

Final Project Report

Open Agricultural Data in Jamaica – Caribbean Knowledge Economy – 106099-001

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Executive Summary

We gratefully acknowledge the support of the IDRC in planting the seeds of this initiative: *Firstly* in terms of the ideas that emerged from the IDRC-facilitated Workshop, "Towards a Caribbean Open Institute: Data, Communications and Impact", held in Kingston, Jamaica June 30 - July 1, 2010; *Secondly*, for providing the "seed" funding that enabled the development and pursuit of a set of activities that have demonstrated considerable potential for OpenData in the Agriculture domain in Jamaica, and has also created a stream of research and ICT4D opportunities that we hope to continue to pursue both in the Agriculture and other Information-intensive sectors of national importance.

This project was conceptualized with the basic objectives of:

- a) *Exploring the feasibility of a Pilot Project that applies the concept of OpenData to Agriculture Production in Jamaica*
- b) *Building a demonstration prototype of an application that illustrates how open data can improve directly and indirectly the efficiency of value chains in Agriculture in Jamaica, with emphasis on small farmers.*

This final project report describes three streams of outcomes that have emerged from the initiative:

- i. Development of technology artifacts to demonstrate the concepts of OpenData
- ii. Engagement of key constituents and stakeholders through high visibility events
- iii. Future possibilities & opportunities for OpenData initiatives in Jamaica and the Caribbean

These outcomes as summarized in Table 1, have usefully demonstrated aspects of the open development hypothesis that is increasingly being contemplated as the basis for "Openness in ICT4D" i.e. "positive development can emerge through new models of engagement and innovation that are more participatory, more collaborative, and driven more by the beneficiaries" (Hagel III, Brown, and Davison 2010)

Table 1: Project Outcomes - Supporting the "Open" ICT4D Hypothesis

Project Outcomes	Activities & Deliverables	Supporting the ICT4D Hypothesis
Development of Opendata technology artifacts (concept demonstration)	• OpenData Webservices API for Agriculture Data • Microfinance Loan Management Application • AgroAssistant mobile application	Illustrates how OpenData can increase the applications and benefits derived from existing Public sector data by facilitating greater access, participation and collaboration
Engagement of key constituents and stakeholders through high visibility events	• Slashroots developers' Conference and Codesprint • Denbigh 2011 Agriculture Showcase	Engaging the local developer community in contemplating innovations in agriculture; Opportunities for greater degrees of "Open" innovation through engagement of both producers and beneficiaries
Future possibilities & opportunities for OpenData initiatives in Jamaican and the Caribbean	Concept Note Components • Build institutional capacity to promote, facilitate and provide sustainable support for OpenData policy, standards and initiatives across the region • Field deployment of Agriculture Opendata initiatives • Extend OpenData principles to other information sectors (local & regional) • Opendata and ICT4D Research initiatives	

We believe the creation of an OpenData "Community of Practice" (Node) that:

- a) operates on a Regional basis;
- b) continues to develop and offer the technical and institutional expertise and capabilities to build OpenData resources; and
- c) encourages OpenData approaches to the management and dissemination of valuable Research and Public Sector data;

can become a catalyst for collaboration and innovation in critical development sectors, particularly those that are information intensive, and ultimately play a significant role in realizing aspects of the *vision* crafted for the Caribbean Open Institute, notably:

- Progression of the Caribbean towards a knowledge based society.
- Caribbean researchers actively collaborating and engaging in dialogue and sharing information; and policy makers using this evidence-based information for decisions.
- Regional Governments embracing Open Data programs as an essential component of their information dissemination strategies and development goals.
- Researchers and users (including project planners, public organizations, NGOs, civil society) taking advantage of Open Data initiatives to create new services and provide new ways for presenting valuable information and positively impacting and empowering the constituents they serve.
- ICT entrepreneurs actively building creative, content based applications for external and internal markets.

1. Background

The workshop, "Towards a Caribbean Open Institute: Data, Communications and Impact", hosted by the International Development Research Centre (IDRC), June 30 - July 1, 2010 at the Jamaica Pegasus Hotel, Kingston, Jamaica brought together international experts and stakeholders in the Caribbean to explore opportunities for strengthening policy-oriented research in the region. The principles of Open Data and the process of making more data available online in open formats in order to strengthen the work of governments, researchers and civil society, was one of three major themes examined during this forum, the other two being Communication and Monitoring & Evaluation.

The meeting established a preliminary vision and guidelines for a regional initiative to drive open institutional data approaches that would contribute to an emerging Caribbean Knowledge Economy. Specific recommendations related to advancing and promoting the use of Open Data included:

- a) Identifying organizations already inclined to openness, to serve as champions (technical, policy, institutional), target groups (NGOs, academia, private sector), open access and open source communities and crowd-sourced data opportunities
- b) Establishing a forum established among the participant institutions that can provide a basis for Collaboration, dissemination of best practices and sharing of lessons learnt

- c) *Conducting Pilot projects to serve as proof of concept and attract credit, recognition and visibility for contributing agencies, as well as providing incentives for organizations to make data open in order to promote the availability of high visibility, high value raw data*
- d) *Building visibility and awareness with various stakeholders and through the engagement of traditional and new media; promoting the understanding of the issue in civil society, sensitizing the public and reinforcing the benefit of open data.*
- e) Development of a set of tools and documents with clear definitions of open data, of the role of the different actors, the benefits expected (best practices), and instruments for assessing the availability of data/readiness of each country/organization will help to guide the process
- f) Institutional and community capacity building through events and workshops ; dissemination of open data standards, index of datasets, applications, formats/ ontologies, best practices, sample code, open source tools, sample implementations, training tools and standards/formats/vocabulary harmonization.

This Pilot project addresses directly recommendations (c) and (d) by building on the existing collaboration between the Mona School of Business, UWI and the Rural Agricultural Development Agency (RADA) in the Ministry of Agriculture, Jamaica to demonstrate the possibilities and opportunities associated with extending the accessibility, reach and utility of several of the Ministry's significant information resources through OpenData principles.

One of the activities that RADA carries out in their many extension support services to farmers is the collection and management of data about farmers, their farming production capacity and ongoing production activity. This is a critical resource for supporting Agricultural supply-side planning production and statistical reporting. The ABIS - Agricultural Business Information System provides the electronic repository for much of this Production data. More recently the Jamaica Agriculture Market Information System (JAMIS), was established by the Ministry of Agriculture to collect and disseminate pricing data of agricultural commodities traded in the local and regional market place, on a weekly basis.

This Pilot project applies OpenData approaches to the existing RADA & JAMIS Agriculture data resources to demonstrate the potential for OpenData approaches to increase the utility, applications and benefits derived from existing Public sector data by facilitating greater access, participation and collaboration. Specific objectives of the project include:

- a) *Exploring the feasibility of a Pilot Project that applies the concept of OpenData to Agriculture Production in Jamaica through the development, promotion and validation of an OpenData web-services API that allowed access to 10 years of Agricultural production data maintained by the Rural Agricultural Development Agency (RADA)*
- b) *Building a demonstration prototype of an application (using the API) that illustrates how open data can improve directly and indirectly the efficiency of value chains in Agriculture in Jamaica, with emphasis on small farmers.*

The remainder of this report consists of **Section 2** - a description of the technical artifacts developed during the project, including the OpenData API and demonstration prototype applications; **Section 3** - describes two significant events and activities geared at promoting visibility and awareness of the OpenData initiative and its benefits; **Section 4** - provides recommendations for extending the OpenData initiatives through the establishment of a “Community of Practice” to advance the development of the requisite institutional capacity, skills and resources at a local and regional level in the Caribbean.

2. Technical ICT Artifacts

The ICT Artifacts developed as part of this project can be usefully described and analyzed using the principles of the Design Science Research paradigm. According to the prescriptive guidelines offered by (Hevner et al. 2004), Design Science Research is motivated by problem solving and is geared towards the building, evaluation and application of innovative, purposeful ICT artifacts that can address practical business needs. Table 1 summarizes how these seven (7) guidelines apply to this initiative.

Table 2: Design-Science Research Guidelines

Guideline	Description	Relevant Project Activities
Guideline 1: Design as an Artifact	Design-science research must produce a viable artifact in the form of a construct, a model, a method or an instantiation.	The specific ICT artifacts developed through this project: •OpenData Webservices API for Agriculture Data •Microfinance Loan Management Application •AgroAssistant mobile application (see table 3)
Guideline 2: Problem Relevance	The objective of design science research is to develop technology-based solutions to important and relevant developmental and business problems	The challenges associated with the effective dissemination, use and utility of public sector data are well established and include: • Limited access to high quality data that is timely and accurate • Limited availability of structured, current, machine-readable and locally relevant data for public consumption. • Treatment of data produced using public resources as the private property of the organization which produced it
Guideline 3: Design Evaluation	The utility, quality and efficacy of a design artifact must be rigorously demonstrated via well executed evaluation methods.	Various processes and mechanisms for evaluating the artifacts are proposed (see table 3)
Guideline 4: Research Contribution	Effective design science must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and or design methodologies.	It is expected that this initiative will provide a basis for the formulation of a larger Open Data Research initiative that will help to establish the institutional capacity to develop and disseminate open data standards, index of datasets, applications, formats/ ontologies, best practices, sample code, open source tools, sample implementations, training tools, etc.

