



Request for Proposal & Quotation for an “Agriculture Inventory & Land Use Mapping” Plugin for QGIS

Organizational Overview

The Deutsche Gesellschaft für Technische Zusammenarbeit (German Society for Technical Cooperation) or GTZ is a private international enterprise owned by the German Federal Government, specializing in technical cooperation for sustainable development with worldwide operation. It primarily works for public sector organizations and is headquartered in Eschborn, Germany. It mainly operates on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ). Further clients are other departments of the government, international donors like the European Union, World Bank or the United Nations, partner countries and the private sector. GTZ works on a public-benefit basis. All surpluses generated are channeled back into its own international cooperation projects for sustainable development. The GTZ provides services in the following areas of sustainable development: Economic Development and Employment; Government, Democracy and Poverty Reduction; Education, Health and Social Security; Environment and Infrastructure & Agriculture, Fisheries and Food.

Required Deliverables

A QGIS plugin for an automated process to manually classify land types from satellite imagery for land use mapping based on visual identification.

Function

To avoid high-level academic training of remote sensing classification techniques, an easy, yet robust method of classifying land types simply by clicking on them from visual identification as a non-expert would from a common application like GIMP is required. The idea is that non-experts would be able to conduct their own land use mapping. The areas from the resultant vector land use maps produced would be further applied to calculate indicators such as expected crop yield.

Target Users

The tool is principally intended for an agricultural inventory project to be conducted by provincial staff from the northern Laotian province of Luang Namtha, though it would also be useful for some Participatory Land Use Planning and other mapping activities across other provinces in Laos. Thus it needs to be as simple and automated as possible.

As it is intended to be an Open Source tool under GNU (general public use) license, it could also potentially be used by anyone with an internet connection and QGIS. It would serve well in the development context where funding, expert knowledge and training is limited.

Technical Specification

A Python plugin is to be coded for QGIS as either a new Menu tool set, Panel or Toolbar.

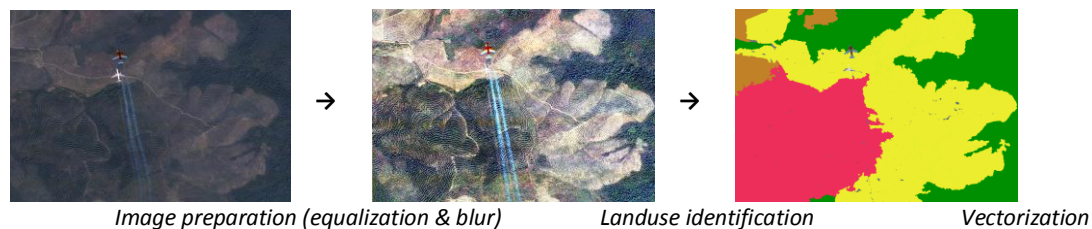
The plugin will have 3 parts:

1. Imagery preparation – this will automate 4 steps:
 - (i) conversion of images to 8 bit Geotif (if necessary),
 - (ii) creation of a georeferencing tag file (.gtf),
 - (iii) Equalization,
 - (iv) then Blur.

The user will simply be asked where to store the new files for the image and then the steps will be run in sequence automatically.

2. Classification –
 - a) Visual classifications of distinct, contiguous recognizable land types are to be conducted on the standard QGIS map interface the same way it would be done in a program like GIMP with BOTH the ‘Fuzzy Select Tool’ and the ‘Select by Color Tool’. The users will apply these tools on a trial-and-error basis with similar dynamic ‘Threshold’ slide bars as in GIMP’s interface until they are satisfied with their selections.
 - b) A third tool would also be necessary to group or generalize the user’s selections, the way ‘Select>Border’ would do in GIMP.
 - c) A dialog should appear on request every time the user is satisfied with their selection to render the land types with an appropriate colour and assign a textual label which will be included in a landuse field. The colours and texts should be editable and not limited in number. This label and colour information may somehow be embedded in the image or stored separately in a look up table if necessary so that it can be rendered accordingly in the resulting end-product vector shapefile.
3. Vectorization – this will polygonize the classified image as contiguously as possible to a shapefile. And the landuse and a colour fields generated in the previous step will need to be either maintained or associated correspondingly to the shapefile.

The following graphic sequence shows generally the 4 step process:



It is proposed that:

- *The conversion of the imagery to 8 bit Geotif and the creation of a tag file could be done with GDAL commands.*
- *The Equalization and Blur need to be produced with the same effect and quality as that produced by GIMP’s Colors>Auto>Equalize and Filters>Blur>Gaussian Blur respectively; however since GIMP’s libraries can only be run internally from within GIMP, it is proposed to implement the equivalent functionality from ImageMagick’s libraries instead.*
- *The same goes for the ‘Fuzzy Select Tool’, ‘Select by Color Tool’ and ‘Select>Border’ GIMP equivalents.*
- *The vectorization could be conducted by the GDAL polygonize function for example as long as its parameters can be set to produce contiguity to reduce individual pixelization.*
- *Step 2b), the most challenging, could be catered for in many ways and so will be left up to the solution provider’s discretion. Use of the already translated Orfeo Toolbox libraries is encouraged.*

This is the proposed construction and presentation for the plugin, however if applicants present a better workflow or methodology this will also certainly be considered and in fact favored.

Assumptions & Agreements

- The name of the plugin shall be “AILUM (Agriculture Inventory and Land Use Mapping)”.
- The plugin needs to be a completely Open Source solution with no legal infringements.
- After being tested, the plugin and its code will be publicly available under GNU license as FLOSS.

Technical Proposal

The solution provider should include time-lines and schedules for completing the project.

Time-Cost

The solution provider must detail the time and costs that will be required to complete the project.

Additional Documentation

Developers can direct us to an internet site or repository which demonstrates their production capabilities.

References

References are optional, though preferable if the candidate is not a company with a published track record.

Submission Deadline

4, February, 2011.

Submit Proposal To:

Ricardo Aravena

Email: ricardo.aravena@gtz.de

For additional information or clarification, contact:

Ricardo Aravena

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Basis for Award of Contract

Balance between the best functional solution and the lowest bid.

Award Date

15, February, 2011.