Use of mobile phone in technical advisory and market information to smallholder farmers in Rolpa district of Nepal

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Introduction

Nepal is an agrarian country with two third of population engaged in Agriculture sector which contributes one third of the GDP of the country. Rice, wheat and maize are the major food crops contributing to household food security. However, average landholding size is only 0.68 ha and over 50 percent farming HHs own less than 0.5 ha (CBS, 2013). Due to small landholding size, a large proportion of farming households in Nepal has serious problems in sustaining their livelihood from agriculture. Farming is mostly subsistence but market-led production of high-value agriculture commodity is slowly emerging. Joshi et al (2004) contends that shifting to high value agriculture from subsistence farming can be a viable alternative to increase income for smallholders. The availability of a diverse agro-climatic conditions of Nepal offer opportunities to grow a variety of high-value commodities. The trend of farmers moving away from traditional cereals to high-value agriculture is already visible as shown by a reduction in area under food crops by 9 percent and an increase in the area under vegetables by 41 percent in the ten years preceding the year 2011/12 (CBS, 2013). Similarly, the number of farming households engaged in vegetable farming has nearly doubled in the same period.

The move to high-value crop productions for market brings new challenges. The smallholder farmers who would have consumed their own production will now have to rely on markets to sell their produce. The subsistence economy of farming households which used to be less impacted by external factors suddenly becomes vulnerable to changes in regional, national and international markets. There has been a wide discussion in the literatures about the constraints hindering smallholders to join modern value chains (Markelova et al, 2009; Poulton et al, 2006; Pingali et al, 2005; Shepherd, 2007). Some of these major constraints are: a lack of information on prices and technologies, a poor access to extension services and a high unit transaction costs due to small volume of production scattered over a wide geographical area. In Nepalese context, it is generally accepted that the agricultural marketing is inefficient due to a lack of price information and the weak bargaining power of small farmers, and bridging the information gap can enable farmers to get a fair share of benefits (Shrestha and Shrestha, 2000; Pokhrel and Thapa, 2007; Khanal, 2012). Bhattarai (2014) found that the expansion of mobile phone technology helped to alleviate information asymmetry in price in the value chain of fresh vegetables and spices in Nepal. In spite of a very high mobile penetration rate- 86% households using voice and 12 percent households using internet (CBS, 2016), the use mobile phone to provide technical advisory and market information to farmers is not yet taking off well in Nepal. This paper describes the experiences and learning of the pilot on the use of mobile phone undertaken by a development project in Nepal.

Project description

ADRA implemented Initiative for Agriculture Productivity and Commercialization (IAPAC) project in Banke, Dang and Rolpa districts of mid-western Nepal for 3 years from March 2014 to February 2017 funded by the European Union and the Austrian Development Cooperation in partnership with iDE Nepal and local partner organizations. The project had three specific objectives are: increased agriculture productivity**;**

increased commercialization of agricultural outputs; and enhanced nutrition. The project worked in fresh vegetable and essential oil sub-sectors with more than 4,000 farming households directly.

The main approach of the project was to develop smallholder commercial pockets by facilitating both input markets (enhancing the capacity of input/equipment service providers in the community that can provide embedded training services sustainably) and output markets (helping to establish market linkages through a collection centre or distillation unit for essential oils). The project organized beneficiary households in 190 farmer groups, helped them to acquire knowledge and skills in improved farming practices through hands on training and demonstrations throughout the crop cycle, and facilitated the establishment and operation of agriculture produce collection centres and distillation units to strengthen marketing linkages. The project also emphasized the capacity building of local service providers such as agro-vets/agricultural input suppliers, vegetable nursery operators and local farm advisors who bulk up demand of agricultural inputs and supply to farmers along with embedded technical advises.

The project supported the establishment and strengthening of 14 collection center and hat bazaars (weekly markets). 13 out of 14 collection center and hat bazaars are functioning and the value of transaction through collection center has increased by more than 6-fold over the three years' period (ADRA, 2017). These collection centers serve more than 2,000 farmers in the project area.

