Innovations

Implications of agricultural extension workers (AEWS) in the implementation of agricultural extension modalities amidst Covid-19 pandemic

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Abstract
The study aimed to determine the constraints of Agricultural Extension Workers (AEWs) in the implementation of agricultural extension modalities amidst COVID-19 in selected municipalities of Bulacan. The researcher used descriptive research method using survey. The survey method was used to gather needed information/data and was conducted through Google form. Most of the respondents were young adults and majority were married. Agricultural extension workers have educational attainment of college graduate and most of them are permanent with less than 5 years in service. Based on the outcome of this study, agricultural extension workers faced the fear of valued farmers to be infected by COVID-19. Due to this fear, farmers tend to avoid meetings and trainings as well. Local Government Units also interfered to limit group meetings to prevent the spread of the disease thereby executing lockdown. Lack of transportation facilities supplies, and materials also became a hindrance for an agricultural extension worker to render his/her service.

Keywords: *1.agricultural extension, 2.agricultural extension workers, 3.COVID-19, 4.agricultural extension modalities, 5.constraints*

Introduction

The whole world was shocked by the tremendous outbreak of the novel SARS CoV-2 virus also called Corona Virus 2019 (COVID-19). For the past hundred years, this is one of the most serious pandemic situations. All throughout the world, lockdown strategy is being executed to slowdown the spread of the deadly disease which in turn cause economic turmoil and abrupt changes in policies aiming to mitigate pandemic's health impacts (Kumar et al., 2021). According to Oxford Business Group, a global research and advisory company, though Philippines economic activity was temporarily hampered by COVID-19 in 2020 pandemic period, strict measures,

effective public sector policies and larger budget are expected to created jobs, generate growth and health kick start the country's recovery on 2021 (oxfordbusinessgroup.com).

Many farmers in the Philippines and in other developing countries continue to experience obstacles to obtaining consistent, adequate access to agricultural extension services. This is the reason why, the presence of an effective, efficient extension system is a crucial factor in agricultural development. Agriculture creates a large share of national output and employs a majority of the labor force in most developing countries, thus, the government sector has been integral to any thinking about development, particularly rural development. As this social goal was set, the national government delegated agricultural extension as one of the services offered by the local government units (LGUs) in their agricultural offices. LGUs are better managers of extension services because of their familiarity to the local conditions of agriculture; therefore, their services could be adapted well to their local needs (Saz, 2007).Moreover, an extension service serves not only to introduce or enforce agriculture policies.

The effectiveness of extension personnel in conducting its activities can be used to assess success of extension program. However, it was shown that technology - transfer oriented agricultural extension has failed to promote rural development in much of the world, particularly to those regions characterized as agro-ecologically diverse and environmentally adverse (Urriza, 2006). This shows that there is a need to consider alternatives within every ecosystem and with constantly changing environment.

Since Philippines is an agricultural country, the government is facing challenges on how to address issues on agricultural sector. Due to lockdown, mobilization of agricultural products was also hampered. Distribution of farm inputs, farmers organization strengthening, and crop and livestock insurance application are some of the tasks that an AEW should handle properly to serve the farmers very well. This paper aims to tackle on the constraints being dealt by AEWs upon rendering service to valued farmers amidst Covid-19.

Objectives of the study

This study aims to determine the constraints of Agricultural Extension Workers (AEWs) in the implementation of agricultural extension modalities amidst COVID-19 in selected municipalities of Bulacan.

Specifically, this study sought to answer the following:

1. Determine the socio-demographic characteristics of agricultural extension workers in terms of:
    - 1.1 age;
    - 1.2 gender;
    - 1.3 educational attainment;
    - 1.4 employment status; and
    - 1.5 number of years in service.
2. Identify the different modalities used by AEWs.
3. Identify the constraints or problems encountered by AEWs in the implementation of different extension modalities during the pandemic.

Review of Related Literature

Extension accelerates technology transfer and help farmers become better farm managers thereby reducing the differential between potential and actual yields in farmers' fields.

