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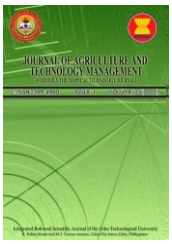

Original article

Farmers' perceived outcomes from participating in the radio school-on-air on organic agriculture

Christina A. Gabrillo[1*] and Lenny Widjayanthi[2]

[1]Department of Development Communication, Visayas State University Visca, Baybay City, Leyte, Philippines
[2]Laboratory of Media Extension Agriculture, Jember University Jl. Kalimantan 37 Jember East Java, Indonesia

ABSTRACT

For farmers to learn about new knowledge and practice of organic agriculture, the radio School-on-the-Air (SOA) was used as an extension tool to promote a sustainable farming practice. This paper sought to find out farmers' perceived outcomes from their participation in the SOA on organic agriculture (OA) in the two provinces of Leyte and Southern Leyte in Eastern Visayas, Philippines. It also identified the crops grown by farmers and determined the effectiveness of the radio SOA as an extension tool. The study employed a survey with randomly selected 125 farmer-graduates of SOA in Leyte and 130 in Southern Leyte. Results revealed that both of the two farmer-groups have: 1) acquired few skills, 2) moderately adopted the OA technology, 3) regarded high impact on its economic significance, and 4) gained high knowledge to benefit their communities and surrounding environment. In Bennett's hierarchy of program evaluation, the perceived outcomes has reached its highest rank of 7.0. This means that the SOA on organic agriculture has not only made an impact on the farmers themselves but also to the communities in which they live. In totality, the Leyte farmer-group perceived the radio SOA as highly effective and very highly effective for Southern Leyte farmers when it comes to the: 1) content, 2) radio hosts/resource persons, and 3) technical aspects/reception of the program. In the Wilcoxon Rank-Sum test, a significant difference existed between the two farmer-groups of Leyte and Southern Leyte as regards the effectiveness of SOA host/resource persons of organic agriculture with the latter giving a higher evaluation rating.

KEYWORDS: *Organic farming, School-on-the-Air effectiveness, radio as an extension tool, environmental benefit*

1 INTRODUCTION

Even with the presence of modern information and communication tools, farmers still use radio to help them access technical experts' advice on agricultural technologies in a more understandable manner. It is because the radio programs are broadcast in the vernacular or in the farmers' dialect. Radio has also proven as an effective educational medium due to its wider scope and coverage in a relatively cheaper cost. Radio has its ability to reach more illiterate and less educated people (Duby, 2006). Moreover, radio ranks second to fellow farmers as a source of agricultural information in Tanzania because of its immediacy wherein farmers could receive timely information on agriculture (Mtega, 2018).

Radio as a tool for extension complements existing agricultural information systems that engage interaction among stakeholders where none of them is the sole expert. As a tool for rural development in an ever-changing technology environment, radio determines information and communication processes worldwide (Rao, 2015; Chapman *et al*, 2003). It covers a wide array of topics and integrates scientific information by considering the interests of its intended audience. For its communication functions, radio starts on raising awareness of development or extension programs, disseminating information and facilitating discussions, promoting campaigns on behavior change, and establishing a network between and among farmers (Rao, 2015).

Agriculture remains a precursor to economic development, poverty alleviation, and environmental sustainability (The World Bank Report, 2009). In response to this, the Philippines has enacted RA 10068 in 2010. This act provides for the development and promotion of organic agriculture (OA) and other purposes in the country (DA, 2011). In Indonesia, the government's role is very important in persuading farmers to go into organic farming by providing them agricultural information including technical assistance (Ashari *et al,* 2017).

In line with its mandate, the Agricultural Training Institute (ATI) in Eastern Visayas has continued through

*corresponding author: christina.gabrillo@vsu.edu.ph

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the years its lifelong learning modalities in all organic technologies and practices through training and extension. One modality that they have implemented throughout the country was the conduct of the School-on-the-Air (SOA) on Organic Agriculture (OA) in Leyte and Southern Leyte in 2015 and 2016, respectively.

