



INDIGENOUS KNOWLEDGE AND SUSTAINABLE DEVELOPMENT



Editors:
Tom Kwanya, Peter Matu

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The Technical University of Kenya • Nairobi, Kenya

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20. Effective Communication Strategies for Dissemination of Integrated Soil Fertility Management Practices Among Smallholder Farmers in Makueni County, Kenya

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Abstract

Effective communication is critical for the adoption and use of innovations such as agricultural technologies. Despite there being various communication strategies for the dissemination of agricultural technologies such as Integrated Soil Fertility Management (ISFM) practices, choosing an efficient strategy is key towards the diffusion of such technologies, which are essential for improving farmer productivity, contributing to increased food production, and alleviating poverty. The study was conducted in Muvau and Kathonzweni wards in Makueni County, Kenya, to investigate the effectiveness of communication strategies used in disseminating ISFM practices. Using diffusion of innovations theory as the theoretical framework, the study investigated this topic by employing a descriptive survey design. Questionnaires were used to collect data from 368 respondents sampled from two Makueni wards, Muvau and Kathonzweni. Data collected were analysed using SPSS version 22. The study established that the use of indigenous farming practices, such as farm yard manure, crop rotation, animal manure, mixed farming, inorganic fertiliser, and cereal-legume rotation, has led to significant production increases for maize, sorghum, cowpeas, and pigeon peas. The study re-affirms that indigenous knowledge practices play a critical role in enhancing farmer productivity. Indigenous or traditional communication strategies such as face-to-face communication, farmer field schools, and demonstration plots remain the most effective ways of disseminating technologies among smallholder farmers. The study recommends that technology developers, government, and development partners should consider prioritising traditional communication strategies as a means for disseminating agricultural technologies to farmers, a sure way to spur adoption and use for increased food productivity needed to fight food insecurity and poverty.

Keywords: *Indigenous knowledge, food security, integrated soil fertility management, improving farmer productivity, farming technologies*

1 Introduction

Agriculture remains the major contributor to the economies of many countries in sub-Saharan Africa (SSA) (OECD, 2016). Agriculture contributes 60% of the total labour force, 20% of the total exports and 17% of the Gross Domestic Product (GDP) for many countries south of the Sahara. Food production in Sub-Saharan Africa (SSA) has been dropping, particularly among smallholder farmers. The decline in production has been attributed to a number of factors, the key among them being the drop in soil quality and fertility (Odunga, 2019; Wawire et al., 2021). To restore agricultural productivity, various actors in the agricultural sector have come up with a range of strategies aimed at recreating soil fertility to enhance production potential. Since the late 1990s and early 2000s, the Kenyan government has implemented various macroeconomic, sectorial, and institutional reforms earmarked to result in high and sustainable economic

growth, the realisation of food security, and enormous poverty reduction. The government has introduced a number of initiatives aimed at boosting farmers' yields and steering the country on the path of becoming food secure. Through its various departments and working in collaboration with development partners, the government has advocated for the implementation of a number of innovative agricultural practices amongst various farming communities.

The government has advocated for the adoption and use of emerging technologies and innovations aimed at reversing this declining trend in production, as was documented in the National Agricultural Soil Management Policy (2020). Integrated Soil Fertility Management (ISFM) practices have explicitly been promoted by the Government of Kenya through the Ministry of Agriculture, Science and Technology and the Kenya Agricultural Research Institute (KARI) working closely with like-minded organisations such as the Alliance for a Green Revolution in Africa (AGRA); Tropical Soil Biology and Fertility Institute of the International Centre for Tropical Agriculture (TSBF-CIAT); and the International Centre for Research in Agro-forestry (ICRAF), to address the low food production menace faced by smallholder farmers spread across the country. ISFM advocates for the strategic use of fertilisers, organic and inorganic inputs and improved crop varieties, combined with the knowledge of how to adapt these practices to local conditions to maximise agronomic use efficiency of the applied inputs (Vanlauwe et al., 2013).

ISFM practices have been promoted for over seven years now, but the expected increase in production amongst farmers still has not matched up. Successful use and adoption of innovations require that appropriate strategies are put in place to transfer these knowledge and skills. This calls for practical communication approaches to be deployed by the technology developers. The development of these innovations is just part of the solution and is a critical starting point to realising gains in the sector. Ensuring that innovations like ISFM are widely and easily accessible and available to the end users is as critical in ensuring that the end goal is achieved (Pettengell, 2010). Pettengell (2010) further argues that access to these innovations should not be hampered at all as a result of a lack of information because they are expensive and/or because of intellectual property rights. For a hunger-free world, small-scale farmers who play a critical role in global food security should be placed at the centre of the new emerging investments and innovative partnerships (FAO et al., 2014).

Most agricultural innovations are knowledge-intensive and require more attention in the process of transferring skills. In the case of ISFM practices, an appropriate mechanism or communication approach is needed if the skills are to be transferred, adopted, and put into practice by the farmers. The communication approaches used to matter a lot as they ensure that knowledge and skills are effectively transferred from the developers to the users.