Guideline 5: Research Rigor	Design science research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact.	Appendix I & II describes the main ICT artifacts and the design choices and development methods
Guideline 6: Design as a Search Process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment	Several PHP frameworks evaluated as potential platforms for API (incl. Agavi , Recess , cakePHP) before selecting cakePHP.
Guideline 7: Communication of Research	Design Science research must be presented effectively both to the technology- oriented as well as management- oriented audiences.	This report is one of several mechanisms used to disseminate the outcomes, findings and implications of this initiative. Other events such as the ./roots conference and the Denbigh Agricultural showcase are described in Appendix III & IV

Adapted from: Hevner et al (2004)

Table III overleaf, provides a summary description of the three main ICT Artifacts developed through this project, their purpose and the basis for evaluation. Detailed descriptions and specifications are contained in the referenced Appendices.

Table 3: Summary of ICT artifacts

ICT Artifact	Description / Purpose	Evaluation and References
OpenData Webservices API for Agriculture Data	RESTful API that allows developer access to 10 years of Agricultural production data and farmgate price data maintained by the Rural Agricultural Development Agency (RADA). The API was developed using CakePHP, an open-source, rapid development framework for PHP, that facilitated the implementation of the API Webservices in a structured and rapid manner—without loss of flexibility.	The effectiveness and robustness of the API was validated during the Slashroots (./roots) Developers' Codesprint competition. Technical specifications are contained in Appendix I and the API is currently published at the site: http://opendata.org.im
Microfinance Loan Management Application	A demonstration prototype application that illustrates how OpenData can improve the efficiency of value-chain microfinance loan processing that could benefit small farmers. This application enables a microFinance Institution to evaluate a Farmer's loan application by querying the OpenData Web-service with his RegistrationID and retrieving information on his farm property as well as crop production history, which provides quasi-Agricultural collateral.	Evaluation of the application and it's utility will be examined as part of a field deployment being planned as part of the expanded OpenData project. Application specifications and design details are described in Appendix II. The live demonstration application can be viewed at: http://mfidemo.data.org.im userid: demo pwd: bankdemo
AgroAssistant mobile application	The AgroAssistant is a companion mobile application developed to extend the capabilities of the Agriculture OpenData web-service. This application for the Android1 Smartphone provides the RADA field officers with remote decision support and information access to the both aggregate and individual agriculture data stored within the API. Functionality includes: On-demand data access to the farm, crop and price information stored in the Agriculture API Location-based searching: An extension officer is able to look up farmer, price or crop information within a geographical area or using the Android's built-in GPS device. Remote data entry: Update farmer records, such as the location of a farmer's property or crop production information	Evaluation of the application and it's utility in supporting the RADA extension officer's field activities will be examined during the field deployment being planned as part of the expanded OpenData project. Application specifications and design details are described in Appendix II.

3. OpenData Visibility & Events

One of the goals of the Pilot project was to begin the process of building visibility and awareness of the OpenData concept with various stakeholders and promoting the wider understanding of the potential benefits of open data. Two significant events provided the main promotional platform that helped to heighten the awareness of, and interest in the OpenData concept while several other activities utilizing traditional and new media were employed to disseminate information about the OpenData initiatives. These activities are summarized in Table 4 below.

Table 4: OpenData Events & Media Activity

Event / Channel	Description / Purpose	Target audience/Reference
Slashroots Developers' Conference & Codesprint, Feb 24th / 25th, 2011	The primary purpose of the event was to provide visibility for the OpenData initiative by exposing the newly-developed Web services API for Agriculture data to the local developer community, and validate the effectiveness and robustness of the API. Conference presenters included John Wonderlich, Policy Director, Sunlight Foundation. The highlight event was the staging of a 24-hr Developer competition, where 13 teams of software developers competed to develop value-added applications in the Agriculture Domain using the Open Data API which was released for the 1st time, at the conference.	Technical developer community; See Appendix III for report on the ./roots conference Conference site: http://slashroots.org/content/rootsdev-conference
Slashroots Conference archived content	Photo archives: http://www.flickr.com/photos/varunbaker/sets/72157626035269339/ Presentation videos: http://vimeo.com/channels/186421	
Denbigh Agricultural Showcase	The OpenData project was showcased at the Denbigh 2011 Show, the 59th edition of the Caribbean's premier agricultural exhibition (held at the Denbigh Showground, May Pen Clarendon). The theme of the 2011 edition was "Opportunity and technology driven, Denbigh 2011", which resonated with the OpenData exhibit that was titled: ICT INNOVATION IN AGRICULTURE THROUGH OPEN DATA INITIATIVES	The Denbigh show provided an opportunity to expose the OpenData initiative and receive feedback from a wide range of stakeholders including Farmers, RADA extension officers, researchers, teachers, etc. See Appendix IV for report on the Denbigh Exhibit
Media article	Interesting commentary on Innovation prospects in Agriculture and the Slashroots initiative by Don Wehby, CEO of GraceKennedy Limited	http://jamaica-gleaner.com/gleaner/20110421/business/business7.html
CVM-TV Technology Today Interview	CVM Television Technology feature Interview on the OpenData initiative	http://www.youtube.com/user/MonaSchoolOfBusiness#p/a/u/0/SB_zcgMZeI0
Slashroots Community	Slashroots (./roots) is a newly formed organization of young developers and technology enthusiasts, that were responsible for the planning and organization of the Slashroots conference, working in partnership with MSB, and have become an active online community and discussion forum for various technology and ICT4D issues.	Website: http://slashroots.org Twitter: /slash_roots Youtube: ./roots/TV Discussion Forum: http://groups.google.com/group/slashroots
http://data.org.jm	The data.org.jm website provides the online platform for the OpenData initiatives. The site currently hosts the OpenData web-services API and technical documentation; and a catalog of demonstration application prototypes that were conceptualized and developed using the OpenData API	

4. Recommendations for Further Development of OpenData in the Caribbean

The following proposal seeks to build on the work and outcomes of this feasibility study and provides the basis for extending the OpenData initiatives in Jamaica and the Caribbean. It contemplates the establishment of an OpenData "Community of Practice" (Node) that:

- a) operates on a Regional basis;
- b) continues to develop and offer the technical and institutional expertise and capabilities to build and utilize OpenData resources; and
- c) encourages OpenData approaches to the management and dissemination of valuable Research and Public Sector data;

Project Title: The OpenData Community of Practice: Creating Possibilities & Opportunities for OpenData initiatives in Jamaica and the Caribbean through increased Access, Collaboration and Innovation

Executing Agency:	Website
Mona School of Business - Centre of Excellence	http://uwimona.edu.jm/msb http://data.org.jm

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4.1 Background - Challenges and Goals

This project will seek to address several of the challenges that constrain the availability and effective use of Research and Public Sector data in the Caribbean, as identified during the IDRC-facilitated Workshop, *"Towards a Caribbean Open Institute: Data, Communications and Impact"*. These issues include:

- Limited access to high quality, locally relevant data that is timely, accurate and available in structured, machine-readable formats for public consumption
- Data produced using public resources is often considered the private property of the organization which produced it and, therefore, limiting the wide availability or accessibility of quality Caribbean research data
- Capacity-building efforts are required within research groups and local/regional institutions to effectively use new technologies to communicate research results and recommendations to policy makers and the public at large.
- There may not be sufficient institutional incentives for research institutions to make data available as well as institutional incentives to communicate research results to policymakers.
- Cultural and institutional limitations that hinder the use of data, and other forms of evidence, for policy making.

The Project is expected to advance the progressive development of the Caribbean Knowledge Economy by contributing to the following vision statements as articulated in the aforementioned workshop:

- Caribbean researchers actively collaborating and engaging in dialogue and sharing information; and policy makers using this evidence-based information for decisions.
- Regional Governments embracing Open Data programs as an essential component of their information dissemination strategies and development goals.
- Researchers and users (including project planners, public organizations, NGOs, civil society) taking advantage of Open Data initiatives to create new services and provide new ways for presenting valuable information and positively impacting and empowering the constituents they serve.
- ICT entrepreneurs actively building creative, content based applications for external and internal markets.

4.2 Project Components

1. Build institutional capacity to promote, facilitate and provide sustainable support for OpenData policy, standards and initiatives across the region

This component will involve the establishment of a team of technical resources at the UWI that will provide resident knowledge and expertise in OpenData technologies, standards and methods. Activities will include:

- a) Technical training and exposure of the Resource team to OpenData technologies, standards and best practices
- b) Identify and establish relationships with regional and international organizations already doing extensive work with OpenData initiatives to facilitate knowledge transfer and build local capacity (eg. Sunlight Foundation, World Wide Web Foundation, and Ciudadano Inteligente).
- c) The development and dissemination of tools, documents and electronic resources relating to open data standards, index of datasets, applications, formats/ ontologies, best practices, sample code, open source tools, sample implementations, training tools and standards/formats/vocabulary harmonization.
- d) Conduct events and workshops to build awareness and visibility and facilitate Institutional and community capacity building
- e) Identify and work with Target organizations (including Regional Governments , NGOs, academia, private sector) to embracing Open Data programs as an essential component of their information dissemination strategies and development goals.