Transactions of NPR. 23,060,000 (€209,000) was made by 14 different Marketing & Planning Committees (MPCs) though the collection and selling of 914 MT of vegetables in year 3 of the project alone. This is more than four times an increment in volume and more than six times an increment in the value of transaction over three years. Major produce traded were: tomato, cabbage, cauliflower, chilli, capsicum, bitter gourd, ladies finger, cucumber, onion, green vegetables etc.

Figure 1: Volume of sale in collection centres (MT)

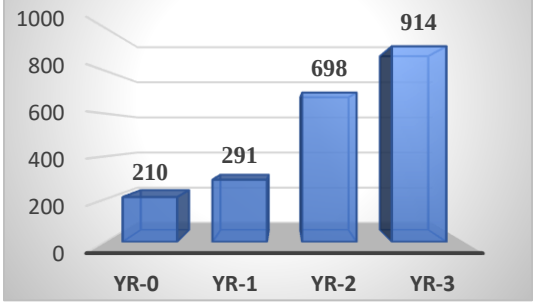
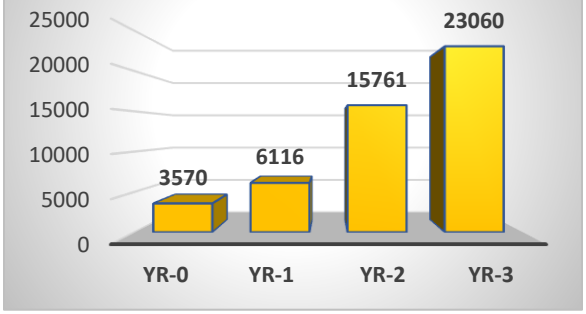


Figure 2: Value of vegetable sold (000 NPR) in collection centres



In spite of these successes, information asymmetry between producers and traders was still a big issue. This had led to mistrust among farmers and traders and are blaming each other for cheating and losses. Farmers usually lack right information at right time to make their planting and harvesting decisions as well to apply appropriate plant protection measures. In this context, the project decided to pilot the use of mass SMS services to alleviate some of these problems.

Approaches

Figure 3 illustrates the flow chart of the piloting on the use of mobile phone to disseminate technical advisory and market information in IAPAC project. Before implementation, project team conducted a feasibility study to collect information regarding farmers expectations, information need, ability to read mobile message and the types of mobile used. The study revealed that farmers were enthusiastic to receive text messages related to agriculture production and marketing and there were no groups with none of the members able to read the mobile message. The project contacted a private service provider to develop a dynamic web interface to send mass text messages (SMS). To begin with the system, the project supported a laptop and an internet device (sky pro) along with a system operation training provided to MPC executives and project

staffs on use of SMS web interface. 140 households were chosen to participate in the piloting who were innovative leader farmers and were able to read and convey those messages to their groups.