It also aids the research establishment craft technology to address the agro ecological and resource obstacles of farmers. Extension functions as a connection medium between scientists and farmers. The function involves initially by translating information from the store of knowledge and from new research to farmers, and secondly helping research workers articulate the problems and constraints faced by farmers.

If a differential exists between the actual productivity on the farms and what could potentially be produced with better know-how, subjected to farmers' preferences and resource constraints, productivity improvements are possible. In many developing countries, technological advances have created such a huge differential, (Feder, Lau & Slade, 1987). It can be broadly classified into two types of "gaps": a technology gap and a management gap. Technology gap is a manifestation of the difference in the knowledge that farmers possess while the management gap is the best-practice knowledge that exists at any point in time. Best practice is composed of the latest science-based developments addressed to overcoming the limitations imposed by traditional technology and practices to promote higher productivity.

Adequate and timely access by farmers to relevant advice is a factor in effective extension service. However, it is not sufficient though access to appropriate information is necessary to improve agricultural productivity. In general, farmers will choose to adopt a particular technology depending on their socioeconomic and agro ecological circumstances. There are three critical factors in the adoption process namely; the availability of improved technology, access to "modern" inputs and resources, and profitability as an acceptable level of risk.

Though extension cannot be assumed to be the only ingredient that can transform traditional agriculture, it usually has maximal impact at an early stage in the dissemination of a new technology, which breaks the informational disequilibrium thereby providing equal distribution of knowledge regarding the new technology. (Feder & O'Mara, 1982). Consequently, extension's is termed as a prominent decoder and transmitter of information from research, as noted by (Huffman, 1985).

The traditional farmers' efficiency and ability to cope with the disequilibria presented by the availability of new technology and new information bridged them to alleviate their poor status as cited in the insights of Anderson and Feder (2007).

Due to the new challenges, problems and developments for agricultural extension, there is complexity in the facilitation of learning and dissemination of knowledge and information. Thus, this primarily affects the main goal of agricultural extension which is to increase agricultural production and productivity by proper the translation of relevant knowledge, information dissemination and the offering of technical and economic advice (Rezaei-Moghaddam &Karami, 2008).

This research used the Task-Technology Fit (TTF) theory (Goodhue et al., 1995). The theory emphasizes individual impact or the improved efficiency, effectiveness, and/or higher quality. The authors assumed that the good fit between task and technology is to increase the likelihood of utilization and to increase the performance impact since the technology meets the task needs and wants of users more closely. This model is suitable for investigating the actual usage of the technology especially testing of new technology to get feedback. This study was also guided by the Theory of Constraint. The Theory of Constraint (TOC) is a method which has a well-developed research apparatus referred to as the Thinking Process (Cyplik et al., 2009). The core concept of the TOC is that every process has a single constraint, and that total process throughout can only be improved when the constraint is improved. According to the theory, every system, no matter how well it goes, has limiting constraint known as the weakest link.

Methodology

The researcher describes the survey instrument and the process in the collection of data. The methods and the instruments were used to analyze the data obtained through the survey. For the purpose of this study, the researcher used descriptive research method using survey. Simple random sampling method was used. A total of 50 respondents were selected coming from the municipalities of San Ildefonso, San Rafael and San Miguel, Bulacan.

Results and Discussion

Socio-Demographic Characteristics of Agricultural Extension Workers

The socio-demographic characteristics of the agricultural extension workers were investigated by the researcher in terms of age, gender, civil status, educational attainment, employment status and number of years in service.

Tables 1 shows that most of the respondents were young adults (62.0%), belonging to 18-35 age level, followed by middle aged adults ranged to 36-55 (34.0%) and only 4% were older adults belonging to 56 and above age level. This indicates that young adults are more economically active and more capable of performing tiresome and time bound function of extension delivery. The old age range also revealed that the respondents were unable to cope with the stress required in participating in extension intervention programmes. Respondents were found to be 50% male and 50% female. This study was also composed of married respondents having the most number with 54.0%, followed by single (46.0%) AEWs. This indicates that majority of the extension workers were married. The married respondents at high percentage have shown high sense of responsibility with an added advantage to participation function (Ironkwe et al, 2006).