The radio SOA on organic agriculture enrolled farmers from Leyte and Southern Leyte and followed a logical sequence of modular lessons every broadcast episode for about three to four months. It started with knowing fully the salient features of RA 10068. Then it tackled the module on identifying organic agricultural practices and existing organizations advocating OA in the region. It also discussed on the actual practicum of making samples of bioorganic inputs such as organic concoctions and extracts, organic gardening and diversified organic farming. Then it delved into the quality and safety management systems like the internal control system and the organic agriculture certification for organic farms. The farmer-students were required to comply with the module requirements like quizzes, exams, and ocular visits for them to graduate from the said development program.

In more than a decade of implementing the radio SOA, there is a dearth of information with regard to the results of these communication efforts on the part of farmer-beneficiaries in Eastern Visayas (Potter & Naidoo, 2009). As defined by the Learning for Action, 'Outcomes are the changes that resulted from a program or intervention.' In this case, the radio school-on-the-air (SOA) on organic agriculture. Thus, this study aimed to determine the farmers' perceived outcomes from participating in the radio SOA in terms of: a) skills, b) adoption of technology, c) economic significance, and d) community and environmental benefits. Most of these variables are also found in the study of Ashari *et al* (2017) in Indonesia on farmers' adoption of organic farming such as: (a) information and knowledge availability, (b) economic and financial motives, (c) technical and management skills, (d) social consideration, (e) environmental concern, (f) institutional environment, and (g) farmers' socio-economic and demographic background.

This study also identified the crops grown by the radio SOA farmers and ascertained the effectiveness of this communication intervention on learning organic agriculture when it comes to its: 1) content, 2) radio hosts/resource persons, and 3) technical aspects/reception.

2 MATERIALS AND METHODS

Research Design and Study Areas

The study applied a one-shot survey research design to collect quantitative data on items in a given population (Safe Foods, 2019). The study was conducted in the three municipalities of **Leyte**: Tanauan, Carigara and San Miguel and in the 11 barangays of Sogod, **Southern Leyte** (Fig.1): Suba, Rizal, Zone 1, Milagroso, San Miguel, San Roque, Maac, Mahayahay, Javier, San Pedro, and Hibod-hibod.

Figure 1. Map showing the study sites (Source: ATI website, 2019)

Respondents of the Study

The respondents included in the study were randomly selected school-on-the-air farmer-graduates in Leyte and Southern Leyte. Using the online sample size generator, only 125 out of 481 farmer-graduates of the said program in Leyte and 130 out of 558 respondents in Southern Leyte were randomly chosen based on the 7% margin of error and 93% confidence level. All the numbers generated for the sample size in both provinces correspond to the list of farmer-graduates of the school-on-the-air.

Data Gathering Method, Instrument and Reliability Test

A survey questionnaire was constructed in English. This was translated into the dialect of *Waray* farmers in Leyte and *Cebuano* farmers in Southern Leyte. The questionnaire consisted of outcomes statements on a 5-point Likert scale for respondents to rate their perceived outcomes from participating in the radio SOA. The respondents also listed down all the crops that they have grown in their farms. As regards the effectiveness of the school-on-the-air, another 5-point Likert scale was used. Before the actual data gathering, the survey instrument was pre-tested among 10 farmers who possessed the same characteristics with that of the target respondents. This was to identify vague and incomprehensible items in the instrument. The pre-test results have pointed out that the instrument was clear and easy to understand. When the instrument was subjected to the Omega reliability test (Table 1), it indicated more than 91 percent reliability. This means that the instrument was excellently reliable as shown in Table 2.

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Table 1. Reliability Test Results

ASPECT	RELIABILITY (%)
Skills	94.83
Adoption of Technology	96.16
Economic Significance	95.37
Community and Environment Benefits	97.67
Overall	**97.86**
Content	97.09
Hosts/Resource Persons	96.55
Technical Aspects/Reception	96.28
Overall	**97.78**

Table 2. Omega Reliability Test Index

RELIABILITY INDEX	DESCRIPTION
0.00 – 0.50	Unacceptable
0.51 – 0.60	Poor
0.61 – 0.70	Questionable
0.71 – 0.80	Acceptable
0.81 – 0.90	Good
0.91 – 1.00	Excellent

Data Analysis

Guided by the objectives of the study, the gathered data were coded and encoded in Microsoft Excel and analyzed through the Statistical Package for Social Sciences (SPSS) version 22. Descriptive statistics such as frequencies, percentages, means and totals for the respondents' socio-demographic profile, perceived outcomes, crops grown and school-on-the-air effectiveness was used. To determine whether a relationship existed between the two farmer-groups, the Wilcoxon Rank-Sum Test was used. The findings are presented in tabular and graphical forms. Bennett's hierarchy extension program evaluation model was also used to determine the overall rank of perceived outcomes.

