The critical role of ICT in shaping the future of small-scale agriculture

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All Nepal Peasants Federation (ANPFa) initiated a campaign and a project on Information and Communication Technology (ICT) in Agriculture to continue its activities during the pandemic and reach the farmers when they were impacted by the health crisis. But finally, it has turned out to be a successful and important learning curve for ANPFa. Along with the International Association for Popular Cooperation (IAPC) and Social Organization for Liberal Volunteers Engagement Nepal (SOLVE Nepal), ANPFa jointly works to help small food producers in Nepal to have better access to ICT and launched an orientation cum training program by the beginning of 2021. In this article, we will discuss the critical role of ICT in agriculture with reference to our work with Nepalese peasants.

Introduction

We are in the era of the Fourth Industrial Revolution with the predominance of artificial intelligence where technology dominates and controls a big chunk of people's daily life. It is evident that people regardless of their age and gender identity live with technology today, it is more prominent among adolescents and in some cases, addiction to technology has prevailed among adolescents. The reports also show that not only children but also adults are spending much time with the internet, mobile, laptops, computers, video games, and there are even problematic or pathological behaviours related to the use of the internet [1]. Thus, technologies have both positive and negative impacts on people, profoundly influencing and transforming people's behavior and social relationships. FAO [2] claims that digital or information technologies have changed the lives of rural populations in developing countries, especially after the pandemic of COVID-19. At the same time, in the neoliberal globalized world with its creative destruction face, as stated by David Harvey [3], information and communications technologies are also misused and monopolized. There are critics of the digital divide and digital monopoly pointing towards how those technologies and information are captured for the benefit of a few at the cost of millions and used to make profits instead of providing benefits to the majority. If we talk about cultural hegemony -a term coined by Antonio Gramsci- in the neoliberal era, imperialism today survives and it is hegemonized using digital technologies.

Agriculture of Nepal

Nepal is an agrarian-based economy where more than 60% of the country's population (NRB, 2022)[4] depends on agriculture for their livelihood and agriculture still contributes 23.9% to the national GDP. Family farming, mixed cropping, cattle rearing, and subsistence-oriented production characterize Nepalese agriculture. It reveals that 53% of the households have less than 0.5 ha of land, therefore they are smallholders. It also depicts that one-fifth (20%) of the rural families are 'small commercial farmers' with land holdings from one to five hectares or above. Samriddhi [5] shows that around three-fourths of farmers produce crops for household consumption. Land fragmentation is rapid and this small plot of land has been fragmented into many pieces. Agriculture in Nepal has become a challenging occupation. Due to neoliberal policies, there is rural distress degrading the agricultural environment and creating rural exodus. That's why, a country which was in a food surplus 30 years before is now importing huge amounts of food items every year.

Internet access in Nepal

More than 39% of Internet Service Providers (ISPs), and more than 6 telephone companies (NTC, Ncell, STPL, NSTPL, UTL, STM -CG Telecom) are operating till now in Nepal. However, only 11.59% of the country's population has access to the internet while 28% of users have access to broadband internet. Similarly, about 75% of internet users use smartphones. In January 2022, there were 19.51 million internet users in Nepal. KPIOS has shown that between 2021 and 2022, Internet users in Nepal have increased by 822,000 (+7.7 %) [6].

Why ICT in Agriculture?

It is known that ICT in Agriculture can be used to get the most recent information about weather and climate, seed, diseases and immediate support for expert advice. Furthermore, it also smoothens the connection of farmers with markets and production centers. It is also useful for the development of agricultural systems in accordance with current demands and needs. It is evident that farming involves numerous risks and uncertainties due to geography, climate, and agri-inputs. In this regard, ICT can convey useful information to farmers on weather, programs and policies, crop care, fertilizers, seed resources, market price, etc. ICT can also make a

significant contribution to the productivity and sustainability of small-scale farmers. In the context of Nepal where agriculture is subsistence-based and lacks market and other necessary information, ICT can transform agriculture towards professionalization, mechanization, and what we generally call “smart”, though it is not easy for farmers to have access and control over technologies that are monopolized by few rich people. ICT has the potential to enrich rural communities as it enables the dissemination of essential information at the right time in a user-friendly, easy-to-access, cost-effective manner if massive training is done. In the context of Nepal, this factor is even more important because:

a) The professionalization of agriculture is urgent

In the context of Nepal where the majority of the farmers are subsistence-based, the use of ICT can help them to make agriculture a high source of income and employment providing the necessary information and techniques for professionalism. ICT can alter the way agriculture is done by making it easy to access modern scientific knowledge, skills, and technology, which will increase productivity and efficiency.