2. Institutionalization and Field deployment of Agriculture Opendata initiatives

The work already completed with RADA and the Ministry of Agriculture , represents an important demonstration of the feasibility of OpenData approaches in the Agriculture domain in Jamaica and provides useful leverage as a platform to increase visibility and validate the utility of OpenData principles . This component will involve:

- a) Working with the Ministry of Agriculture to formalize and institute OpenData Policies as an extension of the current freedom of information policies in place that adhere to “The Access to Information Act 2002”
- b) Field deployment of the mobile and web applications developed as proof-of-concept during the feasibility study
- c) Streamlining of feeder data collection processes for agriculture production & retail pricing data using mobile devices, to enhance the timeliness, accuracy of the OpenData resources.

3. Extend OpenData concept to other information sectors (local & regional)

Identify and extend the OpenData initiatives to at least two additional Information-intensive sectors of national importance. Candidates include trade related data, tourism information, crime statistics, transportation data and ICT data. This component will involve:

- a) Consultations with various Agencies (NGOs, academia, private sector) to establish relationships and identify opportunities for Opendata initiatives based on national priorities, information-intensive sectors, source data availability, etc.
- b) Data Analysis, Sourcing and API development
- c) Building a catalog of demonstration prototype applications
- d) Conduct Awareness, orientation workshops locally and regionally

4. Opendata and ICT4D Research initiatives

Develop an active Research agenda that investigates and informs the use and impact of Opendata on ICT4D initiatives in Jamaica and the Caribbean. Activities include:

- a) Establish research linkages with existing wider research agenda (eg. IDRC's project with W3C.br and ECLAC)
- b) Encourage and facilitate academic interest in research initiatives based on Opendata sources, use and impact
- c) Generate at least 2 x academic publications on OpenData/ICT4D initiatives in the region

References

Hagel III, J, J. S Brown, and L Davison. 2010. *The power of pull: How small moves, smartly made, can set big things in motion*. New York: Basic Books.

Hevner, Alan R., Salvatore T. March, Jinsoo Park, and Sudha Ram. 2004. Design Science in Information Systems Research. *MIS Quarterly* 28 (1):31.

Appendix I – OpenData API Design Specification

This Appendix describes the technical design considerations, choices and methods that informed the development of the OpenData Webservices API and includes the database and programming specification .

SOAP vs ReST

An Application Program/Programming Interface (API) provides software developers and users with a set of routines, protocols and tools for building software applications. Web APIs or Web Services provide an online service that accepts a defined set of HTTP requests message over the Web and returns a response that includes a definition of the data structure of the response and have become a key point of integration for different applications belonging to different platforms, languages and systems. The design of the Agriculture OpenData API contemplated two of the more prevalent architectural approaches to Web Services implementation.

SOAP, Simple Object Access Protocol, provides a simple and lightweight mechanism for exchanging structured and typed information between peers in a decentralized, distributed environment. It uses XML to define a messaging framework providing a message construct that can be transferred over a variety of underlying protocols, and it is independent of any particular programming model or any other implementation specific semantics. SOAP is considered the grandfather of web services is highly regarded due to its structure and extensibility. SOAP is commonly used for Enterprise applications to integrate wide types and number of applications as well as to integrate with legacy systems. This extensibility of SOAP however is one of the major factors that adds to its perceived complexity.

ReST, Representational State Transfer, developed by Dr. Roy Fielding as an architectural style for distributed hypermedia and large-scale networked software, takes advantage of the technologies and protocols of the World Wide Web using HTTP GET, POST, PUT, DELETE to perform create, read, update and delete (CRUD) operations. Web Designs adhering to ReSTFUL principles for defining and addressing distributed data objects, or resources are considered to be a cost-effective means for the easy exchange of information and providing for scalability.

Advantages

SOAP	REST
Language, Platform and transport agnostic	Language and platform agnostic
Designed for distributed computing environments	Much simpler to develop than SOAP
Provides good support for and has good support from other web Standards	Small learning curve, less reliance on tools
Built in error handling (faults)	Concise, no need for additional messaging layer
Extensibility	Very close in design and philosophy to HTTP and the web
Requires less server side processing	Requires less client side processing
Provides stronger typing	Human readable Results
Can provides atomic ACID transactions over a service	Simple Extensible and Flexible
Supports Web-Services Security	Utilises less network resources
	Easier to test and troubleshoot
	Easier to implement caching

Disadvantages

SOAP	REST
More Difficult to implement, more complicated than REST	Assumes point to point communication model. Requires abstraction when implemented in distributed computing environments
More Verbose	Lack of standards for security, policy and reliable messaging
Harder to develop, require tools and specific knowledge of the XML specification	Tied to HTTP transport protocol
Utilizes more bandwidth	

SOAP has been in existence before REST and was the technology of choice for powerful web services. However, most web services do not require the level of reliability and security that SOAP provides. ReSTFUL web services have been increasing in popularity in recent years because the ReST paradigm allows for ease of implementation, ease of access, ease of consumption and ease of understanding. This has been in part due to the intimate relationship that the REST paradigm has with the web as it is developed on the HTTP protocol.

For building the OpenData API that has its primary emphasis on enabling easy access to data, a RESTful API implementation that employs URIs to employ data requests that return structured XML, CSV or JSON responses is an excellent fit. A SOAP implementation for this type of system would be adding unnecessary complexity and may detract from the ease of access and limit the class of potential users of the API. One of the more prominent examples of a RESTful API

Development Framework

Several PHP frameworks were evaluated as potential platforms for the API development, including CakePHP, Agavi and Recess. CakePHP an open-source, rapid development framework for PHP, was selected based on its functionality that facilitated the implementation of the API Webservices in a structured and rapid manner—including built-in functionality for exposing API data via REST. More importantly, CakePHP appeared to have the maturity and an active developer team and community, to provide the requisite ongoing support.

Programming Interface – Data, URI Schema and UseCases

Data Tables: farms, crops, prices

Query Format: **http://data/org.jm/api/[table_ident]/?([col_ident] [delim] [\$var])**

Table	Column
Crops	– FarmerId – PropertyId – Parish – Extension – District – Farm (?) – FarmSize* (micro, small, medium, medium-large, “ “) – FarmerAge – Group – Crop group

Table	Column
	– Group type – CropArea – CropCount – CropDate – PropertySize – xCoord – yCoord
Farms	– FarmerSize* – FarmerAge – Firstname – Lastname – FarmerId – PropertyId – Parish – Extension – district – Farm (?) – PropertySize – xCoord – yCoord
Prices	– Parish – cropType – price – priceMonth

URI Root: **<http://data.org.jm/api/...>**

URI	Description	Example
This Documentation: http://data.org.jm/documentation.html		
Queries		
/crops	Returns the hierarchy of values for CropGroups / CropTypes and production summary	
/crops/parishes	Returns the hierarchy of values for Parishes / CropTypes (i.e. available croptype data by Parish)	
/farms OR /farms/parishes	Returns a tabular (xml) summary of Farms in the database by Parish; includes counts and total PropertySize	
/farms/parishes/extensions /farms/parishes/extensions/districts	Returns a tabular (xml) summary of Farms in the database by Parish/Extension/District; includes counts and total PropertySize	
/prices OR /prices/parishes	Returns the average values of Prices for Parish / CropTypes (i.e. croptypes for which there is pricing information per Parish)	
Parameters/Arguments		

URI	Description	Example
In addition to the basic URI schema above, data can be selected using Argument based Queries /?([col_ident] [delim] [\$var] In cases where Arguments are presented with the URL, all data column values are returned for rows satisfying the specified Queries		
Date Parameters	Date arguments are specified by indicating startdate and/or enddate parameters. A range is indicated using both parameters eg. 2009 is &startdate=2009-01-01&enddate=2009-12-31 eg. After Aug2009 is &startdate=2009-08-01 eg. Jan09 – Aug10 is &startdate=2009-01-01&enddate=2010-08-30	
Paging	Queries are limited to returning a maximum of 1,000 records at a time. In order to manipulate a large result-set, developers can use the following Paging parameters: per_page – number of results per page, for pagination of the result-set. Default setting is 50 page – utility parameter for paging through a large result-set. Indicates the page number requested from the recordset. eg. /farms/?parish=stcatherine&per_page=100&page=2	
	Aggregates	
In cases where developers need to aggregate data across large (or the entire) data-set, Aggregate parameters may be used. Eg. To find the largest tomato farmer in St. Catherine. The following Aggregate parameters will be Available: Count, Sum, Max, Top		
Count	eg. # of Farms in St. Catherine: /farms/?parish=stcatherine&count	
Sum=[col_ident]	Eg. Total Acreage of Banana production in Portland last year: /crops/?parish=portland&cropdate=2009&Sum=CropArea	
Max=[col_ident]	Eg. Largest yam production Farm in Trelawny: /crops/?parish=trelawny&Max=CropArea	
Top=[col_ident] i.e. Top20%	There are cases where it is more useful to find the Top 20%, rather than a single Maximum.. Eg. Largest Cassava producers islandwide, last year /crops/? &Top=CropArea&cropdate=2009	
NB> Developers could accomplish these results using standard queries, paging parameters and local processing, however this will be more efficient		

