



Remote sensing for sustainable farming

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The UTZ Certified Cocoa program is a program for sustainable farming. The program aims to improve crop growth, farmer income, to protect environment, and to secure sustainable supply through good agricultural practices. Cocoa is the main cash crops in Ivory Coast. It is mainly produced by small farmers in a rather extensive way. In order to produce Cocoa in sustainable way without effecting the surrounding environment especially forests, UTZ has been working with farmers and encouraging them to comply with its code of conduct where UTZ only certifies the cocoa that comes from farms complies with its code of conduct. For example the Cocoa farm should not be exist within 15 m distance from big water bodies or within protected area and its 2000 meter buffer zone. UTZ also encourages farmer to maintain the minimum number of shade trees in his farms, which should not be less than 12 tree per hectare in order to mitigate the effect of global warming on coca tree. In order to be able to detect any non-compliance with its code of conduct, UTZ has recently tried to explore the possibility of using remote sensing in detecting non-compliance for some control points of its code of conduct. We were lucky in getting a support from European Space agency (ESA) through EO hops project where they gave us credits to be able to buy, process and analyze high resolution satellite imagery (Kompast- 3 with 1m resolution). Beside this remote sensing data, we collected some information about the status of the farm from farmers by interview, and we were also able to fly a drone over some areas for ground truth. We used supported vector machine (SVM) to create land cover map for our study area depending on the previous inputs. The resulted map enabled UTZ to identify some forest that open source data were not able to identify (protected planet). UTZ was able to estimate the number of shade trees per plots and also to estimate the production of each plot kg cocoa per year and to compare it with what the farmer said during the survey about the number of shade trees and his cocoa production. The results shows that all the cocoa farms were certified by UTZ in our study area is not grown in forest or within protected areas or its 2000 m buffer zone. No farm located within 15 meter from water body. The correlation between the numbers of shade trees that was estimated by remote sensing with what the farmer had said during the survey was high ($r^2= 8.8$). Land cover maps shows that cocoa is the main cash crop in our study area. The correlation between the estimated coca productions by remote sensing with what the farmer had said was good ($r^2=7.6$). In sum, satellite imagery can play a crucial role in improving certification process and its transparency and efficiency.