Agricultural Knowledge Management in Rural China: Learning from Existing Approaches in India

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Abstract

In this proposal we present a preliminary investigation into ICTs used for preserving and transmitting agricultural knowledge in India, with the goal of exploring how they could be modified for use in the rural Chinese context. Farmers in China primarily share agricultural knowledge via oral communication, making preservation and dissemination of the information difficult. We aim to analyze existing work on community-led video production processes, interactive voice response systems, and tailored social media networks to determine which characteristics a system in China should have. By combining this with formative preliminary fieldwork, we hope to devise a new approach for managing agricultural knowledge inspired by existing systems but designed to fit a new context.

Author Keywords

Agriculture; Farming; ICTD; HCI4D; China; India.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Agriculture has been studied from many different perspectives in HCI. Instances include urban agriculture [12], urban food production [19], sustainable HCI [8], and farming practices in developing regions [13]. Recently, researchers have started to look at the intersection between HCI and small-scale food production for possible improvement in productivity and sustainability [3][4][9][21].

In both China and India, rural farming generally remains a small-scale enterprise [5][17]. But the two countries face different contextual challenges. In China, nearly half of the population lives in rural areas as of 2014, while 2.5% is employed in agriculture as of 2011 [24]. In India, more than half of the population pursues agriculture as a livelihood [6]. At about 70%, the literacy level in rural India is relatively low compared to that of China, which is over 95% [23]. While large parts of rural India don't have widespread infrastructure for reliable electricity and broadband coverage [2], most areas of rural China generally do [22].

Despite a developed infrastructure that could support using ICT for spreading knowledge, farmers in China currently get most of their information via oral exchanges and face-to-face meetings [20]. This reliance on oral communication can make preservation and large-scale sharing of information difficult [18]. Since farmers in China regularly use ICTs for entertainment and communication but rarely for sharing or learning about farming practices [20], we believe it is worth studying whether ICTs can offer value in preserving and sharing agricultural knowledge in this context.

Some important work has been done in India about preserving and communicating localized agricultural knowledge through the use of ICTs. By localized agricultural knowledge, we mean information about farming practices and techniques specific to a region's weather, crops, and characteristics. It may come from farmers themselves or some higher organization such as an NGO or the government. We propose that existing approaches from India could be tailored for use in rural Chinese settings. We aim to examine previously implemented community-led video production processes, interactive voice response systems, and tailored social media networks to determine whether one or some combination of the three might be applicable in China. As stated by Awori et al., "while indigenous communities are distinctive … there are similarities that can be abstracted across indigenous knowledges. [1]"

Related Works

Cross-cultural HCI has been prosperous since early 2000s. Early works focused on comparing usability criteria [34] and usability evaluation [35] across different countries. Later on, researchers started designing tools for cross-cultural interaction, e.g. a cross-cultural communication tool for Japanese UN volunteers [36]. More recently, cross-cultural social networks [37], online communities [38], and education [39] have all been studied.

In the past five years, cross-cultural HCI and ICTD work has often focused on re-framing research and design methods to critically analyze factors like power relationships, identity intersectionality, and dynamics of group technology use [28][30][31][32]. Researchers argue that universal claims about users rarely hold

[30], especially when methodology—often developed in Global North contexts—isn't localized or fails to account for the nuanced interplay of human relationships as a part of technology use [27][29][30]. By conducting our research and design with IDEO's "beginner's mind" approach [33] and accounting for meanings intertwined in the relationships between people and context [29], we hope to draw out underlying principles of interaction and communication patterns used for knowledge sharing in the Chinese context that can inform our design and research.

Many studies about presenting and transmitting localized knowledge using ICTs in rural Indian settings have been undertaken in the last decade. Some focus on capturing or disseminating information from farmers specifically, while others address concerns around domains like health and finance. Research analyzing interventions has frequently included a large qualitative component and discussed topics such as information flow, sustainability, power structures, gender differences, infrastructure constraints, and the relationship between technology and behavior. Below we discuss several relevant studies.

Digital Green's use of community-led video production to capture and disseminate localized agricultural knowledge has proven quite successful, now being used across India and in several other countries in Africa [6]. A Community-led Video Education model was leveraged for Projecting Health, a similar community-focused model molded to fit the maternal health domain [11].

Avaaj Otalo is another approach to the management of agricultural knowledge rooted in a voice message forum. Farmers can ask questions and browse others'

questions focused on a variety of agricultural topics [21]. Similar in structure but more broad in domain, CGNet Swara intends to more actively include marginalized individuals in the public discourse around issues and news in local areas by providing a voice forum for citizen journalism [15]. Another system, Gram Vaani, leverages IVR technologies to help community radio stations manage and share their content, which is often created by community members themselves. [7]

KrishiPustak, a text-free social network created for Indian farmers, allowed users to post and reply using audio-visual content. Content was typically posted with the help of a mediator, but findings around the type of materials shared indicate potential for social network use in agricultural knowledge management [14].

Unlike India, not much work has been done in China about using ICTs to capture and share agricultural knowledge at a large scale. We presume this is at least partially due to Chinese farmers' perceived lack of value in the use of ICTs for agricultural knowledge sharing and also a lack of funding for research in this area [20].

Research Questions
Below is a list of research questions we intend to pursue for this project.

- How existing approaches from Indian contexts might be altered to capture and spread agricultural knowledge in rural China?
- How do shared devices and paired/group technology use feed into the system in the Chinese context as opposed to the Indian context? What types of mediators exist in the Chinese and Indian contexts?

- How do gender dynamics affect agricultural knowledge management and dissemination in China? How is it similar to or different from India?

- How should approaches for training farmers to use ICTs for agricultural knowledge management be different in China compared to India?

Research Plan

Thus far, we've completed an in-depth literature review to examine cross-cultural HCI research and the features of existing agricultural knowledge management approaches. Next, the project will focus on setting up a research plan for conducting preliminary needs assessment fieldwork in rural China.

We chose to compare China and India because they both have deep ties between agriculture and traditional ways of life, are similar in population size, and are geographically close. While they share many similarities culturally, we aim to pinpoint areas of difference that directly affect designs for the Chinese context. We anticipate that rural China may face comparably less severe constraints with respect to literacy and technical infrastructure. We also anticipate that gender and power dynamics will play out differently in the two contexts, as they're highly dependent on the intersection with other factors like religious affiliation or caste.

Because China is so large and its rural areas are widely diverse, we will work with local governmental departments to identify a specific village in a province as a potential field site. Observation and interviews in the field will focus on how people farm and how they communicate farming knowledge. From there, a proper

agricultural knowledge management approach can be selected, adjusted, and then applied on site. This project only acts as a beginning and we hope to go further from the lessons we learn.

Conclusion

With this proposal, our goal is to consider the applicability of successful ICTD approaches in the Indian context to the Chinese case, with the objective of preserving and transmitting knowledge of rural Chinese agricultural practices. We would like to partner with others who have an interest in studying the use of ICTs in the agricultural domain.

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