Use Case Scenarios	
Use Case	Query
Crops planted in St Elizabeth	/crops/?parish=st.elizabeth
Carrots planted across the island	/crops/?croptype=carrot
Carrots planted over time period – Jan09 – Aug10	/crops/?croptype=carrot&startdate=2009-01-01&enddate= 2010-08-30
<u>Credit proxy by microfinance institution</u>	
Farmer products over last year	/crops/?FarmerID=90410367&startdate=2009-01-01&enddate=2009-12-31
Number and size of properties	farms/?FarmerID=90410367&count &Sum=PropertySize

Use Case Scenarios	
Use Case	Query
Price of crops planted	/crops/?FarmerID=90410367&startdate=2009-01-01 /prices/?croptype=Pumpkin
Number / Area of other farms planting same crops	/crops/?croptype=xxxxxxx&count&Sum=CropArea
Farmers	
Crops of other farms growing in an area	/crops/?parish=st.elizabeth&district=junction
Highest producing crop last year	/crops&startdate=2009-01-01&enddate=2009-12-31&Max=CropArea
Price of a particular crop	/prices/?croptype=Green Banana
Best place to sell a crop	/prices/?croptype=cassava&Top=PriceAvg
Supermarket/Retailers/Agro-producers	
Largest producers of a crop	
Best places to buy a crop	
Properties near a particular plant	
RADA / Government Agency / Min Of Agriculture	
Most efficient farmer	
Highest growing extension, district, parish	
Which farmer sizes are most efficient	
Farmer sizes or properties that are under performing	

Appendix II - Demonstration Prototypes: MFI Loan Prototype / Android Mobile App

This Appendix describes a prototype application that was developed to demonstrate how the Agriculture open data resource can be used to improve directly and indirectly the efficiency of value chain finance in Agriculture in Jamaica, with emphasis on small farmers. The specific application context is a Microfinance Institution that operates in the Parish of St Thomas (Eastern end of the Island), where Agriculture is the dominant activity (i.e. both primary production and Agro-processing). They operate a Microfinance portfolio and are developing a program based on a “value chain lending model (VCLM)” that was conceptualized to provide more organized economic opportunities for the MSME sector in the parish. The prototype application was developed to enable this VCLM's knowledge-based decision-support process using the OpenData API to provide access to Farmer and Production information, as well as utilize a mobile-enabled data capture/delivery system to better facilitate more efficient data collection, queries and information access in the field.

The Appendix is structured as follows: The *Requirements Overview* describes the context within which the Open data approach is being applied as a value-added solution and provides a high-level specification of the application that was developed. The *Application Features* section discusses some of the main features, considerations and components that were employed in developing the application. *Evolutionary Considerations* outlines plans for the field deployment and possible further enhancements to the application.

Requirements Overview

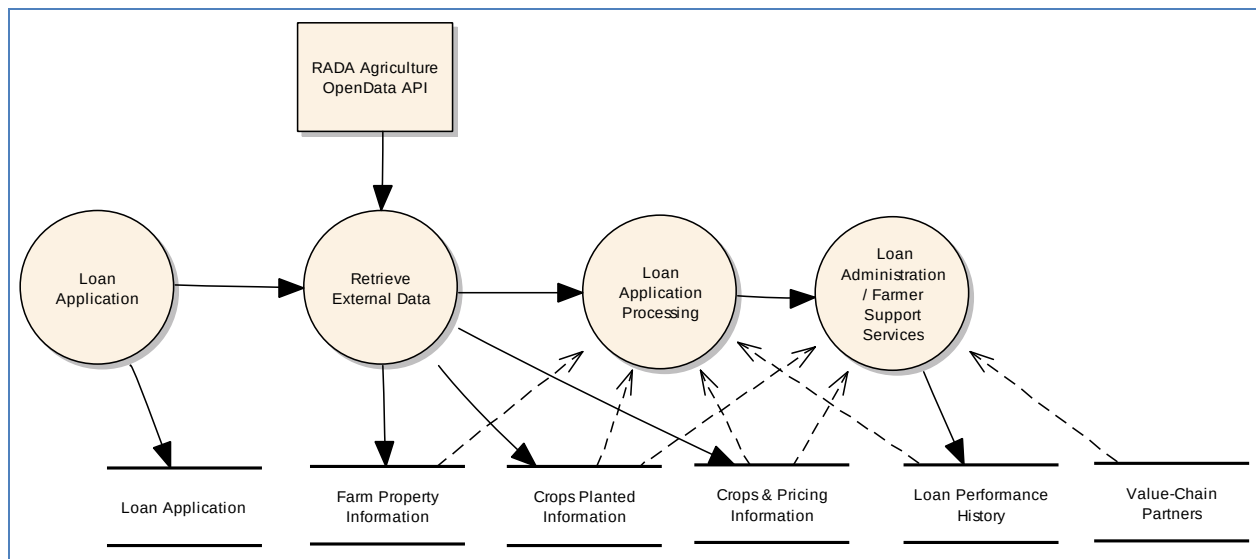
Access to information and access to finance are two of the most powerful drivers of rural development. Accurate, timely and inexpensive information is an increasingly necessary requirement for efficient market operation and sustained economic growth. Likewise, access to adequate and timely financing is a necessary component of sustainable production. Rural Agriculture in Jamaica is particularly vulnerable to the lack of both financial and information resources resulting in market pricing anomalies, high cost of finance, and poor agricultural practices.

Value-chain finance (VCF) activities that focus on linking financial institutions to the Agro value chain by building relationships and offering services to support the product flow between primary producers (i.e. Farmers), Agro-Processors and Markets. VCF spreads the risk-usually associated with micro and small enterprises and rural farmers across multiple value-chain actors, and provides alternatives to traditional collateral requirements. However, value-chain lending has been traditionally constrained by limited access to information about those financially excluded actors it was designed to benefit.

Microfinance Loan Process

The solution therefore, is predicated on enabling and facilitating the increased access to horizontal information across the value-chain for all actors. The focal Actor In this case is the financial institution and its decision-makers involved in the process of making financial resources available and accessible to small farmers in an efficient and risk-controlled manner. The application enhances the microfinance Loan application process by providing access to information on the Farmer applicant (i.e. property / crops planted / current market prices), retrieved from the OpenData API (See fig 1).

Figure 1: OpenData Support for Microfinance Loan Process



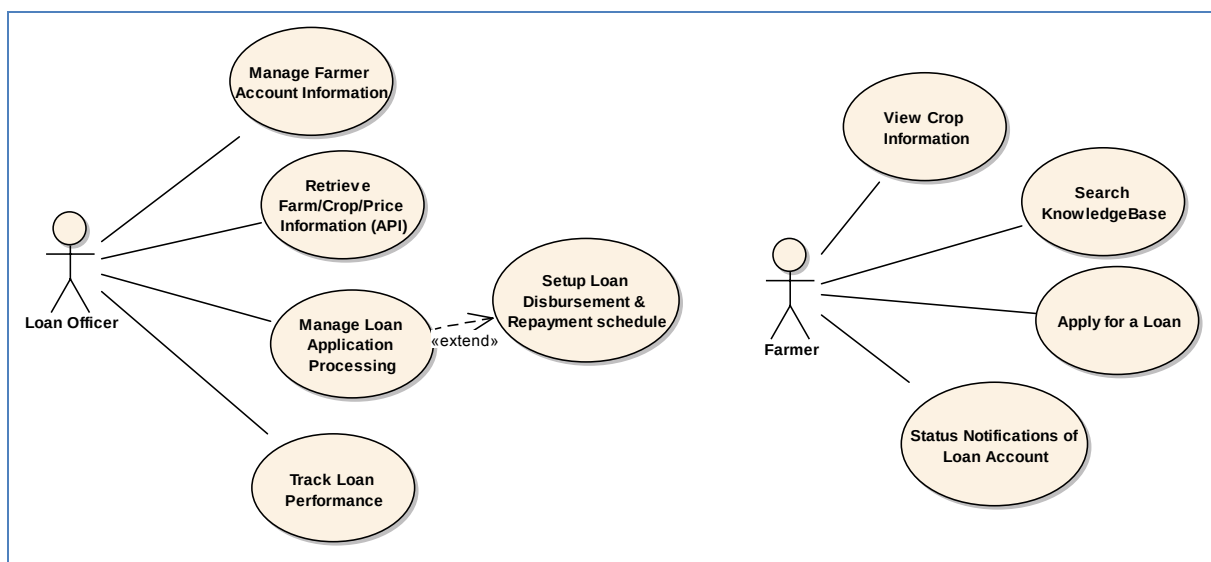
In addition to decision support on the Loan Application Processing stage, the application was designed to provide information support for the end-to-end microfinance lifecycle through the following additional features

- Farmer Information Management, segmented into the following main segments.
 - Basic contact information (Name, Address, Age, etc.)
 - Farm Property Information: (Farm location, size)
 - Crop Production Information (Date planted, CropType, CropArea)
- Manage each approved Loan as a Project with milestones and tasks relating to the Loan repayment schedule and a predefined set of Loan-Processing or other Support activities
- Provide standard Customer Relationship Management (CRM) functionality to continue to manage the Farmer as a client, including keeping track of calls, interactions and other support services
- Provide information on potential downstream value-chain partners that can become associated with and ultimately participate in individual loan applications.
- Develop and maintain a KnowledgeBase for common Farmer/Crop Queries

Primary UseCases

The primary user role in this application will be loan decision-makers within the financial institution i.e. loan officers. This role also incorporates client (farmer) management functionality as well as tracking the performance of individual loans over it's life-cycle. We also contemplate functionality that would enable a farmer to submit a loan application via email or web, and to get notifications (via email/sms) of scheduled loan events such as disbursements, repayments, visits, etc. These use-cases are represented

Figure 2: Primary Use-Cases



Information domain

The prototype application is primarily about access to, and the effective management of information for purposes of decision-support to the microfinance process. **Table 1** summarizes the key information objects to be managed in this domain. The Open data API contributes increased access and transparency for three of the five information constructs (i.e. Property, Crop Production, Crop Pricing). As each participating entity (microfinance institution) develops their own local information content relating to loan applicants, loan performance and value-chain participants, these information resources take increased precedence as the decision support basis. Over time, increased opportunities will emerge to collaborate and share those information resources on a peer-to-peer basis with other institutions to provide shared financial collateral and credit information.