3 RESULTS AND DISCUSSIONS

Socio-demographic characteristics of farmer-respondents in Leyte and Southern Leyte

The following are the socio-demographic characteristics of the two farmer-groups of respondents (Table 3).

Sex. Among the 125 Leyte respondents, majority (68.8%) were female and only 31.2% were male. This was consistent with the 130 Southern Leyte respondents wherein almost two-thirds (51.5%) of them were also female and almost half (48.5%) were male. Unlike in a study with more male farmers who are using social media particularly Facebook in their agricultural marketing (Balkrishna & Deshmukh, 2017).

Age. For Leyte respondents with the mean/median age of 49 and SD of 12.9, majority were aged 41-50 years old while Southern Leyte farmers have a mean age of 43.4, median age of 46 and SD of 15.9, had younger ages from 21-30 years old than with Leyte farmers. Only a few belonged to the age bracket of 70 years old and above for both groups of respondents. Nevertheless, in another study, younger farmers with ages between 30-40 years old are using smart mobile phones nowadays (Balkrishna & Deshmukh, 2017).

Civil status. For the two groups of respondents, a great majority from Leyte and Southern Leyte, (80.8% and 64.6%, respectively) were married. Only a few respondents from Leyte were either widowed (9.6%), single (7.2%), or separated (2.4%) while almost one-third from Southern Leyte were either single (29.2%) or widowed (6.3%).

Education. Among the Leyte respondents, almost two-thirds (69.6%) have finished their elementary years (0-6 years). Some were into high school (26.4%) and college (4%) education. Majority of respondents from Southern Leyte have finished their elementary (79.2%) followed by those who have reached or have finished their high school education. None of them went into college.

Household size. Three-fourths of the respondents from both Leyte and Southern Leyte have exactly the same number of 4-6 members in a household followed by 0-3 household members. A few of them with more than 9 household members existed in both farmer-groups.

Farm ownership. Slightly more than three-fourths (75.2%) of Leyte respondents were tenants and only 28 were farm owners while almost two-thirds (59.2%) of Southern Leyte respondents owned parcels of land with almost one-fourth of them (24.6%) who were tenants. A few in both farmer-groups were owners and tenants at the same time.

Farm size. Majority of the respondents from Leyte (44.8%) and Southern Leyte (41.5%) have tilled more than 5-10 hectares of land. This was followed by those farmers who had more than 3-5 hectares and more than 1-3 parcels of land. Only a few had more than 10 hectares of farm size in both farmer-groups.

Crops grown by farmers in Leyte and Southern Leyte. The Leyte respondents had grown various crops that ranged from rice, vegetables, coconut, banana, root crops, fruit trees, corn, and abaca in that order (Fig. 2). Figure 3 also presents the crops grown by the Southern Leyte respondents that comprised of banana, coconut, root crops, fruit trees, vegetables, abaca, rice, and corn in that order.

Perceived outcomes of farmers from their participation in the School-on-the-Air

Farmer-respondents from Leyte and Southern Leyte rated on the outcomes statements from their participation in the school-on-the-air on organic agriculture in terms of the following: 1) Skills, 2) Adoption of technology, 3) Economic significance, and 4) Community and

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environmental benefits. A 5-point Likert scale was used to determine their perceived outcomes (Table 4).

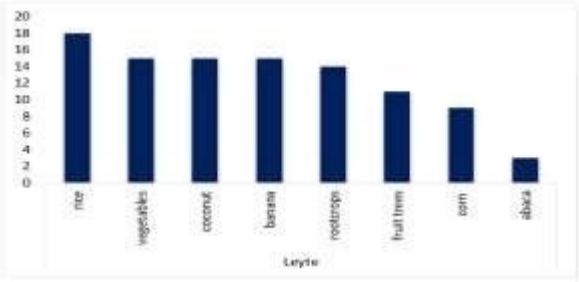

Figure 2. Crops grown by Leyte farmers

Skills acquired by farmers on OA.