Table 2 shows that 94.0 % of the respondents are college graduates which signified that the AEWs have higher educational attainment. It was followed by farmers who are college undergraduate (1.0%), high school graduate (1.0%) and master graduate (1.0%). This depicts that agricultural extension workers with educational attainment of college graduate were found qualified for their job and were also in their formative stage of learning on the job and extension delivery. As supported by the study of Okereke and Onu, 2007, they insisted that education is vital to the success of agricultural production and further improve the capabilities of agricultural extension workers.

As presented in Table 3, most of the respondents are permanent (54.0%), followed by job order (28.0%) and casual with 18.0%. The table also shows that 58.0% of the respondents spent less than 5 years in the service while the least (18.0%) of the respondents spent longer years (11 years and above) in the service above all. This implies that nowadays, majority of the agricultural extension workers are almost youth and the old ones have retired.

Delivery Process on the Modalities used by AEWs during the pandemic COVID-19

It is indicated in Table 4 that in terms of the agricultural extension workers' delivery process of FFS through the *Palay*check, it was noted to be*average* (mean=2.78). Transplanting was noted as *average* (mean=2.90) and has also obtained the highest mean. Also, AEWs' responded *average* in the preparation of seedlings (mean=2.88), application of concoction (mean=2.86), identification of common diseases of rice (mean=2.86), monitoring of PTD Plots and discussion of palay check (mean=2.82), trellising and preparation of natural inputs (mean=2.78), identification of crop & study treatments (mean=2.70) and establishment of PTD Plots, seed sowing in seedbed, seed selection and varietal selection (mean=2.68).On the other

hand, AEWs' responded *poor* in thelay-outing, land preparation and soil sampling (mean=2.58). In the study of Edan and Zamora (2007), the use of locally available organic materials is increased every planting season throughout the farm. Since FFS is the most common extension modality in teaching the farmers using learning by doing approach, it became a part of the regular target in the Department of Agriculture with budget allocation to be implemented by AEWs in the local government units.

Table 5 shows the AEWs' delivery process of livelihood program through meat processing during the pandemic. AEWs were noted to have *average* (mean=2.75). Forming, cooking, cooling and slicing (mean=2.86) were noted as *average* which got the highest mean. On the other hand, proper cutting and deboning (mean=2.74), selection of good quality raw materials (mean=2.72), proper storage (mean=2.72), application of brine and tumbling (mean=2.70), appropriate packaging (mean=2.70) and proper labelling (mean=2.66) were also noted as *average*.

Table 6 shows the AEWs' delivery process on livelihood program through vegetable processing. AEWs were noted to have *average* response (mean=2.71). Proper packaging of products (mean=2.82) was noted as *average* which got the highest mean. On the other hand, freezing of processed vegetable (mean=2.60) was noted as *poor* which got the lowest mean. This was due to the lack of time of the agricultural extension workers to further elaborate the process of freezing of processed vegetable.

As revealed in Table 7, agricultural extension workers' delivery process through Registry System on Basic Sector of Agriculture (RSBSA) during the pandemic was noted *average* (mean=2.95). Fill-out forms was noted as *average* (mean=3.04) and gathering proof of ownership from farmers also noted as *average* (mean=2.86). Because AEWs are familiar and exposed to paper works, it was easy for them to do RSBSA processing.

Table 8 shows the delivery process of an agricultural extension workers through monitoring of planting and harvesting of rice and vegetables during the pandemic. Monthly monitoring of planting and harvesting of rice was noted *average* (mean=2.96) and AEWs also noted *average* (mean=2.88*)* on the weekly monitoring of planting and harvesting of vegetables. This means that agricultural extension workers found it easy to perform the monthly monitoring of planting and harvesting of rice and weekly monitoring of planting and harvesting of vegetables. Also shown in Table 8, the agricultural extension workers noted *average* (mean=2.92) on the strengthening of farmers' cooperative and association. The agricultural extension workers were fully aware of their task to assist farmers' cooperative and association.

