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Communication Barrier: Effect of Noise on Adoption of Irish Potato Farming Innovations in Meru County, Kenya

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Abstract:

This paper explored the effect of noise on the adoption of Irish potato farming innovations in Meru County, Kenya. This study used a qualitative research design. The population of this study comprised all the farmers in Kibirichia Ward in Central Imenti Constituency, Meru County. The target population was 11,907 area residents (Irish potato farmers) from the four sub-locations (Kimbo, Gathuine, Kiambiogo, Mburugiti) spread across 3,327 households. The researcher conducted four focus group discussions (FGDs) of nine members. One focus group from each of the four sub-locations was purposively sampled from Kibirichia Ward. Participating farmers were selected using homogeneous sampling. Findings revealed that noise was present during the communication of information on the adoption of Irish potato farming innovations. Noise resulted from braying donkeys, passing vehicles, power saws logging trees, barking dogs, visual and hearing impairment, complex terminologies which were unfamiliar to farmers, hunger, stress, frustration, irritation, illnesses, wondering thoughts, and tiredness.

Further, findings revealed that while discussing physiological noise, respondents did not mention farmers who were completely deaf or blind but rather those who were partially deaf or blind. Findings also revealed that noise occurred whenever there was a communication of information on the adoption of Irish potato farming innovations. Respondents used several ways to reduce various types of noise that were present during the exchange of agricultural messages. Finally, study results showed that noise led to low adoption of Irish potato farming innovations in Kibirichia Ward. This paper recommends that Irish potato farmers should give considerable attention to noise to avert or reduce its effect on the adoption of Irish potato innovations.

Keywords: *Communication barrier, noise, adoption, Irish potato farming innovations*

1. Introduction

Noise is a barrier to effective communication (Age, Obinne & Demenongu, 2012; Duta, 2015). It is also an ongoing occupational and safety health issue that presents significant risk in agriculture with high exposures prevalent (Mead-Hunter et al., 2019). Noise directly affects farmers' performance by decreasing efficiency and productivity and increasing the chances of accidents occurring due to lack of concentration (Saeki, Fujii, Yamaguchi & Harima, 2004). Even though noise cannot be totally overcome, its effects can be reduced (DeVito, 2015). Reduction of noise influences farmers' performance by increasing effective communication, efficiency, and productivity and decreases the chances of accidents occurring due to lack of concentration.

Irish potato is positioned fourth in the world after maize, rice, and wheat as a food crop. It is produced and consumed more than other root crops such as cassava, sweet potato, and yams. Its output is about half of the world's produced roots and tubers, thus becoming the largest non-cereal cash crop (Food and Agriculture Organisation Corporate Statistical Database (FOASTAT), as cited in Kabungo, 2008). Farming of Irish potatoes ensures food security and gives income to many households through trade (Nyagaka et al., 2009). Gildemacher (2006) and MoA (2006) (as cited in Nyagaka et al., 2009) stated that Irish potato farming being labour intensive, creates employment in the production, marketing, and processing sectors. However, Irish potato yield per unit area is lower than the expected production. Abong, Okoth, Imungi, and Kabira (2010) stated that there has been a steady decrease in the production of a variety of Irish potatoes per unit area in recent years.

In Kenya, the national production of Irish potatoes, including that of Meru County, is far below its potential (FAO, 2008; Njuguna et al., 2015). Several studies have been conducted on factors that lead to low yields and the adoption of Irish potato farming innovations (Kaguongo et al., 2008; Kiptoo, Xia, Mchomvu, Ali & Rehama, 2016; Muthoni & Nyamongo, 2009; Muthoni, Shimelis & Melis, 2013; Njuguna et al., 2015; Ng'ang'a et al., 2003; Riungu, 2011; Wang'ombe & Dijk, 2013). These factors include: perceptions that improved potato varieties are not resistant to blight, failure to adopt clean seeds, proper pest and disease management, disorganised marketing systems, lack of clear policies on marketing, under and overuse of fertilizers and fungicides, and lack of water for irrigation. However, little research, if any, has explored noise as a factor affecting the adoption of Irish potato farming innovations in Kenya. This study, therefore, will investigate the effect of noise on the adoption of Irish potato farming innovations in Meru County.