The respondents' ratings on the outcome's statements show consistency in the results of both groups from Leyte (44.8%) and Southern Leyte (52.3%) which fell on the few skills they acquired after having participated in the radio SOA. It was their skill on the practice of green manuring where uprooted leaves and mown crop parts are used as mulch or cover crops. Same with the farmers in Ghana wherein their gained knowledge resulted to their improved practices with the information they got from the Royal FM agricultural program (Folitse *et al*, 2016).

Table 3. Socio-demographic characteristics of Farmers in Leyte and Southern Leyte

CHARACTERISTICS	CATEGORIES	LEYTE	%	SOUTHERN LEYTE	%
Sex	Male	39	31.2	63	48.5
	Female	86	68.8	67	51.5
Age	<20 years old and below	1	0.8		
Leyte:	21-30	11	8.8	40	30.8
Mean=49.0 (Median=49)	31-40	19	15.2	13	10.0
Standard Deviation=12.9	41-50	37	29.6	25	19.2
	51-60	36	28.8	31	23.8
Southern Leyte:	61-70	14	11.2	17	13.1
Mean=43.4 (Median=46)	>70 years old and above	7	5.6	4	3.1
Standard Deviation=15.9					
Civil Status	Single	9	7.2	38	29.2
	Married	101	80.8	84	64.6
	Widowed	12	9.6	8	6.3
	Separated	3	2.4		
Years of Education	0-6 years	87	69.6	102	79.2
Mean=11.7 (Median=13)	7-10 years	33	26.4	25	19.2
Standard Deviation=5.12	11-14 years	3	2.4	2	1.6
	>14 years	2	1.6		
Household Size	0-3 members	28	21.5	28	21.5
Mean=5.02 (Median=5)	4-6	75	57.7	75	57.7
Standard Deviation=1.86	7-9	24	18.5	24	18.5
	> 9 members	3	2.3	3	2.3
Farm Ownership	Owner	28	22.4	77	59.2
	Tenant	94	75.2	32	24.6
	Owner/Tenant	3	2.4	21	16.2
Farm Size	0-1.0 ha	5	4.0	1	0.8
Mean=1.81 (Median=1.11)	1.1-3.0 ha	22	17.6	27	20.8
Standard Deviation=1.99	3.1-5.0 ha	37	29.6	46	35.4
	5.1-10.0 ha	56	44.8	54	41.5
	>10.0 ha	5	4.0	2	1.5

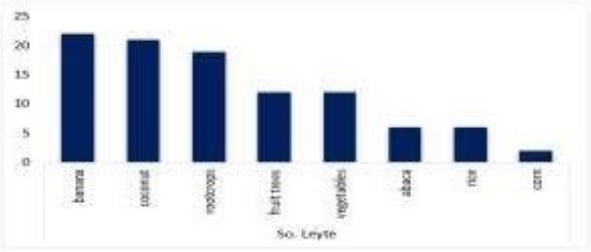

Figure 3. Crops grown by Southern Leyte

Adoption of technology.

Both the Leyte (43.2%) and Southern Leyte (50%) farmer-groups have moderately adopted the OA technology particularly on the Fermented Fruit Juice (FFJ). FFJ is made up of sweet ripe fruits, vegetables and root crops thoroughly blended with crude sugar or molasses and stored for a short period of time that helps

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promote flowering and fruit setting. In (Folitse *et. al.,* 2016) study, the agricultural radio program in Ghana had enhanced the use of agricultural technologies to most of their farmers and they were satisfied with the information they got from the radio program.

Economic significance.

When farmers were asked to rate on the economic significance that the organic agriculture (OA) technology has given them, both Leyte (56%) and Southern Leyte (49.2%) farmer-respondents perceived that OA provides them with lower cost/lesser expense and better quality/desirable crops that inevitably increased their income. Banjara's (2016) study noted that organic farming creates an employment opportunity in the local market and develops their teamwork, leadership and technical skill in farmers. Likewise, Folitse *et al* (2016) stressed out that their farmers' increased knowledge from the radio agricultural program in Ghana made them more productive to attain a sustainable income. This created a positive impact on their farmers' livelihood.

