Research article

Information Transfer among Mango Contractors: Sources, Channels, and Priorities

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Abstract Information transfer is vital in improving knowledge and proper technology implementation, especially in agriculture. This paper aimed to describe the information system among the Pangasinan mango contractors. Specifically, it aimed to 1) identify the sources of information for the mango contractors, 2) determine information channels for information transfer, 3) establish the type of information that mango contractors prioritize, 4) determine the challenges and issues in the transfer of information, and 5) recommend interventions to improve information transfer among mango contractors. The study area is Pangasinan, Philippines, the country's top mango-producing province. The research used a purposive sampling of 55 mango contractors covering six mango-producing municipalities. Descriptive statistics and correspondence analyses were employed in the study. Results showed that most mango contractors generally receive information on the production and marketing of mangoes from farm technicians and buyers. They usually get information on production technologies from farm technicians and other mango contractors. Expectedly, they get their information on mango marketing from their buyers. On the other hand, information transfer usually happens through mobile phones and during farmers' meetings. Furthermore, contractors prefer to get information on the buying price of mangoes, followed by the quality requirements of buyers. Contractors also choose to have a face-to-face conversation when obtaining information. The next preference is through text and calls using mobile phones. In summary, mango contractors still prefer the traditional information system through face-to-face conversations, text, and mobile phone calls. This has implications for the implementation of modern technologies used for information dissemination. Mango contractors might not be receptive to new ways of receiving communication, even if the information might be urgent or essential. It is recommended that contractors be trained to use modern communication technologies to make them more receptive to other communication channels.

Keywords information transfer, correspondence analysis, mango contractors, communications

INTRODUCTION

Communication within the commodity system is an invaluable component that is often overlooked. Most of the time, people focus much on production technologies or market development. However, new developments in production technologies and discovering new market opportunities will not matter if this information is not adequately communicated along the value chain. Players in the chain cannot act on the latest developments if they do not know there are new developments. For example, Indian agriculture is plagued by insufficiency and inefficiencies in conveying pertinent information to the farming industry, not a lack of technology or R and D activities. While Indian agriculture has flourishing technologies that can help their farmers, they can still improve the communication of such technologies to the farmers. This disconnect can be the key to further development of their agricultural sector. Therefore, developing agriculture's information and communication technology (ICT) can catalyze the sector's growth (Behera et al., 2015).

Agricultural information is an essential element that interacts with other production factors like land, labor, capital, and management competence. The availability of pertinent, trustworthy, and beneficial knowledge and information can arguably increase the productivity of these other components. To enable farmers to make better decisions, take advantage of market possibilities, and manage ongoing changes in their production systems, agricultural organizations have handled the information supplied by extension, research, education, and others (DEMİrYÜrEK, 2010). Vidanapathirana (2012) cited Maningas et al. (2000) and found that having information in the hands of farmers leads to their empowerment by giving them control over their resources and decision-making procedures. They pointed out that a system for delivering vital information and technological services effectively and efficiently aids the clients' crucial role in decision-making for better agricultural production, processing, trading, and marketing. Therefore, to manage and enhance specific agricultural information systems, it is necessary to understand how they work.

Attention should be given to the provision of education and training on the implementation of joint technologies and their combined impact on farms since it was discovered that education and information availability were among the factors influencing the adoption of multiple technologies (Toma et al., 2018). Proper channels for information transfer also play a critical role in technology transfer. Farmers can learn about agricultural topics from various sources, including extension services, the media, other farmers, input suppliers, etc. (Adhiguru et al., 2009). Thus, looking at the details surrounding the information system within a value chain is imperative. Likewise, Sugiarti et al. designed an e-commerce information system for mango in 2019. However, the one that they built was just for one enterprise. The authors conducted meetings directed toward the store's owners and representatives. The prepared documentation became the basis of the design of the e-commerce information system. On the other hand, Vanany et al. (2016) developed an electronic traceability system for mango in Indonesia. The abovementioned research tackled one case study with one supply chain network. They mentioned the difficulty in delivering accurate information in Indonesia regarding traceability. They recognize the importance of quality information primarily for the global market. These pieces of literature mainly focus on the role of ICT, not just in the mango industry and the agriculture sector in different countries. It shows the importance of holds and catalyzes an industry's growth. It also emphasizes how crucial the transfer of information is for the sector.