Table 9 indicated that the agricultural extension workers encountered problems regarding field visitation and monitoring. AEWs were noted *always* on fear of farmers being infected by COVID-19 (mean=4.22).It depicts that most of the respondents were affected by the constraint of being feared by farmers to be infected by COVID-19. As revealed by the study of Rajkumar, 2020, COVID-19 has impacted mental and physical health across population along with depression, anxiety, distress, phobia, and many other psychological impacts.

Limitation of group meetings (mean=3.82) was noted *often*. This was emphasized by the protocols executed by the Local Government Unit (LGU).As related in Dang, during the lockdown, agricultural input dealers, meetings conducted by their LGU, cooperatives and groups declined (Alvi et al., 2021).Unavailability of transportation facilities (mean=3.48) was also noted *often*. Because the budget of transportation was also hampered due to realignment.

Table 10 shows the problems encountered by agricultural extension workers in terms of unavailability of supplies and materials. AEWs responded *sometimes* on the unavailability of office supplies (mean=3.10) and unavailability of agricultural inputs (mean=2.94). This was due to the hampered sourcing of fund for agriculture aspect in the LGU with respect to realignment of budget as emergency fund for COVID-19 quick response program.

As presented in Table 11, agricultural extension workers responded *always* (mean=4.42) on the fear of farmers to attend meeting and trainings. With the current condition wherein pandemic seem unstoppable, farmers always have the fear to attend meetings and trainings. On the other hand, due to realignment of budget (mean=3.52), trainings were not prioritized, instead, budget for the food packs for affected families were given allotment.

Conclusions

Based on the outcome of this study, agricultural extension workers faced the fear of valued farmers to be infected by COVID-19. Due to this fear, farmers tend to avoid meetings and trainings as well. Local Government Units also interfered to limit group meetings to prevent the spread of the disease thereby executing lockdown. Lack of transportation facilities supplies, and materials also became a hindrance for an agricultural extension worker to render his/her service.

Recommendations

Parallel to the results of the study, the following are some recommendations in which agricultural extension workers as well as farmers could be benefited:

1. In order to lighten the fear of farmers to be infected, AEWs should further explain simple rules in congruence to the protocols made by the LGU such as wearing face mask, face shield and observe social distancing.
2. To avoid overcrowding in the meeting place, scheduling of limited attendees in a certain day can be made.
3. With regards to lack of supplies, materials and transportation facilities, AEWs can outsource fund support from Provincial and Regional Offices.

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Table 1 to 11 of the Study

Table 1. Distribution of respondents by age, gender and civil status.

Category	Frequency	Percentage (%)
Age		
Young adults (18-35)	31	62.0
Middle aged adults (36-55)	17	34.0
Older adults (56 and above)	2	4.0
Total	*50*	*100.0*
Gender		
Male	25	50.0
Female	25	50.0
Total	*50*	*100.0*
Civil Status		
Single	23	46.0
Married	27	54.0
Total	*50*	*100.0*

Table 2. Agricultural extension workers' educational attainment.

Educational Attainment	Frequency	Percentage (%)
High school graduate	1	2.0
College undergraduate	1	2.0
College graduate	47	94.0
Others	1	2.0
Total	*50*	*100.0*

Table 3. Distribution of AEWs by employment status and years in service.

Category	Frequency	Percentage (%)
Employment Status		
Permanent	27	54.0
Casual	9	18.0
Job Order	14	28.0
Total	*50*	*100.0*
Years in Service		
Less than 5 years	29	58.0
6 to 10 years	12	24.0
11 years and above	9	18.0
Total	*50*	*100.0*

Table 4. Agricultural extension workers' delivery process of FFS through the *Palay* Check during the pandemic.