2. Review of Related Literature

2.1. Noise in Communication

In communication studies, noise appears as though it has been given the least attention even if it affects all the components (source, channel, receiver, message, feedback) of the human communication process (Ifenkwe & Ikpekaogu, 2012). Bello and Obinne (2012) noted that noise is a notable, yet undesirable element of the communication process. Age et al. (2012) and DeVito (2015) define noise as anything that disrupts the transmission and reception of a message.

2.2. Types and Causes of Noise

DeVito (2015) classifies noise into four categories which are:

- Physical,
- Psychological,
- Semantic and
- Physiological noise

However, Age et al. (2012) state that there are three broad categories of noise: Physical, psychological, and linguistic noise. Physical noise is said to occur outside the communicator, while psychological, linguistic, and physiological noise occur within the communicator (Age et al., 2012; DeVito, 2015; Velentzas & Broni, 2014).

Physical noise is disruption from the environment such as loud sirens, disturbing odour, a hot room, loud conversations, side talks at meetings, sound from workmen's tools, horns from moving vehicles, dogs' barking, and disturbances of other animals (Age et al., 2012; Onasanya et al., 2006).

Psychological noise, also called mental noise, comes from the communicator's psychological makeup, intellectual ability, or physical condition (Gamble & Gamble, 2010). It can also result from emotional stress, poor mental attitudes, and preconceived notions such as racial stereotypes, reputations, biases, and assumptions that people bring to the communication process (Age et al., 2012; Michelle, 2018). Farmers experience psychological noise due to economic uncertainty, government regulations, climate change, role conflict, time pressure, poor housing, labour shortage, farm size, livestock loss, and isolation (Ang, 2010; Hovey & Magana, 2002; Logstein, 2016).

Linguistic noise is the inability of the communicator to use language correctly and appropriately (Age et al., 2012). Age et al. further sub-divided linguistic noise into grammatical, phonological, and semantic noise. Grammatical noise may be caused by using the wrong sentence structure and not following the rule of language use. Phonological noise occurs as a result of the wrong articulation of words. Even if the source and receiver of information speak the same language, local variations or dialects may use similar words with different meanings (Oarkley & Garfoth, 1997). Semantic noise is caused by the wrong choice of words, the use of unfamiliar words, or the use of familiar words in the wrong way. Ifenkwe and Ikpekaogu (2012) noted that print media suffers a lot from semantic noise.

Sources of noise in printed materials include language vis-à-vis the targeted audience, the colour of printed material, composition or arrangement of the message, and presentation pattern. Others are character and size of print (which affect legibility) and grammatical and technical accuracy. Although most extension print materials appear quite attractive, some fail to convey intended meaning or produce the desired effect on farmers because they are poorly edited, and so certain undesirable elements-noise (Ifenkwe & Ikpekaogu, 2012, p. 52).

Physiological noise results from:

- Bodily illnesses such as high fever and
- Bodily disabilities such as poor eyesight, mobility, and hearing impairment (DeVito, 2015; Michelle, 2018).

According to Devi, Rajamohan, and Parthiban (2020), blindness, low vision, leprosy cured, hearing impairment, locomotor disability, mental retardation, and mental illness are categories of disability in India.

2.3. Effect of Noise

The ability to hear is essential for participating in farm activities. Therefore, farmers and farm workers should be able to hear other people on the farm despite the sounds of animals and machinery to ensure safe working environments (Winters et al., 2005). However, Solecki (1995) asserts that as farmers increasingly adopt mechanical technologies that aid in increasing yields, the machines have the disadvantage of producing excessive noise. Noises from tractors, mowers, grinders, choppers, elevators, power tools, ban fans, etc., are produced in daily work. Further, sounds from animals in enclosed spaces can reach dangerous levels. Farmers have, therefore, higher chances of experiencing hearing loss as a result of frequent exposure to high levels of noise as compared to people of other professions (Kluge, 2001).

Psychological noise causes farmers to experience extreme stress, anxiety, depression, irritation, interference with speech and sleep, and other mental health crisis (Durgut & Celen, 2004; Rural Health Information Hub, 2021). In addition, stress negatively influences decision-making, productivity, personal health, and safety (Occupational Safety & Health Service, 1998; Starcke & Brand, 2012).