Community and environmental benefits.

The farmers from both Leyte (47.2%) and Southern Leyte (53.8%) had gained high knowledge from the OA technology that benefits their environment and communities. They perceived that the school-on-the-air on OA had taught them on how to sustain biodiversity that lessens pests and diseases on their crops. In Nepalese context, organic farming is the same with their conventional farming system. It aimed to protect their surrounding environment for a cleaner environment thereby improving the quality of soil, air and water in Nepal. Similar results were found in a study on adopting rain forestation farming in Leyte, Philippines (Banjara, 2016; Velarde *et al*, 2007).

Perceived effectiveness of the School-on-the-Air as an extension tool.

When asked on their ratings for the content of the radio SOA on organic agriculture, both farmer-groups from Leyte (62.4%) and Southern Leyte (49.2%) revealed that the school-on-the-air program was able to broaden their knowledge on subjects related to agriculture. Their rating on the content was high followed by the statement, the radio SOA made them aware on the importance of using OA technology from knowing the situation of their province to understanding the salient features of RA 10068, organic concoctions and extracts, organic agriculture production, and quality and safety management protocols in getting a certification of OA in their farms (Table 5).

Perceived evaluation of the hosts/resource persons of the School-on-the-Air.

The Leyte group of farmers rated the radio SOA hosts/resource persons as highly effective (61.6%) while the Southern Leyte farmers rated them as very highly effective (51.6%). They said that the resource persons/hosts conveyed to them the right information through their good communication skills such as proper use of words, good pacing, proper pronunciation, and using a modulated voice. They added that the resource persons discussed eloquently to them the technology and the needed skills that are required of practicing organic agriculture for a healthy environment.

Perceived assessment of the technical aspects/reception of the School-on-the-Air.

The Leyte farmers also rated the technical aspects/reception of the radio SOA as highly effective (56%) and Southern Leyte as very highly effective (54.6%). They revealed that the school-on-the-air had a good theme music and sound effects are pleasing to the ear and did not compete with the delivery of lecture discussions of the resource persons. Likewise, they said that the radio SOA had a clear bnroadcast signal that sustained them from listening to the lessons up until the end of every program.

Overall effectiveness of the School-on-the-Air on Organic Agriculture

The Wilcoxon Rank-Sum Test gave the overall effectiveness of the school-on-the-air from the two farmer-groups or locations, Leyte and Southern Leyte. It was found that there are no significant differences between Leyte and Southern Leyte in terms of the effectiveness of the radio SOA's content and technical aspects/reception. However, there was a significant difference on the program hosts/resource persons between the two farmer-groups even though Southern Leyte group has higher perceived effectiveness of the hosts/resource persons than the Leyte group of farmers (Table 6).

Using Bennett's Hierarchy of Extension Program Evaluation Model

To validate the perceived outcomes attained by the school-on-the-air farmer-graduates, the Bennett's hierarchy of extension program evaluation was used in the study. In the model, there is a logical chain of events from 1.0 up until 7.0 categories. It begins from inputs and goes up to the last two categories of practice change and end results (Agri Futures Australia, 2017). In this study, it was found that the perceived outcomes reached up to the highest rank of 7.0 which fell on the category of End Results. This means that the outcomes identified by the farmer-respondents from their participation in the radio SOA have not only made an impact to them but also to the communities in which they live.

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Table 4. Perceived outcomes by farmers in Leyte and Southern Leyte.

ASPECT	PERCEIVED OUTCOMES	LEYTE	%	SOUTHERN LEYTE	%
Skills	1 No skills acquired	0	0.0	0	0.0
	2 Couple of skills acquired	2	1.6	1	0.8
	3 Few skills acquired	56	44.8	68	52.3
	4 Several skills acquired	45	36.0	45	34.612.
	5 Many skills acquired	22	17.6	16	3
Adoption of Technology	1 No adoption of technology	0	0.0	1	0.8
	2 Slight adoption of technology	7	5.6	6	4.6
	3 Moderate adoption of technology	54	43.2	65	50.0
	4 High adoption of technology	38	30.4	47	36.2
	5 Very high adoption of technology	25	20.8	11	8.4
Economic Significance	1 No economic significance	2	1.6	0	0.0
	2 Slight economic significance	1	0.8	1	0.8
	3 Moderate economic significance	21	16.8	20	15.4
	4 High economic significance	70	56.0	64	49.2
	5 Very high economic significance	31	24.8	45	34.6
Community and Environmental Benefits	1 No learning gained	0	0.0	0	0.0
	2 Slight learning gained	1	0.8	1	0.8
	3 Moderate learning gained	40	32.0	33	25.4
	4 High learning gained	59	47.2	70	53.8
	5 Very high learning gained	25	20.0	26	20.0