Palay Check	Mean	SD	VI
Transplanting	2.90	.931	Average
Preparation of seedlings	2.88	1.00	Average
Application of concoction	2.86	.903	Average
Identification of common diseases of rice	2.86	.881	Average
Monitoring of PTD Plots and discussion of palay check	2.82	1.02	Average
Trellising and preparation of natural inputs	2.78	1.06	Average
Identification of crop & study treatments	2.70	1.02	Average
Establishment of PTD Plots, seed sowing in seedbed, seed selection and varietal selection	2.68	1.15	Average
Lay-outing, land preparation and soil sampling	2.58	1.07	Poor
Grand Mean	**2.78**	**.109**	Average

***1.0-1.8=Very Poor 1.81-2.6=Poor 2.61-3.4=Average 3.41-4.2=Good 4.21-5.0= Excellent*

Table 5. Agricultural extension workers' delivery process of livelihood program through meat processing during the pandemic.

Meat Processing	Mean	SD	VI
Forming and cooking	2.86	.783	Average
Cooling and slicing	2.86	.756	Average
Proper cutting and deboning	2.74	.876	Average
Selection of good quality raw materials	2.72	.927	Average
Proper storage	2.72	.858	Average
Application of brine and tumbling	2.70	.886	Average
Appropriate packaging	2.70	.789	Average
Proper labelling	2.66	.848	Average
Grand Mean	**2.75**	**.075**	Average

***1.0-1.8=Very Poor 1.81-2.6=Poor 2.61-3.4=Average 3.41-4.2=Good 4.21-5.0= Excellent*

Table 6. Agricultural extension workers' delivery process through vegetable processing during the pandemic.

Vegetable Processing	Mean	SD	VI
Proper packaging of products	2.82	.825	Average
Sorting	2.76	.771	Average
Proper labelling of products	2.74	.777	Average
Washing of products	2.72	.858	Average
Proper storage	2.68	.843	Average
Grading	2.66	.848	Average
Freezing of processed vegetable	2.60	.904	Poor
Grand Mean	**2.71**	**.072**	Average

***1.0-1.8=Very Poor 1.81-2.6=Poor 2.61-3.4=Average 3.41-4.2=Good 4.21-5.0= Excellent*

Table 7. Agricultural extension workers' delivery process through Registry System on Basic Sector of Agriculture (RSBSA) during the pandemic.

RSBSA	Mean	SD	VI
Fill-out forms	3.04	.968	Average
Gathering proof of ownership from farmers	2.86	.881	Average
Grand Mean	**2.95**	**.127**	Average

***1.0-1.8=Very Poor 1.81-2.6=Poor 2.61-3.4=Average 3.41-4.2=Good 4.21-5.0= Excellent*

Table 8. Agricultural extension workers' delivery process on different modalities during the pandemic.

Indicator	Mean	SD	VI
Monthly monitoring of planting and harvesting of rice	2.96	1.09	Average
Weekly monitoring of planting and harvesting of vegetables	2.88	1.00	Average
Strengthening of farmers' cooperative and association	2.92	.156	Average

***1.0-1.8=Very Poor 1.81-2.6=Poor 2.61-3.4=Average 3.41-4.2=Good 4.21-5.0= Excellent*

Table 9. Problems encountered in terms of field visitation and monitoring during the pandemic.

Field visitation and monitoring	Mean	SD	VI
Fear of farmers being infected by COVID-19	4.22	.996	Always
Limitation of group meetings	3.82	1.12	Often
Unavailability of transportation facilities	3.48	1.05	Often

***1.0-1.80=Never 1.81-2.60=Rarely 2.61-3.40=Sometimes 3.41-4.20=Often 4.21-5.0= Always*

Table 10. Problems encountered in terms of unavailability of supplies and materials during the pandemic.

Item	Mean	SD	VI
Unavailability of office supplies	3.10	.839	Sometimes
Unavailability of agricultural inputs	2.94	.818	Sometimes

***1.0-1.80=Never 1.81-2.60=Rarely 2.61-3.40=Sometimes 3.41-4.20=Often 4.21-5.0= Always*

Table 11. Problems encountered by AEWs during the pandemic.

Item	Mean	SD	VI
Fear of farmers to attend meeting and trainings	4.42	.835	Always
Realignment of budget	3.52	.886	Often

***1.0-1.80=Never 1.81-2.60=Rarely 2.61-3.40=Sometimes 3.41-4.20=Often 4.21-5.0= Always*