Figure 3: Flow chart of piloting on the use of mobile phone in IAPAC project

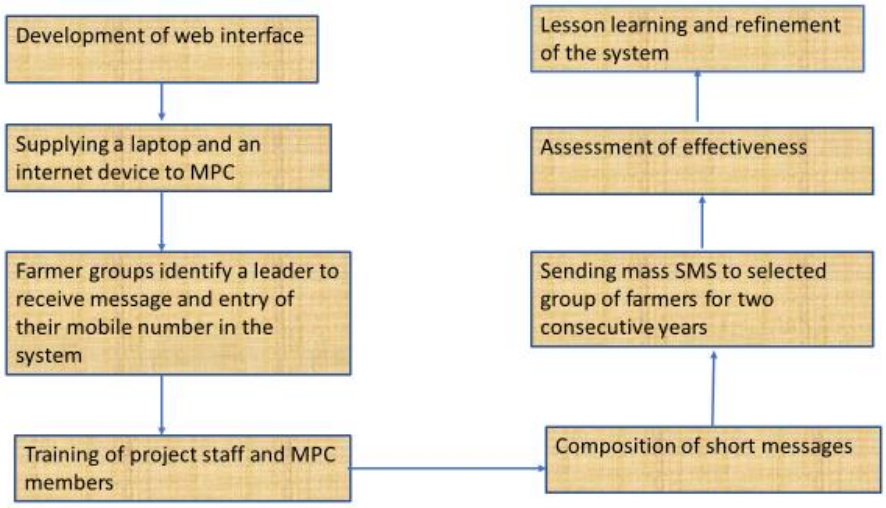
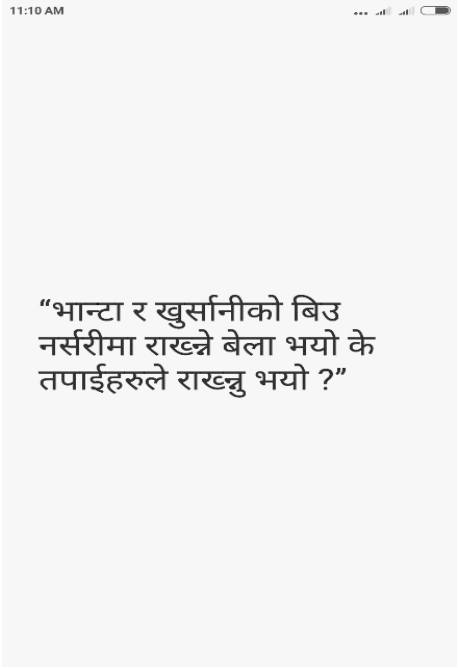


Figure 4: A screenshot of the text message



At the beginning of the system, project staffs facilitated in collection of information and composition of message in Nepali script. After a few rounds of system operation, the MPC took over the responsibility of composing message with back up support from the project staff. They also consulted the staff of local Agriculture Service Centre to find a relevant and useful message at particular point of time. A variety of messages were sent to farmers; upcoming planting seasons and suitable crop varieties, seed rate and spacing, harvesting time and appropriate post-harvest practices, information on pest outbreak and proper use of pesticides, information on new technologies and services, weather information, prices of vegetables etc. District Agriculture Offices was involved in this process and some of the messages were their notices and relevant announcements to farmers such as call for application for small irrigation support, youth self-employment grants etc. Messages were sent usually weekly.

A total of 14,850 SMS was delivered during the project period. At the end of the project, a semi-structured questionnaire was developed and a survey was conducted in a random sample of 24 households to assess the effectiveness of the system. The survey data was analyzed using SPSS statistical package. In addition, farmers' perception was also collected during monitoring visits which provided further insights into the usefulness of the system and opportunities to refine the system.

Results and discussions/Findings

Characteristics of survey respondents: About half of the survey respondents studied up to grade 10 and 25 percent never went to school. The mean size of vegetable farm was 0.22 ha with minimum area of 0.05 ha and maximum of 0.5 ha. Interestingly, almost 50% of respondents are using smart phone. About one third of respondents seem to use social media sites at least occasionally, most popular of them being Facebook and Youtube. Cabbage and tomato are the widely grown vegetables (grown by more than 82% respondents) followed by cauliflower (70%), beans (31%), capscicum (9%) and chilli (9%). Rest of the vegetables are grown by a small number of farmers. 87% farmers can read the mobile messages themselves while take help of someone in their family or farmer group to read messages for them.

Usefulness of the message: 96% respondents perceive messages to be useful whereas 4% respondents were unsure about its usefulness. Plant protection advices was perceived useful by highest proportion of farmers (71%) followed by planting advices (54%), market price information (33%), harvesting and post-harvest management (21%) and weather information (17%). When asked about the least useful messages, 33% farmers perceived weather information as least useful and 8% farmers perceived price information as least useful.

Table 1: Farmers' perception on relative usefulness of the message

Information type	Number of farmers	Percentage
Plant protection measures (IPM, pesticide use)	17	71
Planting advices (varieties, seed rate, season, important intercultural practices)	13	54
Market price information	8	33
Post-harvest advices	5	21
Weather information	4	17

I received a message related to the announcement of support on Youth Self-employment Shceme and immediately contacted the Agriculture sub center staffs. I applied and successfully received NPR 40, 000 (€ 363) for commercial vegetable farming. I would have missed the opportunity if I didn't receive this information on my mobile phone.