ISFM was introduced in Makueni County in 2006 by the government and development partners and was unveiled as a promising solution to improving farmer productivity. Despite being a promising solution to farmers' low production predicament, ISFM has not yet resulted in improved productivity for many farmers in Africa (Sanginga, 2012). To ensure that this dilemma of effective ISFM knowledge dissemination for improved farmer productivity is addressed, the national planners and development partners need to put effective communication approaches into practice. In the agriculture sector specifically, communication holds an integral place because it provides information that fills the knowledge gaps within the system. There is a dearth of informational knowledge in the farming community with regard to soil health, weather fluctuations, market trends, demand-supply chain practices and government policies. Proper communication channels and tools can directly combat the

information asymmetry for the farmers. The development of newer technology in the field of communication helps impart important news about the latest farming practices and tools that will aid the farmers in understanding what is needed and ultimately increase farm efficiency.

However, problems encountered in transferring improved, well-adapted agricultural technologies from the level of research to the farmer in the field continue to place a severe constraint on agricultural development in most developing countries (Janssen et al., 2017). These problems encompass a series of interrelated issues, such as appropriateness, practicality, dependability, and potential economic viability of improved technologies developed through research in relation to the farmers for which they are intended. Although technology transfer projects address the issue of technology diffusion most directly, coordination and collaborative action with projects and programs affecting other factors, such as those just cited, are essential to the achievement of the technology transfer objective (Abebe et al., 2021).

2 Statement of the problem

Despite efforts by the Kenyan government to ensure that farmers' production improves through investment in research and technological invention, adoption and use of innovations are still very low, whereas poverty and hunger still threaten the lives of many Kenyans. Over 50% of the rural population in Kenya is still living below the poverty line. Even after the various initiatives and efforts that have been supported by development partners working with the government, information from the Kenya Agricultural Research Institute (KARI) shows that a number of viable agricultural technologies that have been developed and advocated for are actually not being used by the farmers. The Government of Kenya and other development partners like AGRA have invested in promoting ISFM practices to farmers as a potential solution to the perennial low food production caused by declining soil fertility. Ukamba Christian Community Services (UCCS) has been supported by the government and a number of development partners, including AGRA, to implement ISFM practices for farmers.

However, most farmers in Makueni, as well as other parts of the country, still experience declining food productivity after about ten years of promoting ISFM practices. Food insecurity is still the order of the day and something that the country still has to grapple with. ISFM practices have been promoted to be perfect in helping to regain soil fertility, resulting in increased yields; hence, there is an urgent need to re-look into what has been happening in the process of transferring ISFM practices to farmers (FAO, 2014). The numbers of these technologies have not translated yet into what has been intended, and worse off, food production by many farmers in Kenya is still way below optimal, signifying a problem in the process of knowledge transfer of ISFM practices.

3 Literature review

The literature review for this study covers themes that are in line with the objectives and looks into previous studies in similar subject matter. This rigorous review contextualised the current study within the broader area of the channel for sharing agricultural technologies and knowledge transfer to smallholder farmers. Communication plays a critical role in technology transfer and is an essential tool for disseminating information to farmers. Communication channels are media that facilitate the transfer of messages from sender to receiver (Mtega, 2021). The information, however, has to be timely, rightly packaged, relevant, and, most importantly, a vital partner in initiatives that involve voluntary change in the behaviour of the targeted group.

In a study that investigated how communication channels are used to increase awareness among researchers, Zaira (2012) observes that the online channels preferred by researchers included blogs, Wiki, Facebook, LinkedIn, and Twitter. The study also reported that offline channels preferred by researchers to create awareness among them include printed materials, magazines, and frequent departmental meetings. Researchers from developed nations, in particular, have been sharing and accessing research data through web-based channels such as data repositories. Several meta-analysis and survey studies have revealed that researchers have been sharing research data by depositing it into data repositories (Adika & Kwanya, 2020).

According to Yahaya and Olajide (2000), the diffusion and adoption of innovations remain the backbone of the expected development in agriculture. The effectiveness of these channels varies depending on a number of factors, including the level of farmer education, complexity of the technology, capacity to adapt and use among farmers, and the period during which dissemination takes place.

4 Conceptual framework

For farmers to be able to adopt ISFM practices, they need to acquire knowledge and skills related to ISFM practices. The knowledge has to be transferred from a particular information source to the farmer. The transfer of information is done through a particular channel. For full adoption, there is a need for complete knowledge dissemination, which is a result of effective knowledge and skills transfer. Effective knowledge transfer needs necessary and appropriate approaches. For the adoption of ISFM practices to occur and lead to the stated benefits, communication remains central, and the approach used is very significant. This framework borrows from the diffusion of innovation model, which states that much interaction needs to occur between technology developers and targeted end users via a specific channel of communication that adopts a given approach. This is as per the Figure 1:

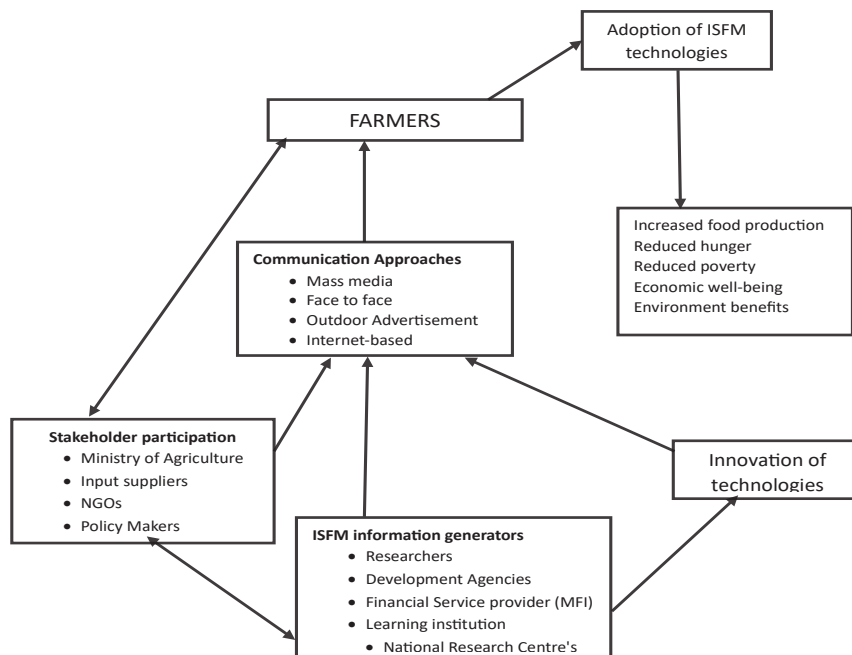


Figure 1: Information transfer conceptual framework

This study was designed to assess communication strategies that are effective in the dissemination of Integrated Soil Fertility Management practices to enhance food production among smallholder farmers in Makueni County, Kenya. Specific study objectives were to identify indigenous farming practices utilised by farmers; to examine the type of ISFM information acquired and used by farmers; to identify the communication approaches used in disseminating ISFM practices to farmers in Makueni County; to assess the effectiveness of communication approaches used; and to establish the challenges faced by farmers in the use of indigenous farming practices.

5 Materials, methods and sampling

This study used a descriptive survey design hailed for its effectiveness in ensuring internal reliability and corroboration of facts and opinions (Orodho, 2009). A survey was done involving farmers enrolled in an ISFM project in Makueni County by the Ukamba Christian Community Services (UCCS) practising ISFM. This study was used to answer the study objectives. The two wards at the time of the study had a total farming population of 9,959 (Muvau -4850 and Kathonzweni -5,109).

A total of 368 respondents participated in the study, which was arrived at using the Krejcie and Morgan (1970) table, which gives a sample size of 368 for a population between 9,000 and 10,000. First, stratified equal proportionate sampling was done to arrive at the two wards, Muvau and Kathonzweni, in Makueni sub-county, Makueni County. After the two strata (wards) were identified, an equal proportionate sampling method was used to arrive at the target 368 respondents, giving each ward an equal amount of 184. To arrive at the 184 respondents in each ward, the snowballing technique was used where the staff of UCCS helped identify the first respondents.

6 Results and discussion

This section presents the results of the study based on the objectives and critical concepts investigated.

Respondents' demographic characteristics

A total of 368 respondents participated in the study. Information about the respondents' main occupations, gender, and farming systems was analysed and presented in Table 1.

Table 1 Respondent's main occupations, distribution by sex, and farming systems

Demographic characteristic	Category	Frequency	Percentage
Profession	Government officer	33	8.9%
	Farmer	328	89.2%
	Student	4	1.1%
	Elected leader	3	.8%
Gender	Male	132	35.8%
	Female	236	64.2%
Household decision maker	Self	292	80.0%
	Other	76	20.0%
Farming	Subsistence	361	98.1%
	Commercial	7	1.9%

Demographic characteristic	Category	Frequency	Percentage
Farm size	Less than 1 acre	26	7.0%
	More than 1 acre	342	93.0%

Source: Field Survey 2022

It was established from the study that the majority of the respondents (89%) were farmers, and this gives a good representation of the farming community, who are the primary target users for ISFM practices. An analysis of the respondents' distribution by gender established that the majority of the respondents were female, accounting for up to 64% of the study respondents. The dominance of female respondents can be easily attributed to socialisation, community culture and societal settings. Traditionally, farming has been left as a reserve for female farmers, especially when it is being done majorly for subsistence, as the majority of the respondents were also subsistence farmers. Regarding their farming systems, 98% of the farmers were subsistence farmers but farming on lands of more than one acre, as reported by 93% of the respondents. Most respondents, comprising 80% of the respondents, made decisions themselves in their households.

The findings on gender distribution and agriculture dominance by gender are in line with the position of the Food and Agriculture Organization, International Fund for Agricultural Development and World Food Programme that the majority of farmers in Africa are actually women (FAO, IFAD and WFP, 2014). They further stated that ensuring a sustainable increase in food productivity will involve lifting the many women locked in traditional farming practices to adopting modern farming techniques.

An analysis was also conducted to determine the age of the respondents involved in the study, with the main aim of finding the age groups that are highly involved in agriculture. The respondents' distribution by age is presented in Figure 2. Age is also a significant factor when it comes to decision-making and, hence, an essential variable for this study.

