal farm consumption	7	100.0
Marketing	0	0.0
Total	7	100.0
<i>C. Crop Utilization</i>		
Fruit trees	3	37.5
Vegetables	4	50.0
Ornamentals	1	12.5
Total *	8	100.0

* multiple response

Sources of Vermicomposting Information

Table 5 shows that most of the farmer-respondents revealed that they commonly acquired their knowledge on vermicomposting through seminar/training sessions (33.6%). Knowledge was likewise obtained through pamphlets/brochures (27.27%) and friends/referrals (18.18%).

Table 5. Sources of vermicomposting information

Information sources	No. of times cited	Percentage
Seminars/ training	4	36.36
Phamplets/ brochures	3	27.27
Friends/ referrals	2	18.18
Radio/TV	1	9.09
Newspapers/magazines/ books	1	9.09
Total	11	100.00

Factors Affecting Adoption of Vermicomposting

The most important factors that affect the adoption of the technology as shown in Table 6 were identified as follows: information availability (25.0%), resource availability (25.0%), cost effectiveness (17.86%), and marketability and profitability (14.29%).

Vermicomposting Information and Dissemination

The three institutions which were actively involved in the dissemination of vermicomposting were PCAMRD, BPI and CTRD.

BPI started its vermiculture project in 1994 thru the invitation of Dr. Guerrero of PCAMRD. During the initial implementation of the project, BPI conducted studies on the

effectiveness of vermicompost as an organic fertilizer for vegetable. This was later followed by evaluation of different substrates combination and identification of the best combination of wastes in terms of higher nutrient contents.

Table 6. Factors affecting adoption of the technology

Factors	Frequency	Percentage
Resource availability	7	25.00
Information availability	7	25.00
Cost effectiveness	5	17.86
Marketability & profitability	4	14.29
Environmental soundness	3	10.71
Reliability of operation	2	7.14
Total	28	100.00

After the conclusion of the evaluation studies, the agency pursued the dissemination of the technology to its target clients. Dissemination of the technology is done through lectures, seminars and on-the-job training, which were held at the BPI compound upon the request of visitors and other interested parties (Figure 1). However, it was noted that due to the lack of resources at BPI, there is no active campaign for its dissemination.

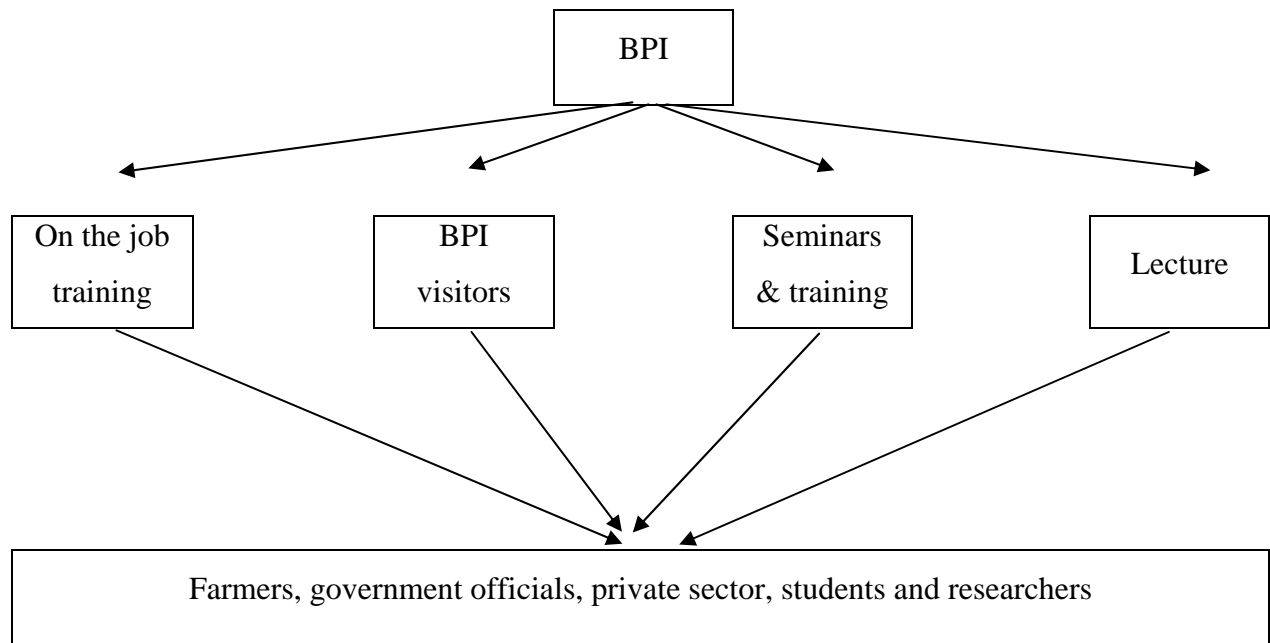


Figure 1. Flowchart of the Technology Dissemination of BPI

CONCLUSION AND RECOMMENDATIONS

The technology was developed, tried and disseminated by three institutions namely PCAMRD, BPI and CTRD. The technology adopters found vermicomposting technology effective in terms of increasing their yield and reducing their production cost through the reduction in the cost of chemical fertilizer inputs. Production of vermicompost showed bright opportunity as a business venture though its full adoption is not in full swing in view of limited crop utilization and lack of sustained technology dissemination.

It is therefore recommended that there should be extensive dissemination of the technology to the farmers and improvement on the provision of technical, financial and marketing support from the private sector and the government .

AREA FOR FURTHER STUDY

A potential area for further study is improving the technology further for adoption by medium to large scale farmer-entrepreneurs. This may improve the supply and distribution of the product among farmers and help improve its acceptance by farmers.

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