Table 5: Domain Information Entities

Entity	Description
Farmer Account	Represents the Account for a Farmer that has applied for, or has been processed for a Loan.
Farmer Contacts	One or more persons associated with a Farmer Account.
Property (Farms)	Represents a Property – Identified by PropertyID <i>(populated from API)</i>
Crops/Pricing	Information on the various Crops grown in different geographical regions from the RADA database. Also includes retail pricing associated with Crops–Regions. <i>(populated from API)</i>
Crop Production	Information about actual instance of Crop Production by a specific Farmer <i>(populated from API)</i>
Loan Contract	Record of all approved Loan contracts with a Farmer. Each Loan will be managed using a Project metaphor. Project Milestones and tasks will be used to represent the Loan disbursement repayment schedule and a predefined set of Loan–Processing or other Support activities that can be scheduled to be performed on behalf of the Farmer, in administering the Loan.
Support Service	This describes any general interaction to manage the Farmer as a client, including keeping track of calls, interactions and other support services
Value–Chain Partners	Various downstream partners that provide outlets for Crop production and could become associated with a particular Loan account as a Value–chain partner

Application Features

Accessing the Application

The application was developed as a web-based application for flexibility and ease of access and deployment. The vTiger OpenSource CRM was used as the base platform from which to build the prototype as it already provides many of the core components required to represent the information entities outlined in Table 1.

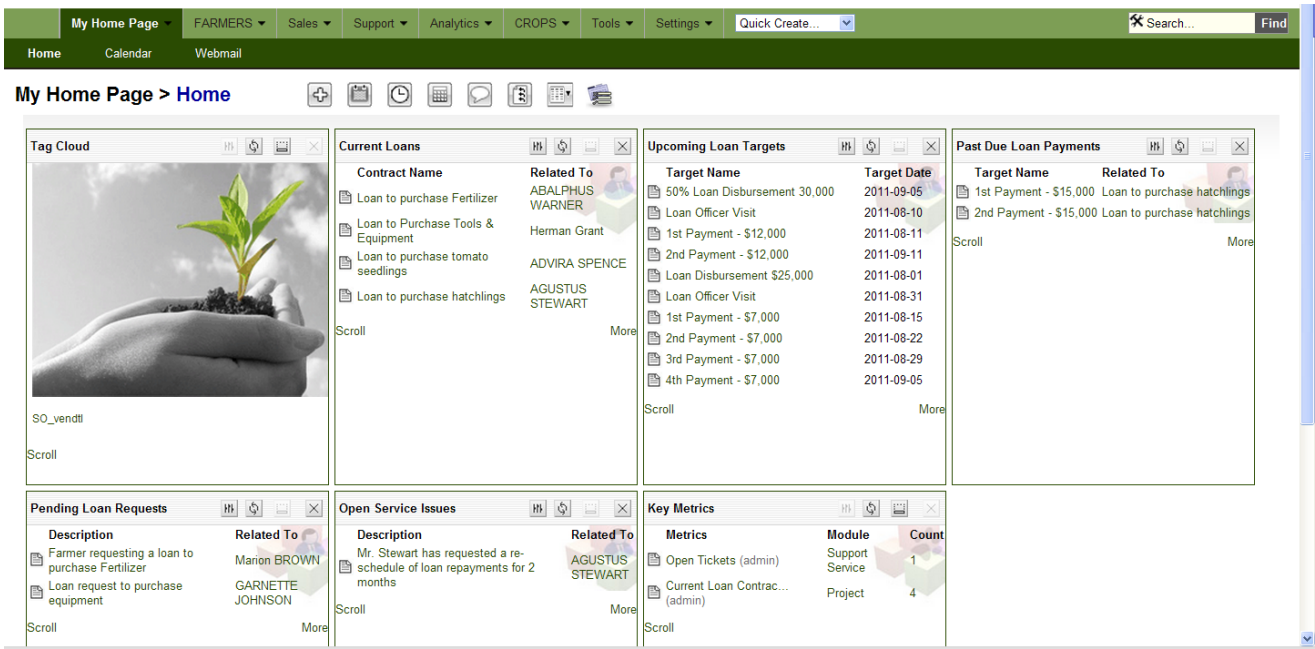
The main login screen is shown in fig 3, and provides for different user roles, as well as a choice of theme preferences. The demonstration prototype is currently staged in the application showcase of the OpenData project website (<http://data.org.jm>), and can also be reached directly at <http://mfidemo.data.org.jm>

Figure 3: Main Login screen



Consistent with the theme of Information management and decision support the main homepage of the application presented at login, presents the user with a dashboard of status and key metrics relating to current loans in process and upcoming targets/milestones as well as overdue repayments. It also provides information on pending loan applications in the pipeline and other service requests.

Figure 4: Application Homepage



Client (Farmer) Information Management

The main client account screen, shown in fig 5, provides the basic identification, contact and address information for each client. The most significant feature is the **"Retrieve Farmer Information"** which uses the Registration ID, provided by the farmer to query the Opendata API and retrieve on-demand,

Figure 5: Farmer Information management screen

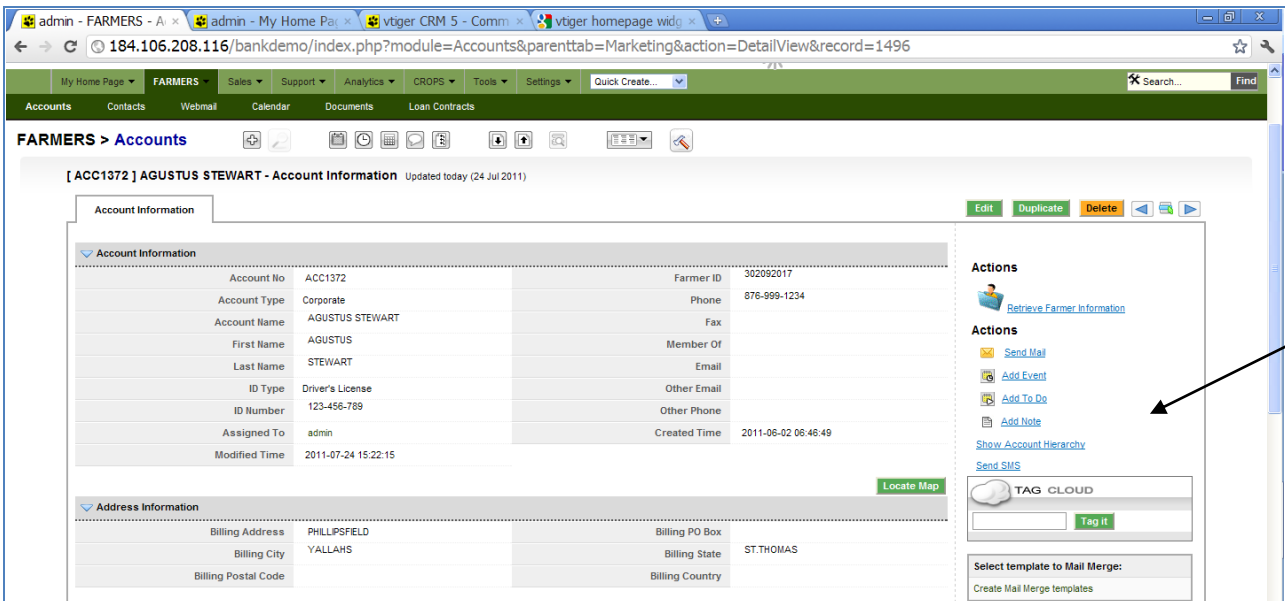


Figure 6: Farmer Information Details

farmer such as current or prior Loan information, documents, queries, etc.

Crop information is provided for reference purposes and displays the Crops planted in each geographic locale (based on data contained in the RADA database. The "***Retrieve Price Information***" feature allows the most recent available retail pricing information to be retrieved from the API, for the specific parish location. This can be updated on-demand.

My Home ▾

FARMERS ▾

Sales ▾

Support ▾

Analytics ▾

CROPS ▾

Tools ▾

Settings ▾

Quick Create... ▾

✕ Search...