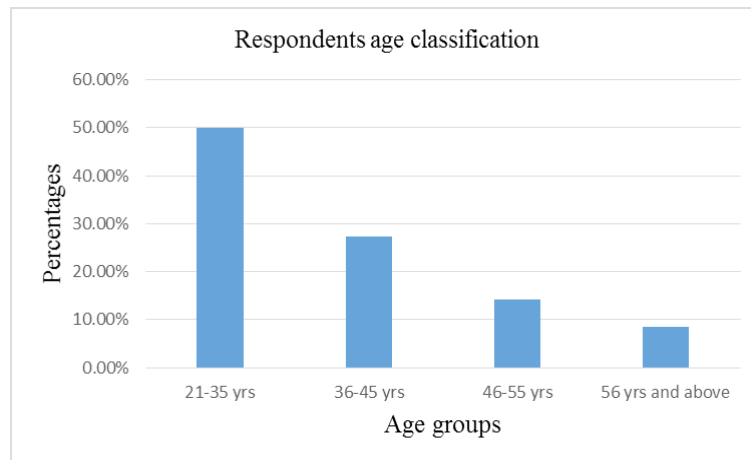


Figure 2: Respondents distribution by age

Source: Field Survey 2022

The majority of the respondents were in the age category of 21-35 years, comprising 50% of the respondents, followed by those in the age category of 36-45 years, comprising 28%. Others, 14% and 9%, were in the age category of 46-55 years and 56 years and above, respectively. This finding shows that the majority of the respondents belonged to the age

groups at which they were able to make independent and informed decisions. This is very necessary when it comes to the adoption and use of agricultural innovations and technologies like ISFM. Most of the respondents for this study were at an ideal age for making decisions on technology adoption and use and were able to make independent decisions regarding farming practices. Most of the farmers had primary and secondary levels of education, comprising 40% and 41% of the respondents, respectively. 9% of the respondents had a tertiary level of education, with 1% having post-graduate education, with the rest having not gone to school at all. This distribution is presented in Figure 3.

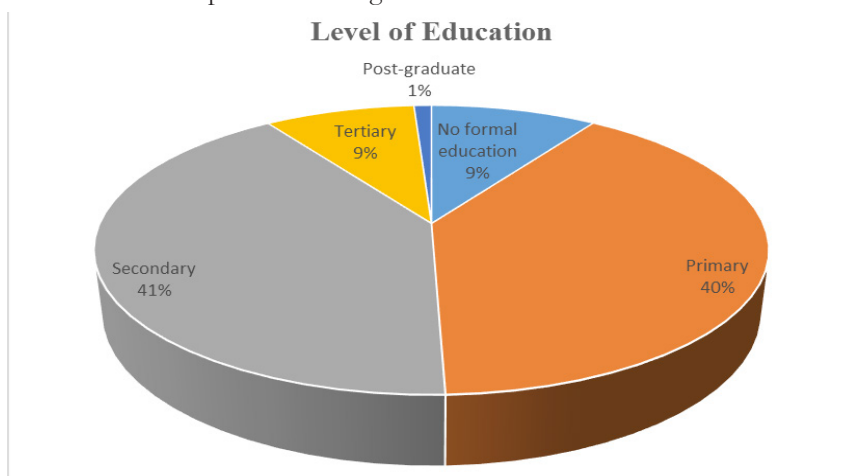


Figure 3: Respondents' levels of education

Source: Field Survey 2022

6.2 Communication approaches used in disseminating ISFM practices to farmers in Makueni County

Agricultural research is the source of knowledge and innovations that propel current and future agricultural development. With the increasing challenges of globalisation, information technology, and international and regional competitiveness, the role of agricultural research as a source of knowledge, technology and innovations has become even more imperative and demanding. Rural farmers play an essential role in Kenyan agriculture. However, there has been a challenge to agricultural extension in Kenya in finding creative, cost-effective and practical ways to communicate agricultural innovations to rural farmers.

6.2.1 Sources of information on ISFM technologies

Of the farmers interviewed, the majority, 23.4% and 21.8%, got information about ISFM technologies from the Ministry of Agricultural Extension Officers and NGOs, respectively. Other sources reported by 14.3%, 13.7%, 13.5%, and 13.2% of the farmers were research institutions, the mass media, farmer cooperatives, and farm input suppliers, respectively, as presented in Figure 4.

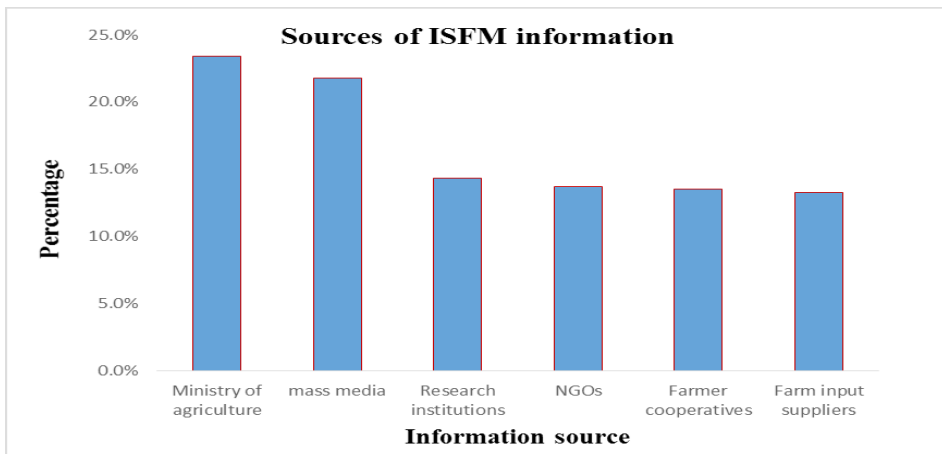


Figure 4: Sources of information on ISFM practices

Source: Field Survey 2022

“I have been farming for long, and the only source of information about farming for me has been extension workers”, said Nduta, a participant at the Focus Group Discussion held in Muvau ward. Contacted, the County Minister of Agriculture for Makueni County, Mr Jacobus Mutuku Kiilu, said, “Most of the farmers in Makueni County prefer getting their information from the farmer field schools, extension workers and development partners like NGOs.”