b) ICT can change the face of agriculture

One of the biggest challenges of farming in Nepal is how it is characterized as a profession of rural poor people that have no alternatives. It is deemed a dirty, hardworking, and traditional occupation. Therefore, people are moving away from agriculture and the youths are diverted from agriculture. ICT can play a significant part in helping to shift this perception of farming, which is something crucial.

c) Overcoming another challenge of erratic and unprecedented climate

The majority of farmers rely on monsoons for their agriculture as the agriculture in Nepal is rainfed. Mobile applications help to forecast the climate. Along with this, Mobile Messages/Facebook, Messengers/WhatsApp/Viber groups, Online news portals, Television Programme/News, Radios, Products and agricultural services Call Centers/Toll-free numbers/Information, etc are the recent technology exchange platforms that can reduce agricultural loss due to unprecedented climate and weather, especially in countries like Nepal where farmers depend on natural climate.

There are dozens of other areas where farmers can be benefitted by using ICT. Some of them can be summarized as:

- The contribution of ICT to transforming agriculture by applying new knowledge, techniques, and information from planting to processing, etc. in order to increase productivity.
- Using ICT makes it possible for farmers to connect to a wide market. They can find out how much their product costs in other places and where there is a market for it.
- By means of ICT, rural areas can now access more financial and insurance services.
- Strengthening rural governance, institutions, and collective action by means of the use of ICT.
- Empowering intermediary institutions with ICT: cooperatives, extension institutions, community organizations, farmer networks, etc.
- Applying ICT to provide solutions for food safety and traceability will improve food security while empowering small producers.
- ICT can be used to educate farmers on new or modern agricultural practices and processes as a way of bringing smallholder farmers up to global standards.
- ICT can also help in land administration and natural resource management, in monitoring and adapting to the impacts of climate change on land and water resources.
- Employing ICT to manage environmental risk in agriculture through monitoring and early warning. With the help of early warning systems made possible by ICT, smallholder farmers can benefit from localizing weather, monitoring, forecasting, and reporting, which can eventually help preserve crops and save lives. ICT also enhances the detection of diseases and insects.

ICT implementation in Agriculture by various Organizations in Nepal

Various organizations have used ICT in agriculture by conducting interactive and informative programs on FM radio and television, publication on websites and newspapers related to agriculture, social networking pages, groups, operating Youtube channels, and developing video tutorials.

Training and programs have been organized by NGOs, INGOs, and private sectors. There are mobile applications such as Krishi Guru, Geo Krisi, Smart Krisi, hat Bazar

Krishi, Hamro Krishi, NARC Krishi, and Krishi Kapurkot. Websites like merotarkari.com, agrinepal.com, and sabjiland.com.

Various entrepreneurial groups providing hardware technologies for the agricultural sector and various vendors and manufacturers of agricultural equipment are currently operating in the country. The government of Nepal has technology concerned with agriculture that includes Radio programs, Television programs, periodical publication of newspaper and newspaper articles, Bebasayik Krishi prabadhan talim, Hamro krishi-PPCR/AMIS, NARC Krishi, Pokhara Krishi, VCDC Nepal, NCFD Nepal, various financial and technical assistance for farmers, Agricultural Development Bank and so on.

Prospects and Potentials of ICT in Agriculture

As we have discussed, there have been efforts to disseminate and transfer agricultural knowledge and technologies, but key stakeholders, expertise, technologies, and knowledge are still out of reach of most rural farmers in Nepal. Large sections of the farming community do not have access to the huge knowledge base acquired by agricultural universities, extension centers, and research stations. In this respect, the main challenge is to find this knowledge and apply it at the field level. Gender disparities in levels of ICT adoption are an additional social and economic concern. Shreds of evidence show that women in rural areas are much less likely to have access to mobile phones or computers than men. There may be reverse impacts of technologies too. It is important to think that in the name of new technologies imposed, there is an increase in the cost of production which has put a burden on farmers, even pushing them into a debt crisis. The technology should be localized. It should be sustainable. In the context of Nepal, high-tech agriculture is not the demand of the present time. More concern should be how farmers can have access to and control over ICT.

Undoubtedly, the benefits of ICT for increased agricultural productivity and strengthening the agricultural sector include timely and updated information on agriculture-related issues such as new varieties release, the emergence of new threats such as diseases, weather forecast, pricing control, warning alerts, etc. In the context of huge inequality including the digital gap persisting in the world, especially in developing countries, the potential of ICT is still a critical challenge for maneuvering in small-scale farming. In the context of Nepal, it has not been a priority yet and the country lacks policies on ICT in agriculture.

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