Crops

Property (Farms)

Crop Productions

Value-Chain Partners

CROPS > Crops

+

+

+

+

+

+

+

+

+

+

[PRO2586] Vegetables - Crops Information

Updated 52 days ago (03 Jun 2011)

Crops Information

Edit

Duplicate

Delete

◀

▶

▼ Crop Information

Crop Name	Callao	Crop No	PRO2586
Crop Group	Vegetables	Price	45.83
Parish	ST.THOMAS	Description	Produced in PROSPECT PEN-YALLAHS-ST.THOMAS
Extension	YALLAHS	District	PROSPECT PEN
Modified Time	2011-06-03 16:10:53		

▼ Crop Image Information:

Actions

🌱

Retrieve Price Information

TAG CLOUD

Tag it

Loan Administration

Once a Loan contract has been approved, the application provides features that enable the Loan contract to be managed and administered as a project with targets, milestones and tasks that maintain visibility of all activities relating to the loan. This loan information is represented in tabular and graphical formats as shown in fig 7 and 8, and summarized in the status dashboard on the homepage.

Figure 7: Loan Contract Administration

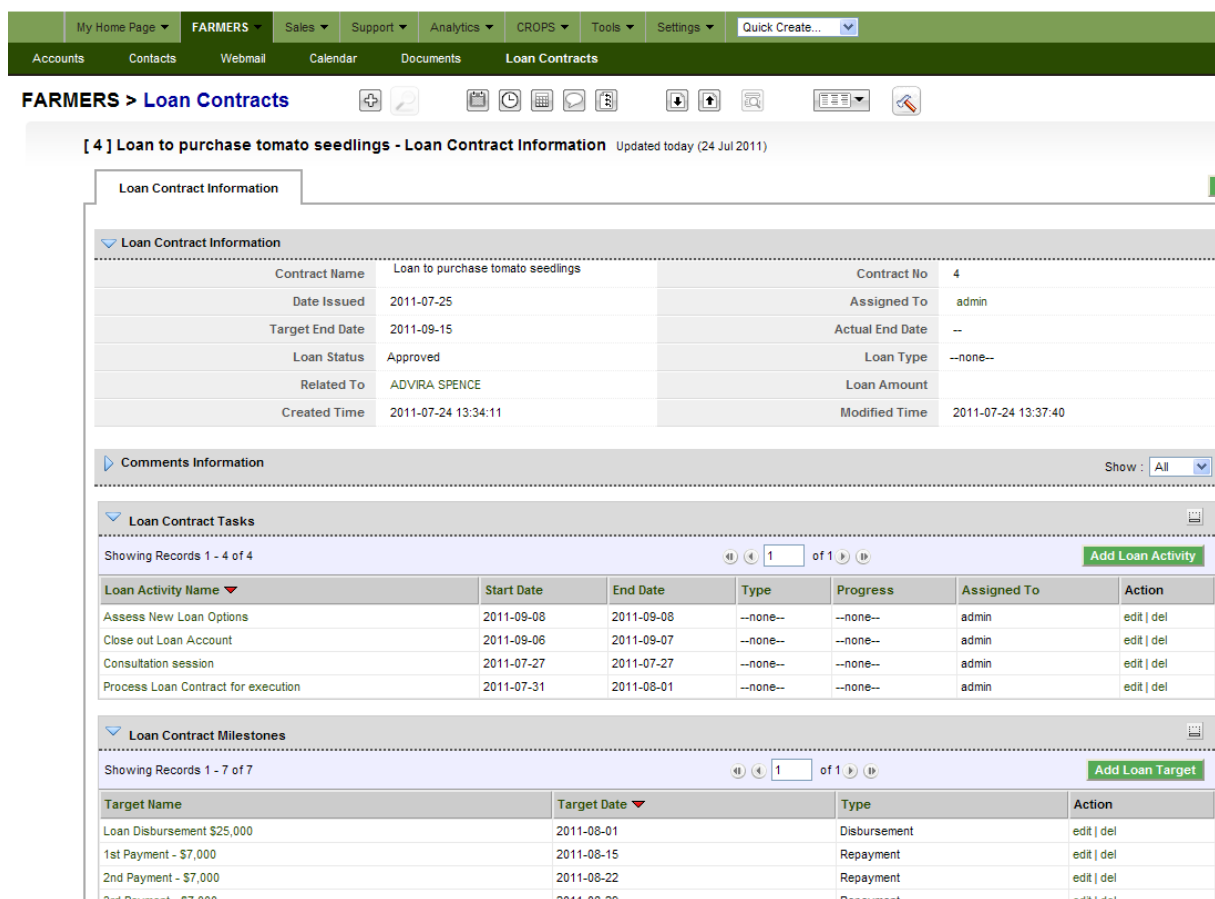
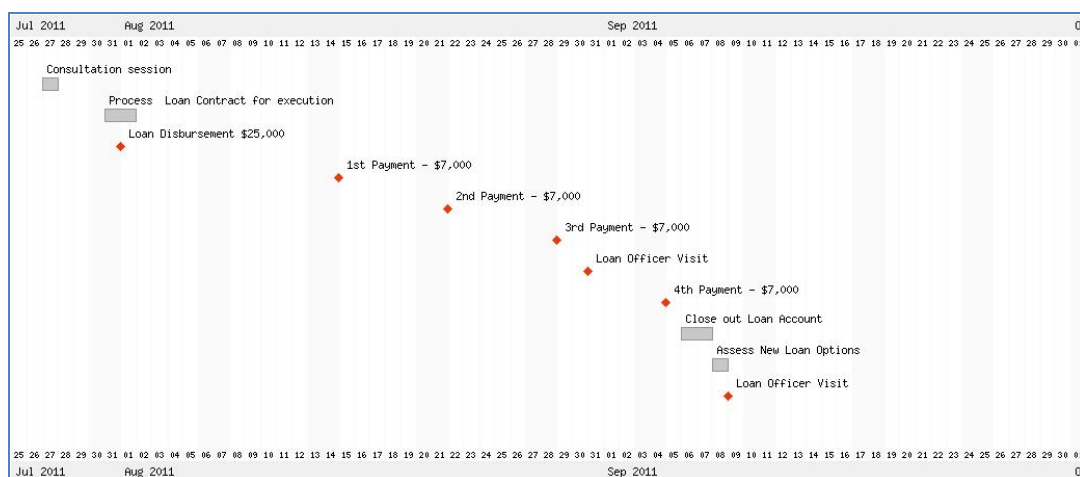


Figure 8: Loan Administration - Gantt Chart



Value Chain Partners

Potential Value chain partners include various downstream organizations such as Exporters, Agro-processors and Retailers. The application provides a database of existing organizations that could participate in any of these roles. Any individual value-chain organization can be linked to a specific Loan arrangement to represent either a formal or informal association with that loan arrangement.

Figure 9: Value-chain partner information

Partner Name	Category	Phone	Street	City	State	Email	Action
ABM Investments Ltd	Exporters	978-6998	15 Lancaster Rd	Kingston 10			edit del
Adduci Jamaican Tobacco	Agro-Processors	957-0708	West End Rd	Negril	Westmoreland		edit del
Advanced Farm Technologies Ja. Ltd.	Exporters	610-5604	P.O. Box 66	Falmouth	Trelawny		edit del
Agri Ventures Jamaica Ltd.	Exporters	968-9252	36 1/2 -38 Red Hills Road	Kingston 10			edit del
All Island Banana Growers Association	Agricultural Associations	922-5497	10 South Avenue	Kingston 4			edit del
All Island Beekeepers Association	Agricultural Associations	983-2281	Bodles Research Station	St. Catherine			edit del
All Island Cane Farmers Association	Agricultural Associations	922-3010	4 North Avenue	Kingston 4			edit del
Antilean Import -Export Co. Ltd.	Exporters	926-8804	Mail Plaza	20 Constant Spring Road	Kingston 10		edit del
Appleton Estate	Agro-Processors	963-9215	Appleton Siloah	St. Elizabeth			edit del
Appleton Hall/Good Hope Ltd.	Exporters	979-8101	P.O. Box 302	Montego Bay	St James		edit del
Ashley Christie	Exporters	813-2734	19 Norbrook Acres Dr. Kingston 8				edit del
Balfour Williams	Exporters	445-7735	Bushy Park PO	St. Catherine			edit del

Mobile Extensions

Together with the Internet and the World-Wide-Web, the mobile phone, which is rapidly becoming the platform of choice for access to and dissemination of Digital content, present significant opportunities for extending the potential reach and impact of Open Data.

As part of the demonstration prototype for this pilot project, a companion mobile application was developed to extend the capabilities of the Agriculture Open Data API. The **“AgroAssistant”** mobile application will provide the RADA field officers with remote decision support and information access to the both aggregate and individual agriculture data stored within the API.

The major application functions are:

On-demand data access: The application provides the field officer with full access to the farm, crop and price information stored in the API. The extension officer can also perform specific search requests based on any of the fields stored in the API

Location-based searching: An extension officer is able to look up farmer, price or crop information within a geographical area or using the Android's built-in GPS device. The farmer can use integrated mapping visualizations to search farms within a chosen area.

Crop Support: The application facilitates searching various crop related information and aggregates, such as top farmers for a particular crop, top parishes for a crop, expected or past crop production.