Table 1 Historical performance of mango (2000-2020)

Year	Production		Area		Yield / unit area		Yield / tree	
	Metric ton (Mt)	Growth rate (%)	Hectare	Growth rate (%)	In Mt/ha	Growth rate (%)	kg/tree	Growth rate (%)
2000-2009	925,247	-0.70	163,106	3.90	5.70	-4.50	No data available	No data available
2010-2020	793,296	-0.93	187,530	-0.14	4.20	-0.80	86.10	-2.10
2016-2020	747,987	-2.30	186,630	-0.14	4.00	-0.94	78.40	-2.20

Source: DA, 2022

On the other hand, the Philippine mango industry's performance has declined these past few years for several reasons. One of the primary reasons is the pest infestation from Cecid flies and Fruit flies. Other problems beset the industry include the following: 1) high cost of inputs/production cost; 2) improper farm practices/excessive use of chemicals; 3) lack of economies of scale; 4) production seasonality; 5) unproductive mango trees; 6) prevalence of infestation and diseases; 7) limited access to information and technologies; 8) high post-harvest losses; 9) inadequate/limited post-harvest and processing facilities; 10) limited access to resources and direct market, 11) unstable supply and prices, 12) multi-layer marketing, and 13) difficulty in accessing export markets (DA, 2022). For the past two decades, mango production has been going down for the following parameters: production, area of production, productivity per area, and productivity per tree. These pieces of information can be found in Table 1.

Despite these challenges, mango remains to be the third most highly exported fruit crop in 2020, with a PhP 35.520B ($716.019M) contribution to GVA in agriculture (Department of Agriculture (DA), 2022). This shows that mango is still one of the top-priority commodities in the country. Furthermore, this commodity system should be studied further to help improve its economic performance.

This study builds on the existing literature and analyzes the transfer of information among the mango contractors in the study area. It delves into the sources of information and channels of information transfer as well as the priorities of mango contractors regarding the information they need and the mode of information transfer.

OBJECTIVE

This paper aimed to describe the information system among the Pangasinan mango contractors. Specifically, it aimed to 1) identify the sources of information for the mango contractors, 2) determine information channels for information transfer, 3) establish the type of information that mango contractors prioritize, 4) determine the challenges and issues in the transfer of information, and 5) recommend interventions to improve information transfer among mango contractors.

METHODOLOGY

The study area for the research is Pangasinan since it is the top mango-producing province in the country, contributing about 29% of the total production in 2020 (DA, 2022). It is also strategically located since its climatic conditions and soil types are ideal for mango production (dela Cruz, 2007). Furthermore, it has developed road networks that make it accessible to processors and exporters in Metro Manila.

The primary data were collected through key informant interviews and surveys on the players. Key informants such as employees from the Office of the Provincial Agriculturist of Pangasinan, mango experts from the academe, and other mango players from other provinces were interviewed during the research. This provided a different perspective outside of the Pangasinan mango industry. On the other hand, structured questionnaires were employed for the survey on the mango players, which includes sections for the demographic profile, farm profile, production and marketing practices, sources and type of information, and channels of the information channel. The research also used purposive sampling on 55 mango contractors covering six mango-producing municipalities ranging from small to large-scale operators. Unfortunately, there is no list of mango contractors since they are considered transient players in the industry. Some mango contractors do not regularly operate annually, especially if they do not have enough capital to finance their operations. As a result, the researchers had to interview known mango contractors in the area and get recommendations from these contractors on who could be interviewed.

Secondary data were collected from online journals and online portals of the DA. Descriptive statistics and correspondence analyses were also employed in the study. This determines the association between and among the variables, such as sources, types, and information channels. XLSTAT was used to run the correspondence analysis for this research.

RESULTS AND DISCUSSION

Most mango contractors live in San Carlos City (50.91%) and Malasiqui (30.91%) since most of the mangoes come from these municipalities. On average, mango contractors who were interviewed were aged 49.48 years. The oldest who was interviewed was aged 69, while the youngest was 29 years old. On the other hand, the interviewed mango contractors are highly educated, with about 41.82% being college graduates and approximately 29.09% being high school graduates.

In terms of farming (generally), these contractors have been farming for an average of 23.18 years. However, some of them just shifted from general agriculture to mango farming specifically. On average, they have been mango farming for about 19.64 years. Approximately 38.18% (21 contractors) operate at a medium-scale (500-3,000 fruit-bearing trees or FBTs), while 32.73 (18 contractors) operate at a small-scale (less than 500 FBTs) and about 29.09% (16 contractors) operate at a large-scale (more than 3,000 FBTs).

Sources of Information

The results (Fig. 1) showed that most mango contractors generally receive information on the production and marketing of mangoes from farm technicians and buyers. They usually get information on production technologies from farm technicians and other mango contractors. Expectedly, they get their market information (price, volume, and quality specifications) from their buyers. As the computed p-value is lower than the significance level alpha=0.05, there is a link between the type of information that mango contractors and sources of information as shown in Table 2. Logically, farm technicians and other mango contractors provide production technology information. With an Eigenvalue of 100%, it can be said that the quality of the analysis is very high (shown in Table 3).