6.2.2 Channels of information dissemination

From Figure 4 below, a number of channels were identified as being used in disseminating ISFM information to farmers in Makueni County. They include farmer field schools, mobile phones, neighbours and friends, the Internet, on-farm demonstrations, workshops and seminars, radios, and newspapers. The frequency of use differs, as per the Figure 5.

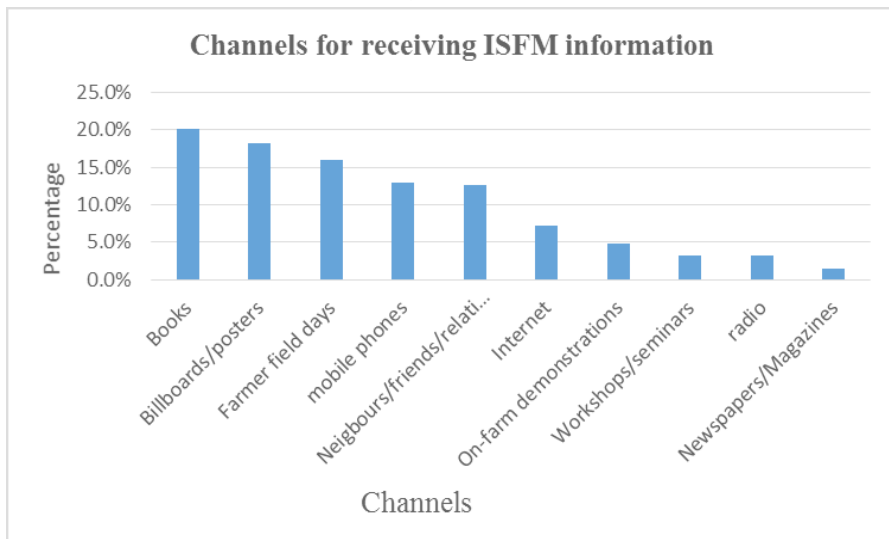


Figure 5: Channels used in disseminating information on ISFM technologies

Source: Field Survey 2022

6.3 Effectiveness of communication approaches used in disseminating ISFM to farmers in Makueni County

To measure the effectiveness of the communication channels, the various channels were rated in terms of accessibility, reliability, preference, informativeness, and comprehensiveness. This was to establish how the identified channels were perceived by the respondents and to establish how they ranked with each other. Responses were analysed and presented in the Figure 6.

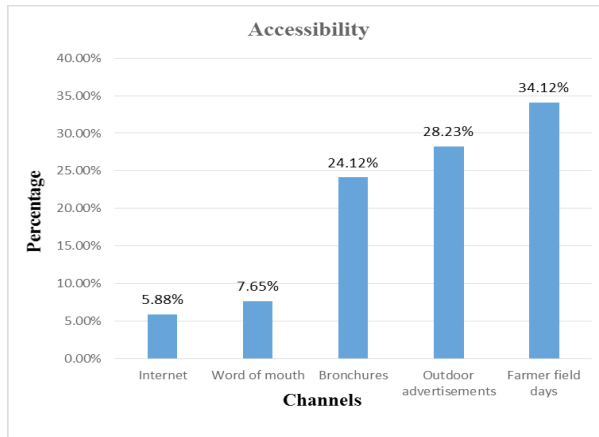


Figure 6: Ranking the channels on accessibility

Source: Field Survey 2022

Figure 6 above represents the analysis of the accessibility of communications channels used in disseminating ISFM information in Makueni County. The respondents ranked farmer field days as the most accessible, followed by brochures. Posters and billboards were rated as the least accessible, with the Internet being the second least accessible.

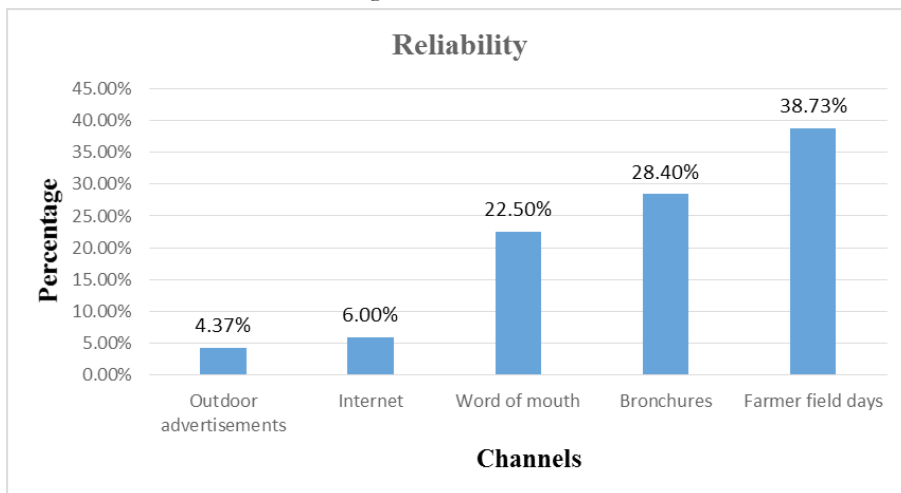


Figure 7: Ranking the channels on reliability

Source: Field Survey 2022

Figure 7 is the representation of the ranking of information channels in terms of reliability. Farmer field days were rated as the most reliable by the respondents at 75%. It was followed by brochures at 56%, neighbours at 45%, Internet at 15% and billboards at 8.7%.