Linguistic noise makes it extremely difficult to hear and understand information. A study was conducted on factors that influence effective communication of agricultural information among farmers in South West Kisumu Ward, Kisumu County by Awili, White, and Kimotho (2016). Results revealed that the language barrier hindered effective communication of agricultural information. A similar study was conducted by Sen et al. (2021) on farmers' barriers to the access and use of climate information in the mountainous regions of Thua Thien Hue Province, Vietnam. Findings showed that the language of information conveyed to farmers was a major barrier. More than 60% of people in A Luoi and 40% in Nam Dong districts use their local language. This made it extremely difficult to hear and understand the information provided through the mass media in Vietnamese.

International Centre of Insect Physiology and Ecology (ICIPE) (2013) notes that intense physical labour in agriculture often poses a challenge to disabled farmers. FAO (2003) carried out a study whose objective was to find out the needs of people with physical disabilities (PPD) in the province of Mazandaran, Iran. The findings of the study revealed that challenges faced by farmers who were physically disabled were the inability to prepare the land, transport heavy inputs, and products, and perform other heavy farming jobs. The respondents recommended that suitable tools, machinery, and special training should be availed to enable them to carry out farming tasks easily.

2.4. Noise Reduction

DeVito (2015) notes that noise cannot be totally overcome, but its effects can be reduced. Ways to reduce the effect of noise include:

- Making language more precise,
- Improving non-verbal communication, listening, and feedback skills

Age et al. (2012) assert that noise can be reduced by controlling physical, psychological, and linguistic factors. Physical noise can be reduced by moving away from loud noise, maintaining silence, and satisfying physiological needs to prevent loss of attention (Age et al., 2012; Durgut & Celen, 2004). Psychological and linguistic noise can be reduced by controlling emotional stress and correct application of grammatical rules, words, and pronunciation respectively (Adebayo, 1997; Age et al., 2012). Ifenkwe and Ikpekaogu (2012) noted that noise should, therefore, be given considerable attention, having been proven as a source of the inefficient exchange of agricultural messages.

2.5. Adoption of Irish Potato Farming Innovations

Irish potato yield per unit area is lower than the expected production. Abong et al. (2010) stated that there has been a steady decrease in the production of a variety of Irish potatoes per unit area in recent years. This has made research institutions and organisations breed newer varieties of potatoes that are more resistant to diseases. To address this challenge, the Government of Kenya and other stakeholders have undertaken a number of Irish potato development programmes such as varietal improvement, seed development, multiplications, and distribution to boost production and improve farm incomes. The National Potato Research and Development Programme has developed and introduced several technologies which have been passed to farmers through the extension service over the years (Kinyae et al., as cited in Nyagaka et al., 2009).

Despite numerous efforts and resources dedicated to creating and diffusing new Irish potato production technologies, the average farm yield has not increased (Nyagaka et al., 2009). Kenya's low yields have been blamed on the failure to use clean seeds, fertilizers, fungicides, and irrigation (Wang'ombe & Dijk, 2013). Wang'ombe and Dijk (2013) conducted a study to assess the relative impacts of adopting clean seeds, fertilizers, fungicides, and irrigation on potato yields in Kenya. The survey was conducted in three counties: Nakuru, Nyandarua, and Meru. Findings of the study revealed that the adoption of clean seeds had the lowest adoption rate (4.5%), followed by the adoption of irrigation at 23%. However, there was high adoption of fungicides and fertilizers at 92% and 96%, respectively.

Namwata, Lwelamira, and Mzirai (2010) assessed the adoption of improved agricultural technologies for Irish potatoes among farmers in Ilungu ward, Mbeya Rural district, Tanzania. They found that the extent of adoption among farmers varied with the type of technology. Seeding rate, timely sowing, and fungicide application were the highly adopted technologies, with each of them being adopted by at least 80% of surveyed households. 58% and 51% of the surveyed households used improved varieties and pesticide application, respectively, and hence moderately adopted technologies. The least adopted technologies were recommended chemical fertilizer application rate and foliar or booster fertilizer application, which were used by nearly one-third of surveyed households. Recommended spacing was not used by any of the surveyed households. Results on the overall adoption of technologies disseminated to farmers indicated that half of the surveyed households had adopted not more than three out of eight improved agricultural technologies for Irish potatoes. This reflected poor overall adoption by a significant portion of surveyed households.