- *A lady farmer from Dubring VDC of Rolpa*

Farmers found mobile messages useful in a variety of way. 79% farmers were able to decide planting time, 71% were able to apply correct plan protection measures and 46% farmers were able to make informed negotiation with traders on market price. Interestingly, few farmers were able to access resources from District Agriculture Development Office (DADO) as they got timely information on announcements made by DADO.

Table 2: Farmers' perception on how the message was useful

How was the message useful	Number of farmers	Percentage
Able to use information to decide planting time	19	79.17
Able to decide variety and seed rate	2	8.33
Able to apply correct plant protection measures	17	70.83
Able to decide harvesting time	4	16.67
Able to better negotiate with traders and got better price	11	45.83
Able to access resources and services from DADO	2	8.33

About 62% farmers share information received through SMS during their group or MPC meeting. 8% farmers were not able to share information with their fellow farmers and rest shared through other means such as information interaction during tea time, showing messages, interaction during social events etc.

Farmers were also asked about the information they would like to get through mobile messages. About 25% farmers reported that they would like to get more information on new technologies and development in agriculture. However, most of them were unsure on what sort of information they would to get other than what they have been receiving.

Local capacity to operate the system: Although the project envisioned the capacity building of MPC to operate this system for the benefit of farmers supplying to the collection center, they have limited technical and financial capacity to operate the system after the phase out of the project. Consultations with the MPC executive team and stakeholders identified that MPCs may explore mechanism to collect service charge in transaction to operate this system or collaborate with private businesses (agri-input suppliers). Apparently, the Ministry of Agriculture Development is also piloting the system in selected VDCs but it may take time for the government to expand this service nationwide.

Farmers willingness to pay for SMS services: Currently the cost of sending SMS is expensive as one SMS in Nepali language is equal to two to three SMS in English due to more number of character in Nepali language. When farmers were asked if they were willing to share the cost of information, 96% responded positively. Farmers were unsure on how much they are willing to pay and replied arbitrarily. Farmers told that SMS cost could be paid by farmers in their collection center or collection centre may deduct a service fee in every kg of vegetable sold to cover the cost.

Conclusion and recommendations

The piloting of SMS system to provide technical advisory and market information was found to be promising. However, it is expensive to operate the system and the MPCs operating collection centres will have limited technical and financial capability to run the system on their own. Farmers have also shown willingness to pay for the service but the information they receive has to be useful and reliable so that their perceived willingness translates into action. Magesa (2015) had extensively reviewed various ICT based platforms used in Africa and elsewhere in linking farmers to market. Market information usually benefitted smallholders by helping them to make informed decisions and increasing their bargaining power while negotiating with traders. However, finding a viable business model to provide extension advisory and market information is important for the sustainability of the system.

Although localized information services through farmer organizations may benefit its members, it may not be viable business model as it is neither feasible for farmer organizations with limited capacity to provide right extension advisory nor generate reliable and real-time price information. Instead, these farmer organizations themselves can be the recipient of information and such information can ultimately be passed to their members through appropriate means.

In order to scale up the use of ICT to provide technical advisory and market information, it is necessary to develop a market-based solution where service providers charge a fee to provide information to farmers. Government and development projects could partner to promote promising business model in public-private partnership approach as extension advisory and market information is regarded as a public good provided by the government. Due to robust telecom infrastructures and mobile penetration rate in Nepal, use of ICT tools in linking farmers to extension services and output markets has a huge potential. New business model should include a right mix of products such as push and pull SMS, interactive voice response and virtual trading platform to match buyers and sellers using mobile application or internet to serve the needs of different customers.

Limitation

This paper is based on the learning from a small pilot covering a limited number of households on the use of bulk messaging system to provide technical advisory and market information within IAPAC project. Therefore, the inferences drawn in this paper may not represent the whole population.

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