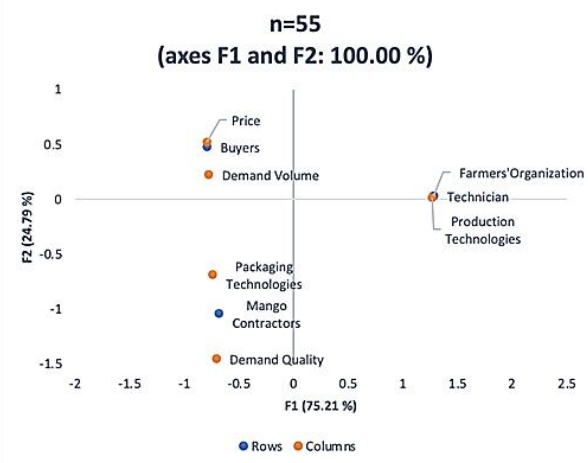

Fig. 1 Graphical representation on sources of information

Table 2 Test of independence between type of information and sources of information

Chi-square (observed value)	174.116
Chi-square (critical value)	21.026
DF	12
p-value	< 0.0001
alpha	0.05

Table 3 Eigenvalues and percentages of inertia

	F1	F2
Eigenvalue	0.970	0.320
Inertia (%)	75.207	24.793
Cumulative %	75.207	100.000

Information Channels

On the other hand, information transfer usually happens through mobile phones and during farmers' meetings (Fig. 2). Farm technicians generally hold round table discussions with contractors to show them new technologies for better mango production. On the other hand, They usually get their market information from their buyers through their mobile phones. As the computed p-value is lower than the significance level alpha=0.05, there is a link between the sources of information that mango contractors get and the information channel as shown in Table 4. Thus, these mango contractors getting their production technology information during farmers' meetings provided by farm technicians is logical. Also, since the buyers are primarily located in Manila, it would be logical for them just to use mobile phones in their transactions. With an Eigenvalue of 100%, it can be said that the quality of the analysis is very high (shown in Table 5).

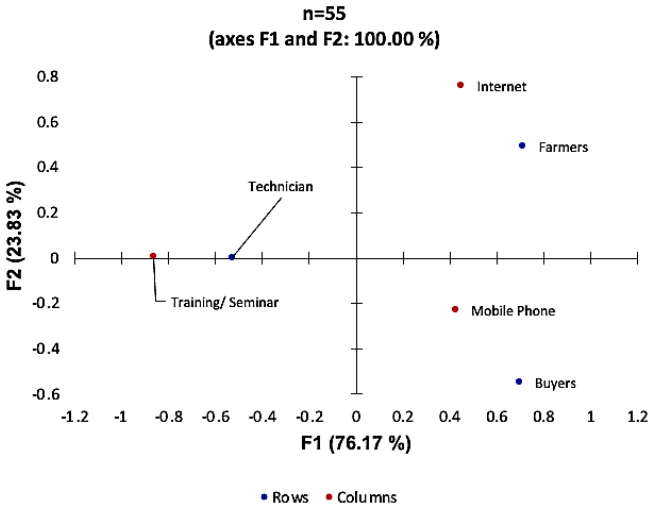

Fig. 2 Graphical representation on information channels

Table 4 Test of Independence between sources of information and information channel

Chi-square (observed value)	54.4160
Chi-square (critical value)	9.4880
DF	4.0000
p-value	< 0.0001
alpha	0.0500

Table 5 Eigenvalues and percentages of inertia

	F1	F2
Eigenvalue	0.370	0.116
Inertia (%)	76.166	23.834
Cumulative %	76.166	100.000

Priority Information

Based on the results (Fig. 3), mango contractors prioritize getting market information like price, demand quality, and demand volume, ranked 1, 2, and 3, respectively. It is followed by production processing and packaging technologies, ranked 4, 5, and 6, respectively. As the computed p-value is lower than the significance level alpha=0.05, there is a link between the rank and the type of information (shown in Table 6). Earning good money is crucial to mango contractors since their production has been low these past few years. Thus, the ranking that mango contractors gave the market information is logical. With an Eigenvalue of 87.24%, it can be said that the quality of the analysis is high as shown in Table 7.