Remote data entry: Using the phone's mobile data connection, the extension officer is able to update farmer records, such as the location of a farmer's property or submitted crop information.

The application was developed on the Android platform and the main screen-shots are shown in fig. 10

Figure 10a: Main menu - Android



Figure 10b: Farmer Search Menu

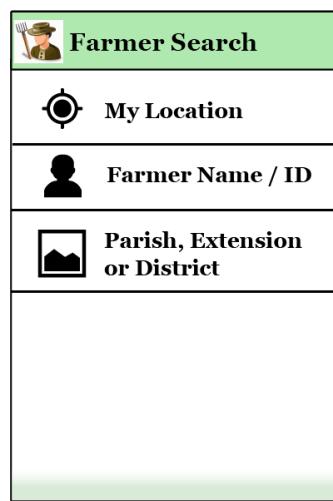


Figure 10c: farmer Search by name

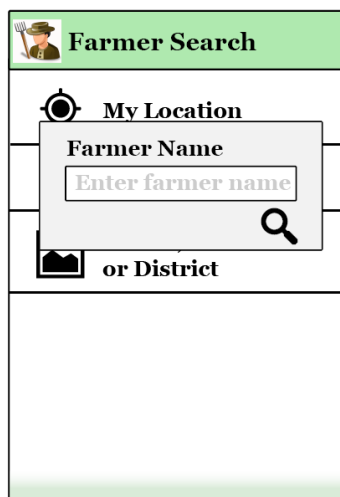
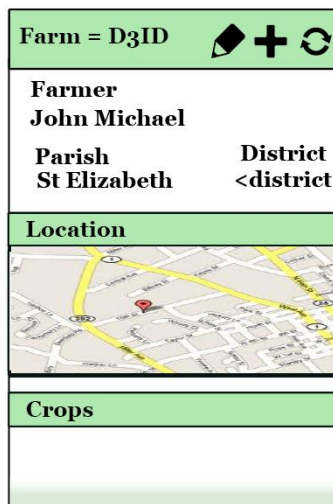


Figure 10d: Display Farmer Information



Evolutionary Considerations

It is worth noting, that the Ministry of Agriculture already has a policy of providing public access to the information contained in the Agriculture production databases maintained by RADA, consistent with “The Access to Information Act 2002” legislation enacted by the government of Jamaica to grant the right of access to records in the custody of Government Ministries, Agencies, Departments and Public bodies, to groups, organizations and the ordinary Jamaican citizens.

Hence, there is already considerable progress in the Government’s intent to promote transparency and government accountability through this Act. However access to this information would traditionally be effected through existing publications, the Ministry’s website or obtained on request from the Data Bank Division of the Ministry, which provides the public with access to all aspects of statistical data on the Jamaican agriculture sector.

The prototypes developed help to demonstrate one of the important principles and benefits of Open Data, that of creating opportunities for independent developers and innovators to take this publicly accessible data and build quite powerful applications for consumers and businesses to:

- Access, consume and reuse those data;
- Deliver new and valuable services to citizens;

In this instance, the applications have the potential for delivering considerable utility to microfinance institutions operating in the Agriculture domain and the clients they serve, in particular small farmers, by making information that may have been previously accessible by other means, available online, and on-demand in an open format.

The benefits of this specific innovation example, derive from exploiting the combination of OpenData and Open Source software, two of the more prominent manifestations of the “Openness” philosophy. Because Opendata facilitates more horizontal and distributed information flows and stakeholder relationships, it also presents new opportunities for peer-to-peer collaboration and value creation. An example of this evolutionary progression would be the scenario where each participating entity (microfinance institution) develops their own local information content relating to loan applicants, loan performance and value-chain participation. Over time, increased opportunities will emerge to collaborate and share those information resources on a peer-to-peer basis with other institutions to generate shared financial collateral and credit information.

Appendix III - Slashroots Developers' Conference and Codesprint

The Slashroots (**./roots**) Developers' Conference and Codesprint was hosted by the Centre of Excellence, Mona School of Business, UWI, on Feb 24th / 25th, 2011. The primary purpose of the event was to provide visibility for the OpenData initiative by exposing the newly-developed Web services API for Agriculture data to the local developer community, and validate the effectiveness and robustness of the API. The **./roots** event also provided an opportunity to explore the premise that OpenData can lead to increased innovation. The Conference was organized and executed by the **./roots** community, a newly formed organization of young developers and technology enthusiasts, working in partnership with MSB.

The Conference featured a wide range of presentations from a panel of local and international speakers, all broadly under the theme of **Open Innovation – create.share.apply**. Notable speakers included:

- **Skye Bender-deMoll**, Data Visualization Expert
 - **Keynote:** Getting from "Public" to "Open" Data: lessons learned scraping and structuring corporate subsidiary data for api.corpwatch.org
- **John Wonderlich**, Policy Director, Sunlight Foundation - a non-profit, organization that uses the power of the Internet to catalyze greater government openness and transparency
 - **Keynote:** Open Data Initiatives, Aspirations and Limitations.
- **Felipe Otamendi** – Principal Game developer for Trojan Chicken Game Studio, Uruguay
 - Python gaming software design/development Workshop for OLPC
- **Angel Goñi Oramas**, Founder and former leader of Nova Cuban GNU/Linux Distribution.
- **Allan Pierra Fuentes**, Head of the Operating System and Open Source Technologies Department and Cuban Government's Assessor in Free and Open Source Software migration
 - Cuban Experiences in Open Source Adoption
- **Professor Haniph Latchman**, Professor of Electrical and Computer Engineering, at the University of Florida, Gainesville
 - **Innovation Case Study:** Building security-hardened, lightweight but scalable and highly available communications appliances with Asterisk, FreeSwitch and Kamailio using the Alpine Linux platform
- **Ross Sheil**, Jamaica Observer
 - Transforming Business Process through Technology: The Observer and Social Media
- **Dr. Maurice McNaughton**, Director Of Center Of Excellence, Mona School of Business, UWI Mona
 - From Users to Creators--Institutional Approaches to Technology Adoption
- **David Bain**, Open Source Enthusiast / UWI Lecturer / CEO Alteroo
 - How to contribute to open source: from download to contribution
- Panel Discussion on Building Innovative Capacity
 - * **Kenrie Hylton**, Director at NCU
 - * **Dr Arnett Campbell**, Director At Utech
 - * **Dr Daniel Coore**, Department of Computing UWI
 - * **Dr. Sameer Verma**, San Francisco State Univ
 - * **Marc Gayle, Technology** Entrepreneur/Founder of Compversions

However the highlight of the conference was undoubtedly the staging of a 24-hr Developer competition, where 13 teams of software developers competed to determine which could develop the most innovative value-added application in the Agriculture Domain. The teams were required to develop their applications using an **Open Data API** (Application Programming Interface) which was released for the 1st time, at the conference and provided access to Agricultural Production & Pricing Data provided through RADA and the Ministry of Agriculture. The Agriculture API was the result of an ongoing Research project being conducted by the MSB Centre of Excellence in collaboration with the Ministry of Agriculture and funded by the International Development Research Centre (**IDRC**).



A panel of judges used the following criteria to evaluate the applications built by the teams:

- Usefulness (Who will use application? Potential Impact)
- Usability (User Interface, Responsiveness, Look & Feel)
- Technical Considerations (Degree of use of the API, Data Visualization, Extensibility of Code)
- Coolness factor (Multiple API usage, Technologies)

There were impressive efforts by several teams over the course of the 24-hr competition period. Some of the highlights included:

Team / Institution	Developers	Description of the Application	Target Users
YamZilla / Private	Paul Allen and Jermaine Byfield	The application's goal is to connect markets with farmers. It is mainly geared at supermarkets or mass market customers who are looking for providers. They would visit the website and search for ""Carrots"" and the application would attempt to find, rank and display the best farmers to provide carrots. The ranking metrics are based on location, price and supply status for products in the farmer's region.	supermarkets or mass market customers who are looking for providers.
The A-TEAM / Trinidad (UWI)	Yudhistre Jonas, Craig Ramlal, Gyasi Ambrose	The application was designed as a complete platform that incorporates both web and mobile technologies. This was done to maximize the reach of the data and also to increase data usability. The WEB module of the application consists of a webpage frontend where we have developed a FLASH based application that assists with aggregation and visualization of the data provided by the API. The main feature of this module is to assist farmers seeking financial assistance such as micro-finance loans. The application can also be used by the very same financial institutions to better assess the suitability of the applicant's claim. The MOBILE module (Android and basic Blackberry JAVA) of the application consists of mobile applications and mobile web technologies to deliver data accessed from the API. This module was	Farmers and Financial Institutions

		designed to enable access to specific data that would be most useful to mobile users. This data includes geographic location of crops, farmers, and prices. The mobile module therefore leverages portability with data accessibility.	
Sapna / UTECH	Tennison Dougherty, Dean Jones, Julian Jarrett	The application is a Decision Support System that facilitates loan providers in making decisions on the loan amount that a farmer qualifies for based on: (1) the crops that he intends to plant, (2) the location and size of his farm, (3) the term over which he will plant them, (4) and the historical performance of such crops in similar locations over a similar periods.	The application is targeted at banks and other loan agencies as well as farmers who need guidance.
UWI team	Aston Hamilton, Jonathon Smith, Stuart South	A game that provides a fun and exciting environment for teaching young students about Agriculture in Jamaica.	Primary School Children aged 7-12
NCU1 / NCU	Shawn, Derron, Nicolas	It's a 2 part application. One is a mobile phone for which farmers can use to see the trends of crops. The trend utilizes past data of quantity, prices and location to give a predicted outcome. Farmers can also select a specific crop to view the feasibility of planting it. Part 2 is data visualization for the Agriculture data.	Farmers

The judges were particularly impressed with the technical scope and completeness of the application built by the **A-team** from Trinidad, UWI. However in the final analysis, the **Yamzilla** team was given the edge, due to the usefulness, usability and immediate applicability of their solution. The winning team was awarded Android phones courtesy of LIME and became the 1st holders of the **./roots** Developers trophy awarded by Grace-Kennedy.



