**ABSTRACT**

Many African countries have moved into the production of non-traditional agricultural products, in an effort to diversify their exports and increase foreign currency earnings. However, in order to access developed country markets and urban domestic markets, these products must meet food safety requirements, including protocols relating to pesticide residues, field and pack house operations, and traceability. Faced with stringent food safety requirements, companies that establish production centres in low-income countries might exclude smallholder farmers. For instance, export demand for Kenyan French bean recently dropped suddenly by 25 per cent when the World Trade Organization put Kenya on the watch list due to high pesticide residue levels. Due to this, exporters stopped buying from about 50,000 smallholder farmers. This research proposed a mobile-phone based traceability system to make it easier for exporters to work with smallholder farmers in outgrower schemes to enable better quality control and avoid such disruptions in future. To do this, a pre study was conducted as a part of an exploratory study in order to understand the main issues of the overall traceability concept and the specifics of pesticide residue excesses detected in Kenyan fresh produce to the European Union (EU). From these findings, early requirements were derived and an initial functional prototype derived using Object Oriented Design (OOD) methodology. The Unified Modelling Language (UML) which is an object oriented language for specifying, visualising, constructing, and documenting the artefacts of software systems was used to develop a requirements model. After validation of the requirements, an end-to-end prototype application system that traces all the farming activities by using a mobile application to capture the information of farming operations was developed. The mobile application was deployed to six farmers from two different farmersq French bean grower groups in Kirinyaga. They were trained on how to use the system to capture data and interpret the results from the system. The results of the usability evaluation of the system show that tracing all activities involved in the growing cycle of horticultural crops and GlobalGAP related information is improved by simple and user friendly system.