Table 5. Perceived Effectiveness of the School-on-the-Air by Farmers in Leyte and Southern Leyte

ASPECT	PERCEIVED OUTCOMES	LEYTE	%	SOUTHERN LEYTE	%
Content	1 Not effective	0	0.0	0	0.0
	2 Slightly effective	0	0.0	1	0.8
	3 Moderately effective	10	8.0	13	10.0
	4 Highly effective	78	62.4	64	49.2
	5 Very highly effective	37	29.6	52	40.0
Hosts/ Resource Persons	1 Not effective	0	0.0	0	0.0
	2 Slightly effective	0	0.0	0	0.0
	3 Moderately effective	8	6.4	18	13.8
	4 Highly effective	77	61.6	45	34.6
	5 Very highly effective	40	32.0	67	51.6
Technical Aspects/ Reception	1 Not effective	0	0.0	0	0.0
	2 Slightly effective	1	0.8	0	0.0
	3 Moderately effective	6	4.8	17	13.1
	4 Highly effective	70	56.0	42	32.3
	5 Very highly effective	48	38.4	71	54.6

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Table 6. Overall Effectiveness of the School-on-the-Air in Leyte and Southern Leyte

ASPECT	LOCATION	OVERALL EFFECTIVENESS	Test Statistic Value	*p*-value
Content	Leyte Southern Leyte	Highly effective Highly effective	7511.0^{ns}	0.2393
Hosts/ Resource Persons	Leyte Southern Leyte	Highly effective Very highly effective	7050.5*	0.0434
Technical Aspects/ Reception	Leyte Southern Leyte	Highly effective Very highly effective	7247.0^{ns}	0.0983

Implications of the study

All the outcomes statements of the school-on-the-air on organic agriculture in terms of: 1) skills acquired, 2) technology adopted, 3) economic significance, and 4) community and environmental benefits were rated high by both Leyte and Southern Leyte farmer-respondents. This could be attributed to the effective use of educational radio in promoting agricultural development to improve the lives of the target clienteles. The results from the quantitative data suggest that the use of radio SOA as an extension tool could be continued and sustained. Likewise, Folitse *et al* (2016) gave the same recommendation for the government in Ghana to sustain its agricultural radio programs. As pointed out by Banjara (2016), organic farming has been adopted by the Nepalese to protect their environment and make their lives better.

Farmer-respondent's ratings on the content, hosts and resource persons, and technical aspects of the school-on-the-air were highly favorable with only some minor suggestions on the conduct of the radio SOA graduation after 3 months. This implies that a strong partnership among the funding agency such as the ATI-RTC 8, radio stations, SUCs, and LGUs should be continued. Moreover, there should be a constant monitoring and evaluation of the school-on-the-air to measure its impact on the knowledge, skills and attitude of farmers. A combination of using SOA with radio forum could also be done to ensure that policies or ordinances are crafted and put in place at the LGU level for good governance.

4 CONLUSIONS AND RECOMMENDATIONS

While the use of school-on-the-air proved to be an effective extension tool for disseminating agricultural information to our farmers, an ethnographic qualitative study on the experiences of the farmers from participating in the radio SOA is worth pursuing. This will validate the quantitative data and give a detailed account on what factors that make this specific type of communication intervention as an effective extension strategy.

Aside from conducting the school-on-the-air, studies on other innovative communication strategies such as participatory radio drama and folk media on agriculture, gender, climate change, and disaster risk reduction, among others could also unleash the local knowledge of farmers and fisherfolk in testing new learning modalities that are participatory, interesting, entertaining and fun for them.

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CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

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