



## **Research and Development Trends and Information Needs in Organic Agriculture in Bicol Region, Philippines**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Author MTBL supervised the data gathering, performed the statistical analysis and wrote the manuscript. Author GJB provided the conceptual framework and protocols in the conduct of the study as well as designed the survey questionnaire. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

The platform for organic agriculture (OA) implementation has great potentials in the Philippines. Various researches on OA had been conducted because organic crops are one of the most important needs of Filipinos. A study was conducted to determine the status and trend of the organic agriculture (OA) research and development (R and D) programs in Bicol Region, Philippines. Specifically, it aimed to conduct inventory and determine the trends of R and D projects on organic agriculture, determine the information needs of OA stakeholders and identify research gaps and propose strategies to enhance the OA R and D programs. A survey using purposive sampling was undertaken to 149 stakeholders to know their information needs and secondary data was gathered on OA researches. Result of the study revealed that 46 projects were implemented and most of the researches conducted were on production aspect. Highest percentage (34%) recorded in terms of information needs of the stakeholders were on demand and supply. Research gaps identified were absence of a whole research chain on organic agriculture for a specific

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commodity, lack of a research with component on developing a centralized, web-based information system, and inadequate research on policy and governance on OA. While considerable effort had been done on researches related to organic agriculture, a more focused action research on market opportunities and market knowledge is needed and imperative to ensure the effective and successful implementation of the OA program in the Bicol region. This should be coupled with continued aggressive information dissemination campaign to firm up appreciation and strengthen awareness of stakeholders on organic agriculture.

*Keywords: Organic agriculture; organic farming; organic growers; research; development.*

## 1. INTRODUCTION

The Philippine agriculture contributes 17 percent to the country's gross domestic product, employing 33 percent of the country's labor force. Agricultural commodities such as rice (*Oryza sativa*) and corn (*Zea mays*) production for 2015 were lower by 4.31% and 3.24%, respectively, compared to the 2014 levels. The decline was attributed to the reduced hectares and yield brought about by insufficient water supply, dry spell/drought, and adverse effects of typhoons [1]. In a similar report [2], it stated that this sector accounts for more than half or an estimated 66 percent of the country's poorest. The deteriorating condition of the environment has contributed to increasing vulnerability of the agriculture sector particularly to extreme weather condition. Pre-dominance of chemical-intensive farming has contributed to at least 33 percent of the country's greenhouse gas emissions.

In the Bicol region, intensive use of chemical fertilizers has caused high acidity in paddy fields. Farmers had to increase the amount of chemical fertilizer in order to secure certain yield. Thus the inputs of chemical fertilizers have increased over time causing further acidity of soil and soil erosion [3]. In the rice industry, conventional method of farming requires chemical fertilizers, pesticides and herbicides. Though touted for its high yields, this production system is believed to enhance soil degradation, pollution, chemical residues in food and loss in biodiversity [4]. It also intensifies the farm household's actual and physiological burden on high-cash capital expenses [5]. With the multitude of adverse impacts of conventional agriculture and the pressing problems facing the agriculture sector, it is essential to push for the implementation of alternative method such as organic agriculture. Organic agriculture is pushed by various sectors in Bicol and it is spearheaded by the Department of Agriculture (DA). In fact, the DA established within the vast agricultural property that the Pecuaría Development Cooperative Inc. (PDCI)

is tending in Barangay Lanipga, Bula, Camarines Sur the one-hectare demonstration farm has been planted to organic and aromatic rice varieties called JM2 and Basmati [6].

Hence, the signing of Republic Act No. 10068 known as the Philippine Organic Agriculture Act, on June 16, 2012 was considered by many as a landmark legislation which provided for the development and promotion of OA in the Philippines. It is a culmination of long years of development efforts mostly by non-government, community based organizations and private groups pushing for agriculture sector reforms around ecologically sustainable, environment friendly and safer production systems, availability of safer and more nutritious staples and food and increased farm productivity and income opportunities for Filipino farmers [7].

The attributes of organic agriculture is indeed, favorable to the community and environment. Because of this, there had been a growing concern to strengthen organic agriculture. For instance, market share of organic and partially organic rice accounts for 0.9 percent of the rice from irrigated land. But the number of adopters has been increasing dramatically [3]. Large scale production of organic crops is now being encouraged during these times when farmers as well as consumers are becoming conscious of the adverse effects of using pesticides and fertilizers in farms.

This growing interest on OA is well supported by some government agencies [8]. In 1997, the Philippines Council for Agriculture, Forestry, Fisheries and Natural Resources Research and Development (PCARRD) sponsored a national consultation workshop on OA where speakers among organic producers in the private sector and members of International Federation of Organic Agriculture Movements (IFOAM) were invited to interact with government researchers. PCARRD is just one of the many organizations which had shown interest and generated

voluminous information on OA which need to be gathered and made available systematically to OA stakeholders.