The **./roots** Competition demonstrated an important principle of the **OpenData** philosophy, that data becomes far more valuable with use. It also demonstrated the potential to stimulate the local software developer community to contemplate innovations in agriculture, thereby engaging a wider constituency of interests in agriculture that can accelerate the rate of ICT innovation in the sector.

The following links contain photo images and video archives from the **./roots** Conference as well as articles and features in the local and regional media that reflect the considerable visibility generated by this event, which has helped to heighten the awareness and interest in the OpenData philosophy.

Photo archives: <http://www.flickr.com/photos/varunbaker/sets/72157626035269339>

Presentation videos: <http://vimeo.com/channels/186421>

Media article: <http://jamaica-gleaner.com/gleaner/20110421/business/business7.html>

Media Interview: http://www.youtube.com/user/MonaSchoolOfBusiness#p/a/u/0/SB_zcgMZeio

Appendix IV - Denbigh Agricultural Showcase Report

The work of the Mona School of Business' OpenData project was showcased at the Denbigh 2011 Show, the 59th edition of the Caribbean's premier agricultural exhibition (held at the Denbigh Showground in Clarendon, July 30-August 1, 2011). The theme of the 2011 edition was **"Opportunity and technology driven, Denbigh 2011"**, which resonated with the MSB exhibit that was titled: **ICT INNOVATION IN AGRICULTURE THROUGH OPEN DATA INITIATIVES**

Against a background where rural agriculture in Jamaica is particularly vulnerable to the lack of both financial and information resources, the exhibit featured the products of MSB's collaboration with the Rural Agricultural Development Agency (RADA), demonstrating the use of OpenData resources together with Web and Mobile technology and applications to illustrate how these approaches can enhance directly and indirectly the efficiency of value-chain microfinance loan processing in Jamaica to benefit small farmers.

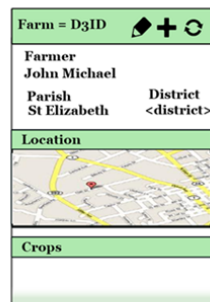
The following 3 technology components were featured in the exhibit:

- Web-based application showing how Agriculture data is enhanced using geospatial visualization
- Business application that enables a microFinance Institution to evaluate a Farmer's loan application by reaching into the ABIS Dataset with his RegistrationID and retrieving information on his farm property as well as production history, to provide a quasi-Agricultural collateral.
- Mobile application that enables a RADA field officer to provide more effective extension support services including data collection and providing remote access to geographically contextual property, production and market pricing information

Positive responses to the initiative were received from members of the public as well as from various interests in the Agriculture fraternity. A number of ideas for further development and collaboration were generated from the active discussions with various persons that visited the MSB booth. A selection of these ideas, interests and comments include:

- using the mobile application not only for RADA extension officers but also for the general public so they can find farmer crops and prices info whether for purchase, research, collaboration, or just for general access to the information.
- utilizing the Visualization application for general purposes such as in the classroom for teaching social studies or other subjects as applicable, use of the interactive charts for download and use in school projects, or just used to locate farmers, crops and compare prices, etc.
- some farmers wanted to know if they would be able to update their own farm and crops info so to allow the data to be more current.
- Greater integration of functionality with the Ministry's ABIS and JAMIS applications and use of the mobile application in their current ongoing collection of data.

The following pages show samples of the brochure and posters prepared for the Denbigh exhibit, as well as some images from the event.



The AgroAssistant

With a penetration of close to 100% in Jamaica, the mobile phone is rapidly becoming the platform of choice for access to, and dissemination of digital content and presents significant opportunities for extending the potential reach and impact of Open Data.

The **AgroAssistant** is a companion mobile application developed to extend the capabilities of the Agriculture OpenData web-service. This application for the Android¹ Smartphone provides the RADA field officers with remote decision support and information access to the both aggregate and individual agriculture data stored within the API.

Functionality includes:

- On-demand data access** to the farm, crop and price information stored in the Agriculture API
- Location-based searching:** An extension officer is able to look up farmer, price or crop information within a geographical area or using the Android's built-in GPS device.
- Remote data entry:** Update farmer records, such as the location of a farmer's property or crop production information.

¹Android phones for this project sponsored by LIME



Slashroots Developer Competition

The *Slashroots* Developer Conference, was hosted by the Mona School of Business in partnership with *./roots*, an enterprising organization of young developers and technology enthusiasts on Feb 24-25, 2011. *Slashroots* was used as the platform for the launch of the Agriculture OpenData web-service and the highlight of the conference was the staging of a 24-hr Software Developer competition, where 13 teams competed to determine which could develop the most innovative value-added application of technology to agriculture. The winning team **YamZilla**, comprised of Excelsior graduates Paul Allen and Jermaine Byfield who developed a Farmers' Google search application aimed at connecting markets with farmers. *Slashroots* demonstrated some important principles of the **OpenData** philosophy, the ability to engage the local software developer community and the potential to accelerate the rate of ICT innovations in the Agriculture sector.

For More Information visit <http://data.org.jm> or Contact Us at:

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Centre of Excellence

ICT INNOVATION IN AGRICULTURE THROUGH OPEN DATA INITIATIVES



A Research Initiative sponsored by the
International Development Research Centre
(IDRC)



The Mona School of Business (MSB) is the premier Business School in Jamaica and the Caribbean. A Degree from MSB is today regarded by recruiters and employers as the leading MBA available in Jamaica.

The mission of the Mona School of Business is to produce world-class transformational leaders equipped to shape the economic development of the Caribbean.

One of MSB's most recent initiatives in pursuit of this Mission, is the establishment of The Centre of Excellence (CoE) for IT-enabled business innovations. Through the Research and Business Outreach activities of the CoE, MSB will seek to provide more activist leadership in conceptualizing, building and disseminating ICT solutions that drive business innovations, in the wider business community, particularly Small Medium Enterprises (SMEs).

The CoE offers a range of services that include business ICT solution research & consultation, training, open source software evaluation & implementation, and ongoing technical advice to SMEs and other Organizations interested in utilizing Free and Open Source Software (FOSS).



What is OpenData?

The Open Data Initiative emerged out of the recent thrust by civil society and policy makers in several countries towards increased Freedom of Information and Transparency in the Public Sector (eg. "The Access to Information Act 2002" legislation in Jamaica). However it was soon discovered that opening up access to raw public sector data in "Open" formats created opportunities for independent developers and innovators to take this publicly accessible data and build quite powerful applications for consumers and businesses to access, consume and reuse those data in order to deliver new and valuable services to citizens.

MSB Collaboration with RADA

The Agriculture **OpenData** project is an ongoing research initiative being conducted by the MSB Centre of Excellence in collaboration with the Rural Agricultural Development Agency (RADA) in the Ministry of Agriculture and is funded by the International Development Research Centre (IDRC). It seeks to demonstrate the possibilities and opportunities associated with extending the accessibility, reach and utility of several of the Ministry's significant information resources through OpenData Web-services..

Key data sources are:

ABIS - Agricultural Business Information System that stores farm registration and agriculture production data.

JAMIS - Jamaica Agriculture Market Information System that provides pricing data of agricultural commodities



Visualization Application

This web-based application demonstrates how geospatial agriculture data can be made more meaningful, accessible and user friendly. The application allows the user to view farm and crop data island-wide on a map basis. Query and aggregate functions also enable data to be summarized as both Bar and Pie charts, run complex queries and receive real time results in either a tabular or map view.



Microfinance Loan Management

A demonstration prototype of an application that illustrates how OpenData can improve the efficiency of value-chain microfinance loan processing that could benefit small farmers. This application enables a microFinance Institution to evaluate a Farmer's loan application by querying the OpenData Web-service with his RegistrationID and retrieving information on his farm property as well as crop production history, which provides a quasi-Agricultural collateral.

Open Source Software in Agriculture



This Visualization Application demonstrates how geospatial data can be made more meaningful, accessible and user friendly.

<http://data.org.jm/>



Farmer Relationship & Loan Management System



A demonstration prototype of an application that illustrates how OpenData can improve directly and indirectly the efficiency of value-chain microfinance loan processing in Jamaica that could benefit small farmers.

<http://data.org.jm/>



Mobile Application: The Agro Assistant



The "AgroAssistant" mobile application will provide the RADA field officers with remote decision support and information access to both aggregate and individual agriculture data stored within the API.

<http://data.org.jm/>