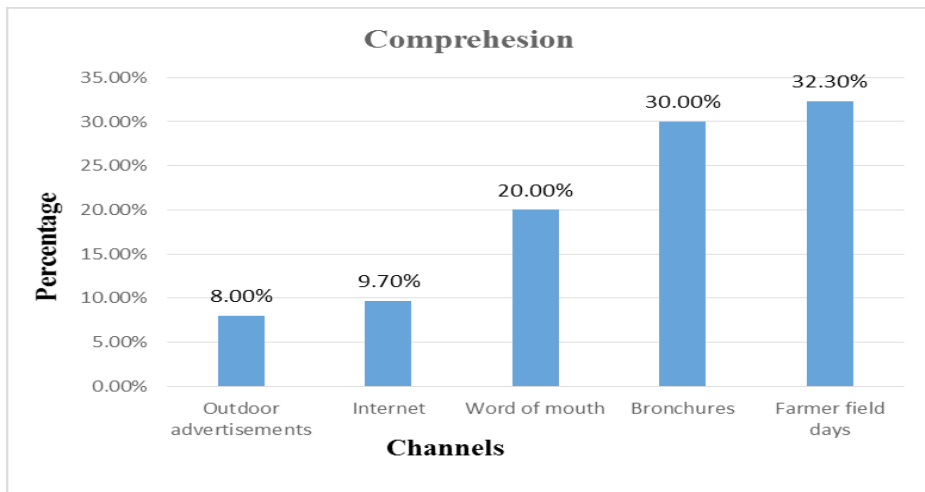


Figure 8: Ranking the channels of comprehension

Source: Field Survey 2022

Figure 8 above represents the ranking of communication channels on the level of comprehensiveness. The farmers ranked farmer field days as the most comprehensive channel, at 62.5%. Brochures followed, and billboards were the least comprehensive, at 16.25%.

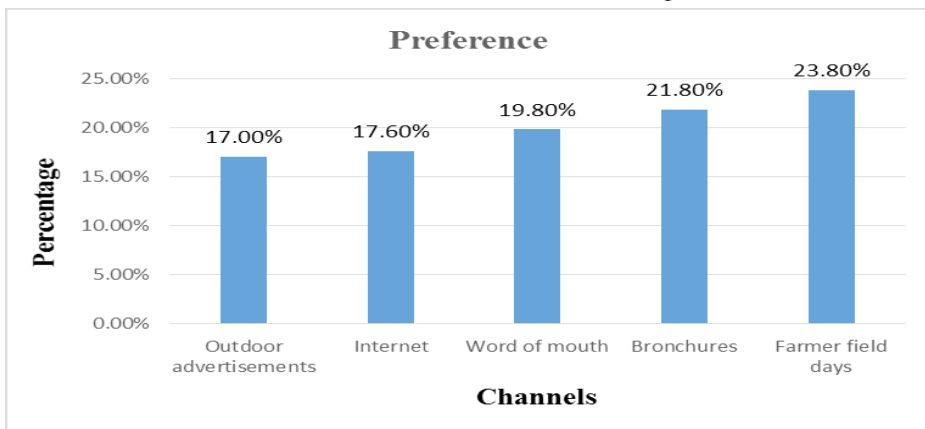


Figure 9: Ranking the channels on preference

Source: Field Survey 2022

Figure 9 above shows how the respondents ranked the communication channels in terms of preference. Farmer field days were ranked as the most preferred by farmers (respondents). Farmer field days were the most preferred channel by the respondents in Makueni County. Farmer field days were ranked at 73.75%, followed by brochures at 67.5%, neighbours/friends at 61.2%, Internet at 55%, and the least at 52.50%.

6.4 Ranking of effectiveness of communication approaches

An analysis was done to establish which of the investigated approaches was the most effective when used in disseminating ISFM practices to farmers in Makueni County. The channels were first ranked as above to establish how accessible, comprehensive, reliable and preferred they were as sources of agricultural information. The rankings were then subjected to further

analysis, which resulted in Figure 4.9 below. According to Figure 10, face-to-face approaches were the most effective at 42.3%, followed by mass media approaches at 26.2% and written approaches at 23.1%. The last is internet-based approaches at 8.3%.