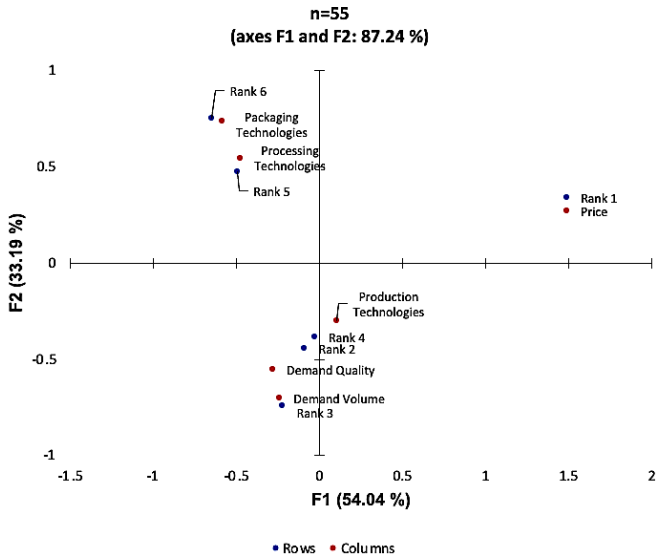

Fig. 3 Graphical representation on priority information

Table 6 Test of Independence between ranking and priority information

Chi-square (Observed value)	298.3640
Chi-square (Critical value)	37.6520
DF	25.0000
p-value	<0.0001
alpha	0.0500

Table 7 Eigenvalues and percentages of inertia

	F1	F2	F3	F4	F5
Eigenvalue	0.489	0.300	0.099	0.016	0.001
Inertia (%)	54.041	33.194	10.898	1.776	0.091
Cumulative %	54.041	87.235	98.133	99.909	100.000

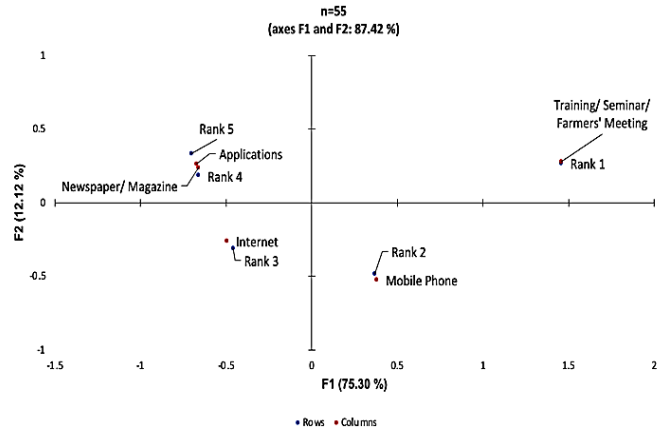

Fig. 4 Graphical representation on priority information channel

Priority Information Channel

Contractors also choose to converse face-to-face when obtaining information (Fig. 4). The next preference is through text and calls using mobile phones. As the computed p-value is lower than the significance level alpha=0.05, there is a link between the rank and the type of information channel

(shown in Table 8). Mango contractors are pretty old-fashioned when it comes to communication. They prefer more traditional tracks of information transfer. Furthermore, farmers' meeting is also an excellent venue to socialize and catch up among the mango contractors since most are friends and relatives. They do not prefer using the internet or applications since they do not have Android or smartphones and are reluctant to learn to use these gadgets. With an Eigenvalue of 87.42%, it can be said that the quality of the analysis is high as shown in Table 9.

Table 8 Test of independence between ranking and priority information channel

Chi-square (Observed value)	248.000
Chi-square (Critical value)	26.2960
DF	16.0000
p-value	< 0.0001
alpha	0.0500

Table 9 Eigenvalues and percentages of inertia

	F1	F2	F3	F4
Eigenvalue	0.679	0.109	0.101	0.012
Inertia (%)	75.301	12.119	11.237	1.343
Cumulative %	75.301	87.420	98.657	100.000

CONCLUSION

In summary, most mango contractors generally receive information on the production and marketing of mangoes from farm technicians and buyers. Furthermore, information transfer usually happens through mobile phones and during farmers' meetings. Moreover, contractors prefer to get information on the buying price of mangoes, followed by the quality requirements of buyers. Mango contractors also prioritize getting market information like price, demand quality, and volume. Contractors also choose to have a face-to-face conversation when obtaining information, followed by text and mobile phone calls. Mango contractors currently get information through traditional means since they value social interaction with their colleagues in the industry. Even with the aid of technology, the contractors also appreciate personal touches like having conversations through calls and texts.

Furthermore, most mango contractors still prefer the more traditional information system through face-to-face conversations, text, and mobile phone calls. This has implications for the implementation of modern technologies used for information dissemination. Mango contractors might not be receptive to new ways of receiving communication. However, it seems like social networks are essential to these contractors. It is recommended that contractors be trained to use modern communication technologies to make them more receptive to other communication channels.

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