While organic farming is definitely creating waves in the agriculture sector, there are setbacks which had been initially identified in its implementation. In a research study conducted [9], several issues were noted that cause problems for the advancement of research in organic agriculture. One of them is absence of networks by researchers in organic agriculture. Other concerns were the present structure of research funding; the different requirements in organic agriculture leading to rather expensive research; lack of a united front by the organic sector; relative lack of good researchers and inadequate structure to foster them (by good supervision of potential researchers and peer review); and lack of policies which encourage research in organic agriculture directly or indirectly.

These setbacks should not become the reason for researchers to discontinue and be disenchanted on OA. Bicol Region, Philippines which is the location of this study has great potentials for organic agriculture. The region's total agricultural area is 891, 955 hectares, and 5% of this is targeted to be utilized for organic agriculture. Report revealed that seventy-four percent (74%) of organic rice production and 44% of the country's over-all production of other organic crops come from Bicol region [10].

The platform for OA implementation is indeed, very promising. However, a dearth of information on consumer/market demand, input resources, commodity pricing, R & D interventions and other relevant information on organic products in particular and organic agriculture in general has been identified. Access to these information is limited and more often than not, unavailable and incomplete. It is therefore, crucial to assess the available information on organic agriculture vis-a-vis the information needs of farmers and other stakeholders hence, this study.

## 2. METHODOLOGY

A survey was conducted to gather data needs and information from organic agriculture stakeholders. The place of study is in Bicol Region, Philippines (Fig. 1). A total of 149 respondents were selected using purposive sampling. The list of farmers who are practicing organic farming was taken from the Department

of Agriculture and government employees who are directly involved in the implementation of OA from the same institution were also taken as respondents. A pre-tested survey-questionnaire was prepared for this purpose and questions on the communication media preferred by farmers and other stakeholders in disseminating OA information were likewise included. Faculty-researchers from an agricultural university who are conducting OA-related research and development projects were also interviewed to validate the secondary data gathered from the field as well as determine the R & D projects being implemented relative to organic agriculture.

An inventory of R & D initiatives and projects on organic agriculture was also conducted. Secondary data was gathered from educational institutions, agencies, non-government organizations (NGOs) and private organizations. Data gathered was categorized in terms of profiling, production, marketing, promotion and processing of OA products. Descriptive-evaluative method was used in discussing the profile of the respondent. Frequency counts, ranking and percentages were used to determine the information needs of the stakeholders, preferred communication media and the trend of R & D projects being conducted in the region.



Fig. 1. Map showing the location of the project site, Bicol Region, Philippines

## 3. RESULTS AND DISCUSSION

Table 1 shows the respondents' profile from the four provinces in the Bicol Region. Sixty (60) percent and 40% of the respondents are males

and females, respectively. Majority of the respondents (30%) belong to age 51-60 years old, 25% with age range 31-40 years old, 20% and 19% belong to ages 61-70 and 41-50 years old, respectively. In terms of occupation, about half of them (60%) are farmers and the remaining respondents are either government employees or researchers/teachers in an agricultural university.

**Table 1. Demographic profile of respondents**

	Number	%
<b>A. Sex</b>		
Male	89	60
Female	60	40
Total	149	100
<b>B. Age</b>		
71 – above	2	1
61-70	30	20
51-60	45	30
41-50	28	19
31-40	37	25
Below 30	7	5
Total	149	100
<b>C. Occupation</b>		
Farmers	89	60
LGU/Govt. employee	51	34
Others	9	6
Total	149	100

Fifty three percent of the respondents come from the province of Camarines Sur and the rest come from Camarines Norte, Albay and Masbate (Table 2). The high number of respondents coming from Camarines Sur may be attributed to the big number of farmers and the large agricultural farms in Camarines Sur compared to other provinces. Likewise, The Department of Agriculture is situated in this province hence, more respondents were taken from this office. These respondents are involved either directly or indirectly in organic farming activities. Likewise, results revealed that the highest percentage (34%) recorded in terms of information needs of the stakeholders was on demand and supply (Table 3). Respondents revealed that they are willing to adopt organic farming but the problem is, they do not have the information where lies the great demand for organic produce in the region. Majority of them are growing organic products for their own local consumption or if there is an excess, they just sell it to the nearby market. Given this scenario, they cannot dictate higher price and are forced to sell based on what is prevailing in the market.