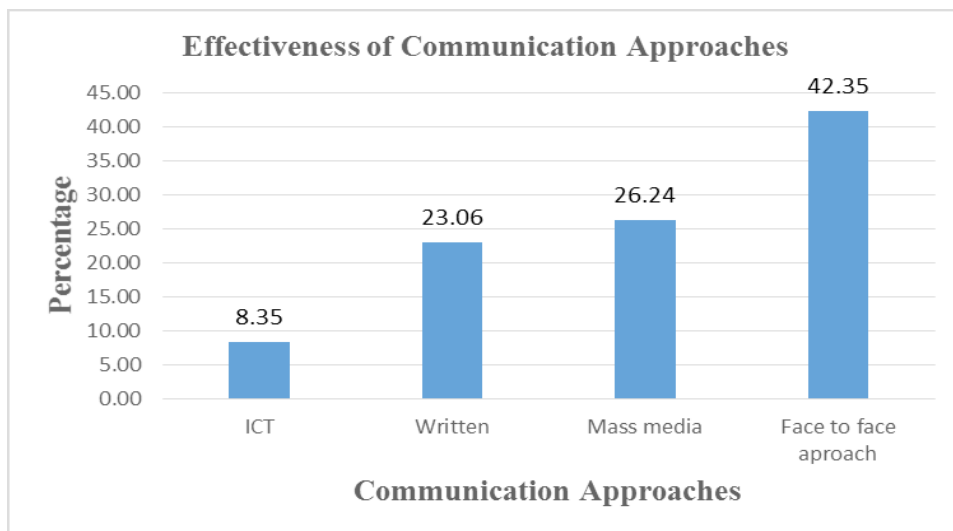


Figure 10: Ranking of the effectiveness of communication approaches

Source: Field Survey 2022

These findings confirm the argument by Rusike and Dimes (2004) that face-to-face approaches are still the most widely used and efficient way of reaching out to farmers, especially in rural areas.

6.5 Effect of ISFM practices on local farmers on their production levels in Makueni County

The researcher sought information about the acquisition and use of the acquired information in the application of ISFM technologies in order to establish whether the acquired information had any impact on their production levels. Responses on variables such as whether the farmers had acquired any information on ISFM, general production and farming systems and productions and farming systems using ISFM were analysed, and results were presented in Table 2.

Table 2: Acquisition and use of information in the application of ISFM practices by farmers in Makueni County

	Crops farmed	Frequency	Percentage
Crops farmed and which farmer acquired information on ISFM practices	Maise	24	9.1%
	Sorghum	75	28.3%
	Cowpeas	73	27.5%
	Pigeon peas	73	27.5%
	Other crops	20	7.5%
	Total	265	100.0%

	Crops farmed	Frequency	Percentage
Crops farmed using ISFM information acquired	Maise	14	5.3%
	Sorghum	60	22.6%
	Cowpeas	68	25.7%
	Pigeon peas	69	26.0%
	Other crops	15	5.7%
	Total	226	85.3%

Source: Field Survey 2022

It was established from Table 2 above that 85% of the farmers who acquired information on ISFM technologies had practised them on their farms. The majority of farmers had acquired information on technologies for growing sorghum, as reported by 28% of the respondents, and cowpeas and pigeon peas, as reported by 27% of the respondents. Other crops farmers knew how to grow using ISFM technologies, including maise, among others. Similar results were reflected in the adoption of the technologies, as the majority of farmers had used ISFM information acquired to grow sorghum, cowpeas and pigeon peas.

In terms of the adoption of ISFM technologies disseminated, farmyard manure, animal manure, and cereal-legume rotation were the highly adopted technologies at the rates of 22.5%, 28.2%, and 28.2%, respectively. Farmers had similarly practised the same technologies for the most extended periods, with each practised for an average of 7, 6, and 6 years, respectively. Inorganic fertilisers had been adopted by lesser farmers at a rate of 4% for an average period of 3 years, as shown in Figure 11.

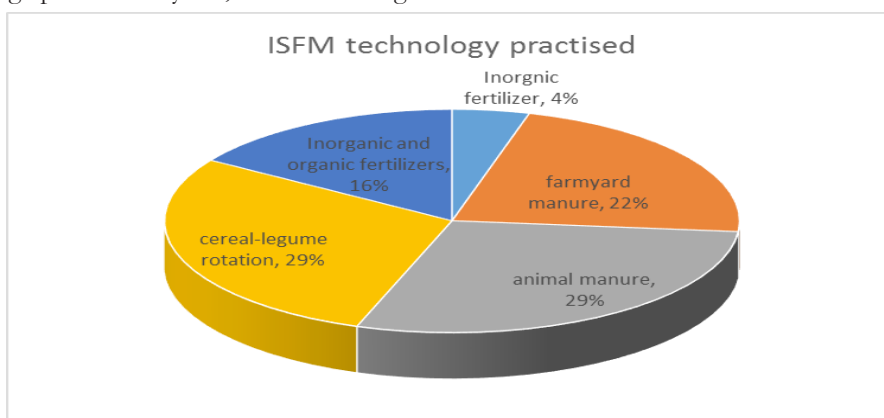


Figure 11: ISFM technology adoption rates and practice

Source: Field Survey 2022

Generally, farmers' adoption of ISFM technologies is very low in Makueni County. This might be explained by the fact that communication approaches used in disseminating the technologies have various limitations. For instance, some sources such as research institutions, the mass media, farmer cooperatives and farm input suppliers, and channels such as reading books and posters, farmer field schools, mobile phones, neighbours and friends, radio and television, as reported by the majority of the farmers in Makueni County are not comprehensive and informative enough.

An analysis was conducted to establish the impact of ISFM practices on farmer production. The production trends were analysed, focusing on yields before and after the application of ISFM technologies, and the results are shown in Figure 11 below.