Kiptoo et al. (2016) conducted a study on factors influencing the adoption and use of clean certified seed potato tubers among small-scale potato farmers in Koibatek Sub County, Baringo, Kenya. Study findings revealed:

- Farmer education level,
- Frequency of access to agricultural extension services,
- Years of experience in potato farming,
- The administrative ward of the farmer and the farmer's off-farm income influenced the likelihood of adoption and
- Use of clean/certified seed potato tubers for production

3. Methodology

3.1. Research Design

This study used a qualitative research design. According to Kasomo (2006), qualitative research attempts to describe, explain and interpret the conditions and processes of a phenomenon. The design, according to Neergaard, Olesen, Andersen, and Sondergaard (2009) and Sullivan-Bolyai, Bovac, and Harper (2005), aids in finding out the who, what, and where of events or experiences and gaining insights from informants regarding a poorly understood phenomenon. It is also easy, quick, and cheap to perform because data are collected only once from the respondents (Sedgwick, 2015). However, Sedgwick further asserts that this design may be prone to non-response bias if participants who agree to participate in the study differ from those who do not, resulting in a sample that is not representative of the

population. Based on the above-discussed advantages and disadvantages, the design was appropriate in determining the effect of noise on the adoption of Irish potato farming innovations in Meru County.

3.2. Population and Study Site

The population of this study comprised all the farmers in Kibirichia Ward in Central Imenti Constituency, Meru County. The ward has a population of 24,850 persons (IEBC, 2013). It is characterised by annual rainfall ranging between 1400 and 2600mm and temperature averaging 18oC (Jaetzold, Schmidt, Hornetz & Shisanya, 2006, as cited in Muthoni et al., 2013).

The researcher chose to conduct the study in Kibirichia Ward because of two reasons. Studies by Kaguongo et al., (2008), Kaguongo et al. (2009), and Muthoni et al. (2013) revealed that:

- Kibirichia Ward in Meru County is an area of high potato production in Kenya, and
- Farmers in Meru County, specifically those in Kibirichia Ward, have the longest experience in cultivating Irish potatoes.

3.3. Target Population

The target population of the study was a total of 11,907 area residents (Irish potato farmers) from the four sub-locations (Kimbo, Gathuine, Kiamiogo, Mburugiti) spread across 3,327 households, according to the 2009 National Census. The study adopted the target population of farmers from the four sub-locations in Kibirichia Ward, considering that every farmer in the selected sub-locations grows potatoes because it is the most productive crop.

3.4. Sample Frame

The 2009 National Census Report was the sampling frame for the households in Kimbo, Gathuine, Kiamiogo, and Mburugiti sub-locations.

3.5. Sample Size

In this study, the researcher conducted four focus group discussions (FGDs) of nine members. One focus group from each of the four sub-locations was purposively sampled from Kibirichia Ward. This was within what both Hill et al. (2005) and Hancock (1998) recommended. Such a group size is small enough to allow all the participants to talk and give their own experiences and yet large enough to accommodate a diverse group (Lasch et al., 2010). The assistant chiefs assisted in identifying nine household heads from their sub-location to be included in the focus group discussions. Farmers selected in this study were household heads aged 30 years and above because they had enough experience in Irish potato farming and, therefore, were able to answer the focus group discussion questions.

3.6. Sampling Technique

Participating farmers were selected using homogeneous sampling, which is an approach of purposive sampling. Homogeneous sampling was ideal for this study as it describes a particular subgroup in depth, reduces variation, simplifies analysis, and facilitates group interviewing (Palinkas et al., 2013; Patton, 1990). The homogeneous sample comprised farmers who were household heads and were 30 years of age and above. The assistant chief assisted in identifying the farmers.

3.7. Data Collection Instruments

This study used focus group schedules. The questions were discussed with the research assistant before meeting farmers to ensure they were understood and appropriate and covered the research objectives. The questions were formulated as a series of open-ended discussions requiring explanations, descriptions, and narrations on the effect of noise on the adoption of Irish potato farming innovations. This enabled the researcher to get adequate information from the respondents. Further, all focus group discussions were conducted in Kimeru because some farmers were illiterate. Further, all the participants preferred discussing the FGD questions in Kimeru since they were more conversant with their mother tongue than with other languages. The discussion for each group was scheduled at a convenient time and place.

3.8. Data Collection Procedure for Focus Group Discussion

3.8.1. Introducing the Session

The researcher and research assistant (facilitator) introduced themselves to the farmers, followed by self-introduction by the participants. The facilitator then explained the purpose of the FGD, the kind of information needed, and how the information would be used. Finally, participants sought permission to use a tape recorder during the focus group discussions.

