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Capacity development of small-scale farmers
in developing countries:
Analysis of preferences and the role of
information and communication technologies

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Summary

Capacity development through agricultural training is a proven approach to enhance the management skills of small-scale farmers in developing countries, aiming to increase their standard of living in the long run. Yet, little is known about their preferences for different types of agricultural training as well as the impact of trainers' qualification on participants' learning success and satisfaction. Moreover, modern information and communication technologies are increasingly promoted as means to spread agricultural knowledge because of their large technical possibilities, wide coverage, and high exchange rate of information. In particular, the use of smartphones is discussed as a new way to train farmers in developing countries. However, the drivers of small-scale farmers' intention to use smartphones still seem largely under-explored. Besides modern technologies, innovation platforms also called learning alliances are another method to develop farmers' capacities, where all stakeholders involved into agricultural production try to solve problems and improve the value added for everybody. Yet, frameworks to evaluate these alliances are rare. Against this background, this dissertation presents four papers, which focus on capacity development from small-scale farmers' perspectives regarding their preferences, intentions to use smartphones, learning success, satisfaction and trust.

Capacity development in agriculture still follows standardised top-down models driven by the public sector in most developing countries. In contrast, in industrialised countries training activities are increasingly privatised and service provision demand-driven. This is due to the increasing specialisation and industrialisation of agricultural production in recent decades. The trend is prompting researchers and other stakeholders to re-think the contextual fit of capacity development models whereby small-scale farmers in developing countries are passive knowledge recipients rather than holders of traditional know-how and capacities that can be exploited and further developed in customised training. To analyse this research gap, paper one examines the preferences of small-scale farmers for agricultural training with respect to training method, trainer, duration and location of training, and additional offers. A discrete choice experiment was conducted with 664 randomly selected farmers in Bihar state, India, in 2016. The data obtained are analysed using a mixed logit model in a willingness-to-pay space, including analyses for different subgroups. Based on their particular willingness-to-pay for the studied attributes, the analysis depicts small-scale farmers' preference for training activities that include demonstrations, additionally offered inputs (seeds, fertilisers, credit) and an academic trainer.

The second paper builds on the findings of the first paper and focuses on trainers' qualification. Within capacity development, the type and quality of the trainer play a crucial role in promoting farmers' capacity, which is underlined by the results of our first paper. Whilst several studies have addressed the identification of farmers' capacity development preferences, few have investigated the relationship between trainer qualification, learning success and satisfaction of participants. Hence, the main purpose of this paper is to examine the relationship between trainers' qualification and learning success as well as satisfaction of small-scale farmers. Moderated mediation analysis is utilised to measure the influence of direct and indirect effects through trainers' qualification on learning success and satisfaction. In this framework, psychological and relevant proven constructs from the Theory of Planned Behaviour are taken into account: attitude and perceived control operate as mediators, subjective norm acts as moderator, and gender and age are considered as covariates. This framework is applied on primary survey data from 217 farmers collected in Bihar state, India, in December 2016, by the use of a structured questionnaire. The results show no difference in the degrees of satisfaction among farmers related to trainers' qualification. However, learning success decreases with an academically educated trainer. The change of attitude during the training has a significant positive effect on satisfaction. Subjective norms also affect the participants' satisfaction positively. With respect to the theories used, the results indicate that the behavioural constructs are relevant in the field of agricultural education and extension to explain participants' satisfaction. Theoretical implications can be drawn regarding the improvement of this conceptual framework and other related studies.

Besides the trainer, also the method of training is important, whereby the smartphone is one possible device and method to transfer knowledge. The use of smartphones is increasingly supported by non-governmental organisations as well as governmental institutions as a modern information and communication technology to spread agricultural information. However, uptake of the smartphone usage in agriculture is still relatively low in developing countries. Up to now, psycho-economic drivers of farmers' adoption behaviour are mostly not taken into account, or the stakeholders are unaware of the possible importance of non-monetary factors. The aim of the third paper is to identify and quantify drivers of farmers' adoption behaviour through the development of a complex conceptual framework, based on the Theory of Planned Behaviour and its further advances. This framework is applied to primary survey data from 664 farmers collected in Bihar state, India, in 2016, using a structured questionnaire. The results of a partial least squares analysis

indicate that subjective norms, attitude, self-control, as well as positive and even negative emotions exert positive influences on the intention to use a smartphone for agricultural purposes. With these results, the paper extends the academic literature through new conceptual insights and provides application-oriented implications for stakeholders, such as non-governmental organisations, extension services and research institutes.

Another approach to strengthen small-scale farmers' capacities is to use multi-stakeholder innovation systems or learning platforms, such as the Nicaraguan Learning Alliance. However, tools for the evaluation of multi-stakeholder innovation systems are rare so far. The fourth paper reports the application of a conceptual framework to evaluate multi-stakeholder innovation systems using the Nicaraguan Learning Alliance in this paper. The assessment focuses on the business relationship constructs of trust and capacity development. In total, 90 survey interviews of producer organisations, 20 in-depth interviews, and six focus group discussions were collected from agribusiness stakeholders linked with the Nicaraguan Learning Alliance and from a control group of stakeholders involved with other networks. The quantitative data were analysed through factor and regression analyses. Results from the quantitative analyses were triangulated with qualitative data. The analysis shows that the Nicaraguan Learning Alliance has been successful in developing smallholder farmers' capacities as a result of trust developed through its dedicated project managers. Nonetheless, the Nicaraguan Learning Alliance has not been more successful at developing agribusiness capacities among Nicaraguan farmers than other networks with the same goals. Results from this study point to the need for facilitating more interactions between the different networks of farmers' cooperatives and organisations with other stakeholders already active within the Nicaraguan agrifood innovation system.

Based on the results of the four presented paper a series of practical recommendations for training activities apply. One of those is to combine the strength of an expert trained on-the-job as the main trainer with an academically educated trainer. The academic trainer could be integrated directly in some parts of the training activities or via modern technologies such as videos or smartphones. This seems to be the most promising approach with respect to the farmers preferences and in order to achieve the greatest learning success and satisfaction of the participants. Furthermore, by the usage of modern information and communication technologies the effectiveness of the training could also be increased. Besides the professional background of the trainer, it is important that trainers gain qualifications in teaching methods and other soft skills. With respect to modern

information and communication technologies like smartphones, our results indicate that presenting trainers and later farmers with the various possibilities of smartphones and creating a positive image of these technologies could help to reinforce the willingness to adopt this new method of communication for agricultural purposes. Hereby, also the social environment needs to be addressed, for example within the training. Smartphones cannot replace direct contact, but their importance regarding capacity development will increase rapidly as previous developments in mobile phone use have shown.

These findings provide politicians and other stakeholders with tangible recommendations to improve their training programmes. Ultimately this could make capacity development more attractive and therefore more likely to be attended by small-scale farmers in the short and long-term. These consequences in return could have further implications for the agricultural productivity and poverty reduction.