**Table 2. Distribution of respondents by Province**

Province	Number	Percent
Camarines Sur	79	53
Camarines Norte	25	17
Albay	24	16
Masbate	21	14
Total	149	100

**Table 3. Information needs of stakeholders in organic agriculture**

Category/Aspect	Total	%
A. Production	37	25
B. Marketing	46	31
C. Demand and supply	51	34
D. Profile of stakeholders	15	10
Total	149	100

An in-depth analysis on the result revealed that majority of the respondents whose needs on information were on demand and supply and marketing whereas the local government unit (LGU) officials/government employees' focus and concern was more on the production side. This may be due to the fact that some of them are old already and establishing an organic farm may be one of their options upon retirement. Market for organic products is not yet stable and therefore, there is not sufficient guarantee that farmers' produce can be disposed within a particular period of time. It is therefore, essential to carefully consider product stabilization in order for farmers to secure their source of income. This is further supported by the report that product stabilization with enough technical support and farmers' education and appropriate marketing system for organic rice are necessary for the development of organic farming in the Philippines [3]. Likewise, markets, not production, increasingly drive agricultural development. Value addition & product differentiation is becoming increasingly important to ensure increase in income, reducing malnutrition/poverty and for competing in the global market. This is further supported by a study in 2009 wherein it revealed that before beginning cultivation of organic crops, their marketability at a premium price over the traditional and modern produce has to be assured. Inability to obtain a premium price, at least during the period required to achieve the productivity levels of the conventional crop is a setback in Nepal [11]. High prices of these products remain a major deterrent for consumers.

In addition to this, there is high possibility of organic produce to get spoiled and rotten especially if there is no proper post-harvest facilities available to farmers. Some farmers aired their predicament on this matter. While they want to plant and produce more organically grown products, inadequacy if not absence of storage facilities remain to be a major problem. Infrastructure must be readily available to sustain the desire of farmers for organic products. This is also supported by a study emphasizing that the growth of organic agriculture requires producers' and consumers' awareness and availability of sound infrastructures [11].

Focus should not only be given to marketing of products but policy implementation should be carefully considered as well. In a previous study, it emphasized the interconnectedness of the various stakeholders of organic agriculture which includes farmers themselves, the retailers/marketers / merchandisers, and finally the consumers [12]. According to them, all these sectors must be given due attention in the crafting of the law for organic agriculture. Institutionalizing organic farming is making organic agriculture as the mode of farming which can be a good agenda yet may come as a very costly policy as it will alter the socio-economic conditions of the farmers, while local demand for organic foods may not grow in the same proportion as the production of organic foods itself. Likewise, a firm network/partnership between the local government units (LGUs) and academic institution should be given due consideration. This was the findings of a previous study which posits that proactive roles of LGU and academic institutions can be a potent force to stimulate farmers to adopt a new crop and the technology that comes with it [13].

On one hand, the least identified information needs of OA stakeholders were on the need for profile of experts/researchers which only recorded 10%. Respondents preferred that information on OA be disseminated through broadcast media and fora/symposia which got the highest percentages of 34% and 28%, respectively (Table 4). This is understandable considering that the use of radio and its presence in every family is a necessity and not a luxury. Farmers who reside even in far-flung areas can get news and avail of important information through radio. Regardless of the age of the farmer, radio is also an effective means of communication channel.

The need for information on OA cannot be overemphasized. The knowledge of the principles and techniques of organic agriculture is just as important as the communication media to where it will be disseminated. If developing a quality organic agriculture sector is the target of the region, then, production of information and education materials should also become an integral part of the OA program. This will result to an increase in knowledge of all stakeholders and will result to the ultimate development of the OA industry.

**Table 4. Preferred communication media on organic agriculture**

Communication media	Total	%
A. Online/Internet	33	15
B. Broadcast (Television/Radio)	75	34
C. Print (Newspapers, Magazines/Flyers/Brochures)	36	17
D. Fora/Conferences/Symposia	62	28
E. Others (Cellphone)	14	6
Total	220	100

In other countries, the role of media in enticing farmers to turn to organic agriculture is also very crucial. For instance, production of training manuals and making them accessible to farmers is a welcome step towards their appreciation of organic farming. A leading research institute in Europe named the Switzerland's Research Institute of Organic Agriculture (FiBL) prepared an African Organic Agriculture Training Manual to improve access of African farmers to markets, especially to the organic market [14]. Organizations involved in training in organic and sustainable agriculture are invited to use the new training materials and contribute to their further improvement. Likewise, a study in Bangladesh noted that media (both electronic-television and radio and print-newspapers) play important roles in increasing awareness of farmers and consumers [15]. Similarly, in China, most organic food production is managed by smallholder farmer organizations which are not well organized and managed. Most of the farmers do not understand the essence of organic production. They only know that no chemical inputs are allowed in organic production and the economic aspects attract them to cooperate with the companies [16]. Given this scenario, the role of media in making the farmers appreciate better organic farming is likewise, very important. Also, there is a popular perception in the world about "good farming" that is extremely emotionalized (the feelings of the topic and the aspects shown)

and romanticized and the media and advertisements play a major role [17].