3.8.2. Encouraging Discussion

The facilitator and researcher were enthusiastic and lively and showed their interest in the groups' ideas. They asked questions and encouraged all the participants to express their views. They also made sure that there was no expression of 'right' or 'wrong' answers and reacted neutrally to both verbal and non-verbal responses. The research assistant and researcher re-oriented the discussion when it went 'off the track.' In the end, the main issues were summarised and read back to the group to check whether additional comments were needed. The researcher then thanked the participants and assured them that their ideas were valuable and would be used for the intended research. Afterward,

the researcher and the facilitator listened to each interview recorded on the tape and took notes. This enabled the researcher to fix mistakes manually and maintain accuracy when the information was still fresh.

3.9. Data Processing and Analysis

After the completion of data collection, data were transcribed manually. The researcher listened to each of the recorded discussions and recorded them on paper. During the transcription process, the researcher noted how the respondents expressed their feelings during the focus group discussions. After transcription, the researcher read and made sense of the collected data after transcription. The data was then coded and categorised into relevant themes and sub-themes. For easy identification and interpretation of themes, the researcher marked key phrases with different coloured pens. Consistencies and differences in the data were identified by making systematic comparisons across categories of data. Finally, the researcher made possible and plausible explanations of the findings.

4. Findings and Discussions

4.1. Demographic Information

Most of the farmers in this study ranged between 40 and 70 years of age. This indicates that most of these farmers had many years of experience in Irish potato farming. However, the minority was between 20 and 30 years, and one was 80 years old. Though the study targeted household heads over 30 years old, a minority of those selected could not make it for the focus group discussions. To replace the farmers who could not make it for the FGDs, the assistant chiefs selected a few farmers who were household heads between 20-30 years old and had experience in Irish potato farming.

Female farmers were more than males in the Focus Group Discussions (FGD). This indicated that women headed many households in Kibirichia Ward. Most of the farmers had an experience of 10-19 years in Irish potato farming. Some female participants reported having been born and brought up in other areas that did not cultivate Irish potatoes. They were married in Kibirichia Ward, where they practice Irish potato farming. The majority of the farmers had attained secondary school education, followed by those with primary school education, and a minority was university graduates. Another minority had no formal education.

4.2. Types of Noise That Occur during Information Exchange

Farmers' responses revealed that there were physical, physiological, semantic, and psychological noises. External noise resulted from braying donkeys, passing vehicles, people consulting the chief as meetings went on, power saws logging trees, barking dogs, etc. Farmers with visual and hearing impairment experienced physiological noise. Semantic noise occurred when complex terminologies which were unfamiliar to farmers were used during information exchange. Hunger, illnesses, and tiredness were stated as some of the causes of psychological noise.

While partially blind or deaf farmers experienced physiological noise, semantic noise occurred when technical words were used that farmers could not comprehend. On the other hand, Farmers who could not understand agricultural messages due to mental disturbances resulted in psychological noise. Psychological noise was also caused by stress, frustration, irritation, illnesses, and wondering thoughts farmers had during information exchange.

Findings revealed that noise was present during the communication of information on the adoption of Irish potato farming innovations. Noise resulted from braying donkeys, passing vehicles, power saws logging trees, barking dogs, visual and hearing impairment, complex terminologies which were unfamiliar to farmers, hunger, stress, frustration, irritation, illnesses, wondering thoughts, and tiredness. These findings agree with several scholars (Age et al., 2012; DeVito, 2015; Gamble & Gamble, 2010; Onasanya et al., 2006; Solecki, 1995; Winters et al., 2005). These scholars indicated that noise comes from loud conversations, side talks at meetings, sound from workmen's tools, horns from moving vehicles, dogs' barking and disturbances from other animals, poor mental attitudes or emotional stress, and inability to use that language of communication correctly. Durgut and Celen (2004) argued that environmental noise can affect people physically and psychologically by making them unable to hear, irritable, angry, and interfere with speech and sleep.

Again, findings revealed that while discussing physiological noise, respondents in this study did not mention farmers who were completely deaf or blind but rather those who were partially deaf or blind. This indicates that perhaps completely blind and deaf people in Kibirichia Ward did not engage in farming activities and thus had no need to attend agricultural meetings due to the challenges they faced from their handicap (ICIPE, 2013).

