# QGIS and Land Accounting lab exercise outline

## Intro to QGIS

1) History and downloading QGIS

2) Installing QGIS
    a. Customizing and setting and saving project properties
    b. Things to consider

3) Overview of QGIS
    a. The layout and navigating QGIS
    b. Plugins – QGIS addons
        i. What are they
        ii. Where to find them
        iii. How to install them

## Data sources and saving data in QGIS

1) Identifying and where to get data sources for land cover
    a. FAO GLC-Share
    b. GLC30
    c. ESA 300m 1992-2015
    d. Global hydro data set
    e. Administrative boundaries

2) Data types supported by QGIS
    a. Explore data type icons in QGIS
    b. How to bring in background mapping services (BING, Google, etc)

3) Getting data into QGIS
    a. Explore and select level of vector data – for reporting framework
        i. Load in administrative boundaries and GDB sample data set derived for Asia using GADM data and select out layer to use for reporting unit frame **(RUF)** and land cover statistics for country of interest
        ii. Change symbology of admin framework layer and save project
    b. Raster data
        i. Load in global FAO 1km,
        ii. Load in selected GLC30 30m (2000 / 2010) for country of interest (maximum 6 tiles)
        iii. Possibly Load in global ESA 300m (2000 / 2010 / 2015)
        iv. Load in hydro data from USGS – water features and basins

4) Projections
    a. What they are
    b. How to project in QGIS
    c. Default projection for this exercise (reproject rasters and vector for project)

d. Save data and project layout

**Exploring and working with data**

1) Open saved project file

2) Open vector administrative boundary **attribute table** and examine contents

3) Add various fields to calculate area, percentage area and total area for country (to be used as base area for land cover matrix and reporting)

4) Merge GLC30 (6 tiles) into one raster for 2000 / 2010

5) Extract from GLC30 merge, FAO 1km, ESA 300m admin boundary created above for specific country (using Clipper mask and selection tool)

6) Reclassify GLC30, FAO 1km to best fit to SEEA land cover classes

7) Perform zonal statistics on each reclassified raster dataset using RUF boundaries

8) Export out zonal statistics table as csv for use in Excel

9) Load csv files for exported land cover zonal statistics into Excel and perform analysis and create statistics for RUFs

**Constructing a land cover change matrix / table**

1) Take 2010 GLC30 merged raster and extract each land cover class into its own raster

2) Perform clipper using 2010 GLC30 individual land cover classes on 2000 GLC30 to see what changes have occurred for each of the land cover classes

3) Perform zonal statistics on each 2010 individual land cover class and produce csv table for construction of land cover change matrix in Excel

4) Load MOLUSCE (Modules for Land Use Change Simulations) plugin to get familiar with

5) Load csv files into Excel and format

6) Analyse results of land cover change matrix (charts and tables)

7) Export out as PNG,JPEG land cover change matrix table for map

**Visualization and construction of land cover map**

1) Load in merged GLC30 raster and symbolize

2) Import land cover change image from Excel (PNG/JPEG)

3) Add title / legend / explanatory text / sources

4) Print and export out as image (PNG/JPEG)

Data sources for Lab

**Global adminsitrative boundaries**

http://www.gadm.org/version2

**Land Cover datasets**

http://www.fao.org/geonetwork/srv/en/main.home?uuid=ba4526fd-cdbf-4028-a1bd-5a559c4bff38

https://www.esa-landcover-cci.org/?q=node/175 1992 - 2015 300m

http://www.globallandcover.com/GLC30Download/DownLoad.aspx

http://worldgrids.org/doku.php/wiki:land_cover_and_land_use

https://glovis.usgs.gov/

https://www.nnvl.noaa.gov/site-custom/Green.html

http://glcfapp.glcf.umd.edu:8080/esdi/

**Hydrological boundaries**

https://hydrosheds.cr.usgs.gov/datadownload.php?reqdata=15bass

http://institute.smartprosperity.ca/sites/default/files/publications/files/Importance%20of%20Natual%20Capital%20March%202014.pdf

http://ggim.un.org/country%20reports.html