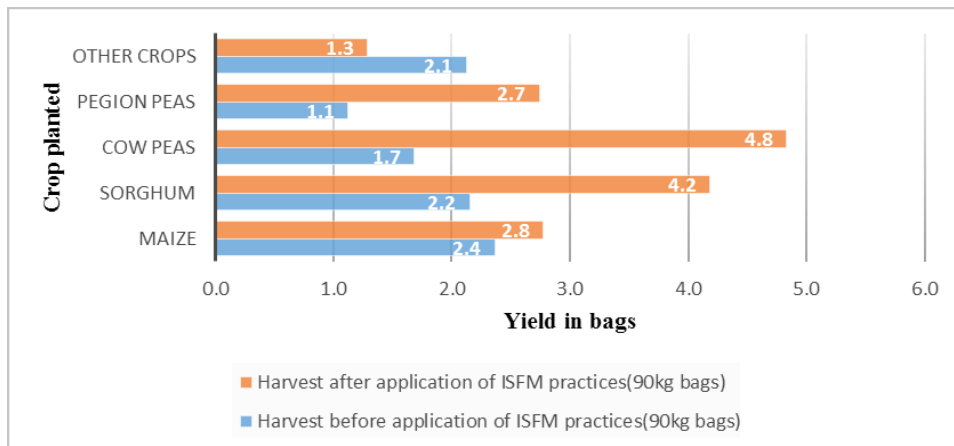


Figure 12: Comparison between production yield from different crops before and after application of ISFM technologies

Source: Field Survey 2022

It was established from Figure 12 above that yields from the harvest of the crops grown using the application of ISFM technologies adopted by farmers had increased significantly compared to the other crops. Yields from cowpeas and sorghum had increased tremendously compared to previous seasons, where high yields were mostly realised from maize and other crops not promoted in the ISFM technologies. The use of ISFM practices can lead to an 182% increase in the production of cowpeas, a 145% increase in the production of pigeon peas, a 90% increase in the production of sorghum, and a 17% increase in maize production. As Sanginga (2012) suggested, this study has actually confirmed that the use of ISFM practices leads to a resultant increase in crop production for farmers.

The findings clearly demonstrate the fact that access to agricultural information and knowledge enhances farmer adoption and use of the technologies, thus increasing their productivity in terms of crop yields. Asaba et al. (2006) state that agricultural information is a critical component in improving small-scale agricultural production and linking increased production to markets, thus leading to improved rural livelihoods, food security, and national economies. Therefore, knowledge and information must be channelled to farmers through appropriate dissemination that uses appropriate communication approaches.

7 Conclusion

In conclusion, according to the findings of this study, a number of communication approaches have been used to disseminate ISFM practices to farmers in Makueni County. A number of communication approaches have been used to disseminate information and knowledge on ISFM practices to farmers in Makueni County. The effectiveness of the different communication approaches in knowledge dissemination varies, as has been found in this study. Face-to-face approaches that include farmer field days/schools, on-farm demonstrations, agricultural extension, and community channels emerged to be the most effective. Face-to-face approaches were also found to be very comprehensive, reliable, and informative and, therefore, highly preferred. The use of an appropriate approach to communication was found to lead to the adoption of ISFM practices. The adoption and use of ISFM practices were hence found to be having a positive impact on farmer productivity, and those who have adopted

some aspects reported an increase in yields. 85% of the farmers who acquired information on ISFM practices and practised them in their farms to grow sorghum, pigeon peas and cowpeas reported that ISFM practices indeed had improved their farm productivity.

Not all aspects of ISFM practices are being used by farmers. In agreeing with this argument, the study found that not all aspects of ISFM practices are actually in use by farmers who have adopted and are using ISFM practices. Most of the farmers using ISFM practices apply only portions of the ISFM package. The majority of the farmers had received information on the following components of ISFM practices: farmyard manure, animal manure and cereal-legume rotation and were adopted at the rates of 22.5%, 28.2% and 28.2%, respectively. There were reported increases in yields after the application of these ISFM practices observed.

Finally, this study has confirmed that adoption of ISFM practices occurs through a process. Despite the introduction of ISFM practices to all farmers in Makueni County, only a few farmers have adopted them. It is, therefore, necessary to factor this in while taking innovations to users like farmers and to use appropriate communication approaches to inform, equip, and persuade people to adopt and use the practices.

8 Recommendations

The researcher wishes to make the following recommendations.

- Face-to-face communication approaches should be prioritised as the means of transferring knowledge and skills on agricultural innovations;
- Establishment of demonstration sites in at least each sub-county as central points for acquiring knowledge on innovations;
- ISFM practices be introduced in all counties and, most importantly, counties that lie in arid and semi-arid areas of the country;
- All farmers are encouraged to farm crops that can do better in their specific regions so that they can realise maximum benefits from their farms. Farmers in arid and semi-arid lands are advised to concentrate on farming drought-resistant crops such as cowpeas, pigeon peas, and sorghum;
- Government and development agencies need to invest more resources in knowledge transfer and innovations. More time and money need to be allocated towards knowledge and skills transfer;
- Research is needed to explore how emerging new media can be used to transfer knowledge about innovations to farmers. A study should be conducted to find out how this can be used to ensure even more farmers are reached with these innovations.

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