4.3. The Place and Time Noise Occurred during Agricultural Communication

Farmers said that noise occurred whenever and wherever information was communicated. In Kiamiogo, for example, one farmer said that noise occurred in all their meeting places. *'During demonstrations, people have side talks,'* a Mburugiti farmer said. In addition, another Mburugiti farmer said, *'People cannot avoid coughing and sneezing during meetings.'* A farmer from Kimbo explained, *'Farmers that have cows and donkeys on their farms experience external noise. Similarly, farms by the roadside encounter noise from passing vehicles.'*

Findings revealed that noise occurred whenever there was a communication of information on the adoption of Irish potato farming innovations. These findings are more or less similar to those of Durgut and Celen (2004), Kluge (2001), and Solecki (1995), who noted that external noise occurs on the farms, while psychological, physiological, and linguistic noise is said to occur within the communicator (Age et al., 2012; DeVito, 2015; Velentzas & Broni, 2014). Further, Durgut and Celen (2004) argued that external noise leads to hearing loss (physiological noise), irritability and anger (psychological), and interference with speech (semantic noise).

4.4. Ways in Which Noise Was Reduced

When asked by the researcher how various types of noise were reduced, responses were varied. Farmers, who murmured while the communication process was going on, were requested to keep quiet. However, it was also noted that in some situations, the communicating parties made a great effort to listen in the midst of external noise. *'If we are holding a meeting near a road, we strive to listen in the midst of the noise produced by cars on the move,'* said one farmer. Farmers who were partially deaf or blind were usually requested to move closer to the source of information and encouraged to seek clarification.

The study revealed that respondents used several ways to reduce various types of noise that were present during the exchange of agricultural messages. This finding is in tandem with that of Age et al. (2012), who recorded that noise can be reduced by controlling physical, psychological, and linguistic factors. Age et al. and Durgut and Celen (2004) reported that physical noise can be avoided and reduced by moving away from loud noise, maintaining silence, and satisfying physiological needs to prevent loss of attention. Psychological noise can be reduced by controlling emotional stress (Age et al., 2012), while linguistic noise can be decreased by writing the same message in different forms but with the same meaning, correct application of grammatical rules, words, and pronunciation (Age et al., 2012; Adebayo, 1997). Bello et al. (2014) and Ifenkwe and Ikpekaogu (2012) reported that noise can be reduced and cannot be totally eradicated because it affects all the components (source, channel, receiver, message, feedback) of the human communication process.

4.5. Effect of Noise on Adoption of Irish Potato Farming Innovations

Among the farmers, there was consensus that the presence of noise during agricultural communication resulted in low adoption of innovations in Irish potato farming in Kibirichia Ward. For example, one farmer from Kiamiogo said, *'When long meetings are held, we are usually unable to concentrate on what we are being told because of hunger pangs. This results in low adoption of innovations.'* A Gathuine farmer said, *'Farmers who are mentally distracted easily are unable to listen to advice and put into practice what has been communicated. As a result, such farmers experience low adoption of agricultural innovations.'*

Findings revealed that noise led to low adoption of Irish potato farming innovations in Kibirichia Ward. These findings agree with a number of researchers (FAO, 2003; Occupational Safety & Health Service, 1998; Saeki et al., 2004) who found that noise directly affects farmers' performance, such as decreased efficiency and productivity due to lack of concentration. However, noise can be reduced and not totally eradicated because it affects all the components (source, channel, receiver, message, feedback) of the human communication process (Bello et al., 2014; Ifenkwe & Ikpekaogu, 2012).

5. Conclusion

Noise is a barrier to effective communication and an ongoing occupational and safety health issue that presents significant risk in agriculture with high exposures prevalent. Noise directly affects farmers' performance by decreasing efficiency, productivity and increasing the chances of accidents occurring due to lack of concentration. This study revealed that physical, physiological, linguistic, and psychological noise was present during agricultural information exchange. Noise lowered the adoption of Irish potato farming innovations in Meru County. Respondents used several ways to reduce various types of noise that were present during the exchange of agricultural messages.

6. Recommendation

Concluding, this paper recommends that Irish potato farmers should give considerable attention to the noise to avert or reduce its effect on the adoption of Irish potato innovations.

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