In this study, a total of 46 R & D projects were identified. Table 5 shows the trend and priority list of OA R & D projects conducted based on commodity system flow. Most of the researches conducted were on production aspect which included studies on cropping system, crop improvement, soil, pest management, weed control, productivity performance of organic crops grown such as rice, sweet sorghum, lettuce, stevia. Funding of projects generally comes from the Department of Agriculture and DA – Bureau of Agricultural Research and academic institutions. Market research should always be given primary attention in any systems analysis conducted, be it in agriculture or non-agriculture based products. Marketing of products is always a critical issue and strengthening of production-market linkage such as in fishery-based livelihood projects is also recommended [18].

**Table 5. Organic agriculture R & D projects, Bicol Region, Philippines**

Systems flow	Number	%
A. Production	25	54
B. Marketing		
Demand and supply	4	9
Promotion	5	11
Profile of OA stakeholders	4	9
C. Processing	8	17
Total	46	100

In a similar fashion, the development of organic farming in Korea focused on projects that aimed at gaining economic benefits from producing organic products with high value-added tax, limit to the maximum the use of chemical complex including chemical fertilizer and agrochemicals to protect and improve the agricultural ecology and sustainably develop the agricultural production [19]. Furthermore, a project report stated that cropping systems & crops have the overwhelming majority of projects in the United Kingdom, funding and intensity of research [20]. Livestock systems & livestock follow this. These two production orientated topics are followed by information & dissemination and soil & nutrient cycling. The other topics receive considerably less resources, with environment, sustainability & conservation having relatively few expensive and long running projects, resulting in much lower research intensity.

While Bicol region has considerable number of OA R & D projects being implemented and funded by national and international institutions, there seems to be a missing link in terms of its adoption by OA stakeholders. Research institutions and agricultural universities are poured over with financial support to conduct OA-related programs and projects as can be gleaned from the number of research initiatives and yet, a glaring question that may be asked is its applicability. This seemingly incongruent match stems from the inadequate baseline data from stakeholders regarding their real needs on OA. Likewise, majority of the farmers are still dependent on their indigenous knowledge on farming and that which can give them immediate cash for their families. As a result, some of them would veer away from OA technology and still hold on to what they had been practicing in their farms. It is therefore, crucial that a more aggressive information dissemination of OA technology be conducted to increase awareness of stakeholders and the potential of OA to increase their fiscal resources in the long run.

Likewise, more researches were conducted focusing on the production aspect of OA. The information generated out of these are very useful to farmers however, their primary concern is how to get their products out of the farm and turn them into cash. In other words, they would prefer information related to marketing and the provision of market knowledge that will assure them that indeed, organic farming is a better alternative for the farm families.

Based on the above data gathered, additional researchable areas and research gaps were identified:

1. A whole research chain on organic agriculture which will include inputs, production, marketing, processing and support mechanism for OA.
2. While there are numerous researches which are location-specific (i.e. municipality or province), these information are difficult to access by other stakeholders. A research with a component on developing a centralized, web-based information system is essential.
3. A research on policy and governance on OA assessing the ability of the policy-makers and local government officials to implement them at the local and regional level.

Likewise, the following strategies to improve policy implementation are hereby recommended:

1. Intensification of R & D initiatives which will extend through the whole research chain putting more focus along the areas of market opportunities and market knowledge.
2. Conduct of research on governance, policy processes as it relates to the implementation of organic agriculture program.
3. Continuance of inventory, survey and mapping of relevant information on organic agriculture which is crucial in the data content build-up of a centralized organic agriculture database/information system at the regional and national level. This can strengthen marketing of organic products and facilitate access of information on organic farming and agriculture.
4. Establishment of an on-farm research in order to generate more information for organic farmers
5. Enhancement of financial support from institutions such as the Department of Agriculture (DA) and Department of Agriculture-Bureau of Agricultural Research (DA-BAR) for the conduct of researches on market and processing of organic products
6. Intensification of information dissemination campaign and awareness on organic agriculture using broadcast and print media and the conduct of fora/symposia that will serve as a good venue for information exchange among OA stakeholders.

#### **4. CONCLUSION AND RECOMMENDATIONS**

There is voluminous information available regarding organic agriculture research and development initiatives locally and globally. Likewise, a considerable number of research initiatives on OA is being conducted at the regional level and most of these focused on the production aspect of organic crops. On the other hand, the information needs of OA stakeholders which need priority attention are on marketing aspect especially on the demand and supply side of OA products. Likewise, the preferred communication media for disseminating this information is through conduct of fora and symposia and through broadcast media, either by radio or television.

While considerable effort had been done on researches related to organic agriculture, a more focused action research on market opportunities and market knowledge is needed and imperative to ensure the effective and successful implementation of the OA program in the Bicol region. This should be coupled with continued aggressive information dissemination campaign to firm up appreciation and strengthen awareness of stakeholders on organic agriculture.

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#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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