HOPES OF CHANGE - FROM ILLICT TO IDEAL CROPS

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Colombia is undergoing the implementation of the peace accord, ending a long protracted conflict with the FARC guerrillas. The government has officially initialized the illicit crop substitution program, which aims to benefit more than 100,000 smallholder families involved in cultivating coca leaf over an area of more than 60,000 hectares. This program aims to enable farmers to eradicate the coca plants and transition to legal crops, complying with the fourth point of the peace accord.

With the purpose of empowering this development project, we will create a web-based application to help small-marginalized illicit crop farmers make business decisions on which crops are profitable locally, to help their transition along the government program to eradicate illicit crops. To do this, farm level microdata and multi-scale market data (municipality, region, nation) on input costs and crop prices, will be combined with field size data supplied by the user to estimate potential gross and net yearly returns, and this information will be provided to the user so that they can view which crops have been financially performing well in their location over the past years. Success will potentially open doors to include the complete farmer population and then expand to other countries.

Our idea rests on the strength of three pillars. 1) Big data analysis using quantitative farm scale data (fed with priors of ~3 million observations) for supportive decision-making on historical returns and range of possible business outcomes (with explicit uncertainty estimation). 2) Cutting edge user experience and user interface (UX/UI) research design to match literacy levels and mobile technology penetration, and allow the leapfrogging of big data utilization in rural populations. 3) Perfect timing – we will take advantage of the ongoing government program that subsidizes the transition from illicit crops, and provide a long-term solution to their existing safety net payments, a once in a lifetime opportunity for helping vulnerable populations on a path to long-term sustainability.

We hypothesize that knowledge mobilization is lacking for farmers to achieve smart decision-making in their transition from illicit crops. We expect to succeed with our solution because our project will be user driven, and will build upon Agronet's extensive experience bringing new technology to farming populations in the country. We aim to bridge the disconnect between data sources on the performance of farming and input costs from national surveys and monitoring programs, and the real performance of individual farmers. Our proposed technology explicitly will feature a feedback mechanism to collect data on business performance of cropping choices so that other farmers can benefit from successful farming business practiced in their network, facilitating the building of long-term sustainable development of locally relevant crop transitions away from illicit crops.

Implementation

The critical point for this project is adoption. This will depend on three main factors. First, the ease of use, and the quality of user experience and user interface design. Second, the perceived benefit from using the app by the user group. Third, the local technology infrastructure, including but not limited to penetration of smartphone use in rural settings, and availability of free data.

1st part (1-6 months) We will work with Dirección para la Sustitución de Cultivos Ilícitos to identify 9 clusters of 10 farmers**,** across 3 regions/districts to test our design assumptions. Each cluster will be engaged in participatory workshops, and one-to-one interviews and user journey mapping will be undertaken with one farmer from each cluster to identify needs and concerns of former illicit crop farmers. These will be used to develop personas, use cases, user stories, and information architecture. We will iterate the design process with user testing through paper prototypes, mid and high fidelity prototypes. During this period, we will develop the backend design and analysis for integrating market and microdata for user display (using the National Agricultural Census, National Agricultural Survey, DANE-SIPSA). Once high fidelity prototypes are complete we will implement these into a functional prototype. We will design and test the server design for the pilot period, and launch the application in Free Basics. To achieve these aims we will employ an Agile development process, involving a user experience designer, a full stack developer (MERN stack), a data scientist, a project coordinator, and Agronet from the Ministry of Agriculture and Rural Development.

2nd part (7-12 months) Smartphones will be distributed to the 9 clusters of 10 farmers in the three identified distinct regions. Training on using the application will be given to all farmers in local launch workshops. One farmer from each cluster will also be elected to be the focal point for checking the use of the application in the cluster, for helping the other users with the app, and for feeding information back to the local project organizer on any problems with local functionality. Essential data will be generated by users, such as plot size, location, crop choice, fertilizer and pesticide use, input costs, selling price. This information will then be used to improve the regional market and yield information data from historical market and microdata used initially. At the end of the trial farmers will be interviewed on the project experience.

Next steps: Should the pilot be successful, the UI/UX of the app will be improved based on the lessons learned. Future funding and partnerships will focus on scaling the app, i.e. server infrastructure to support a larger user base, smartphones, app marketing, and community participatory programs in other regions with high densities of farmers transitioning away from illicit crops. Once the user base is large enough the app will be valuable for conventional farmers as well. This project will kick start smallholders use of ICT and open the door for expansion towards other functionalities developed within the CGIAR Big Data Platform, such as Climate Smart Agriculture and data intensive Precision Ag.

Budget considerations: The budget for paying local farmers for participation might look low in comparison to the other payments. It is nonetheless calculated in a way that daily payments to local farmers don't exceed twice of what a farmer on the higher end spectrum of success might make on a day. We also take into account all families are already enrolled in a government program that guarantees a salary for the incoming year, plus funding for agricultural development projects. A formal ethics review will be sought prior to farmer engagement to limit negative disruption of local power dynamics through the program.

Big Data Architect	$10.000
User experience + interface designer	$20.000
Full Stack Developer	$15.000
Data Scientist	$10.000
Server set up and maintenance	$10.000
Smartphones	$7.000
Project Coordinator	$12.600
Travel, accommodation, and meals for workshop participants and organizers	$10.000
Payment for local farmer leaders during study	$2.700
Payment for participating in app surveys	$2.700
TOTAL USD	**$100.000**