Future directions for LUCI

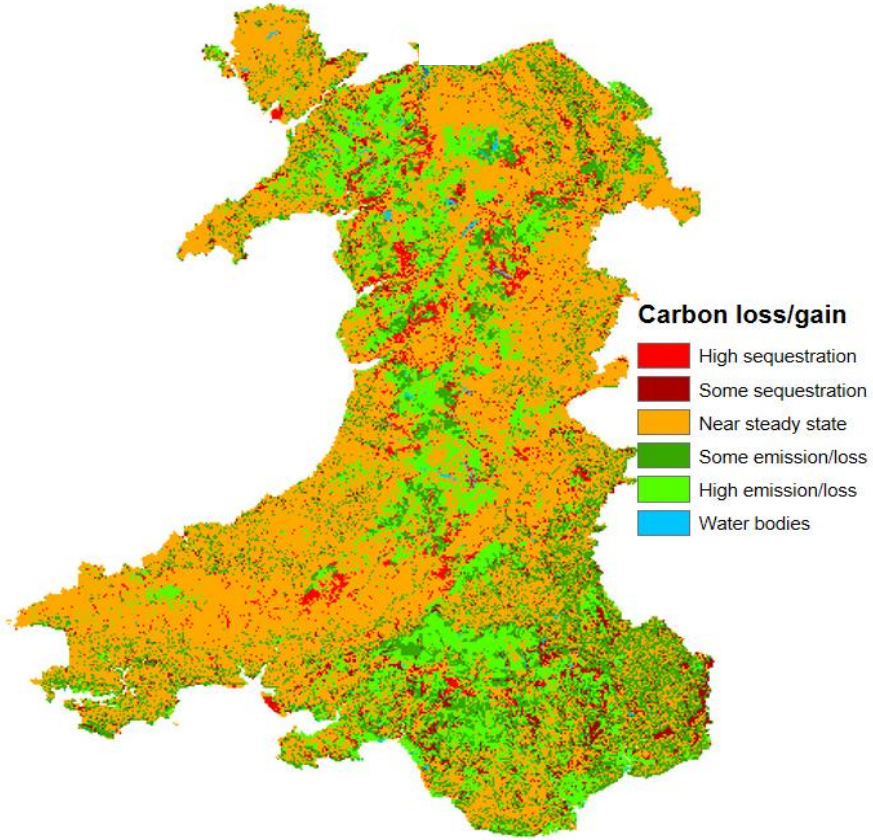
Bethanna Jackson

School of Geography, Environment and Earth Sciences

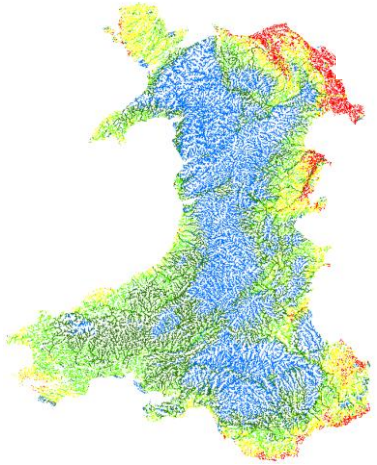
Victoria University of Wellington

Mapping Wales (21,000 km2) at 5mx5m scale: ~800 million elements *per service*

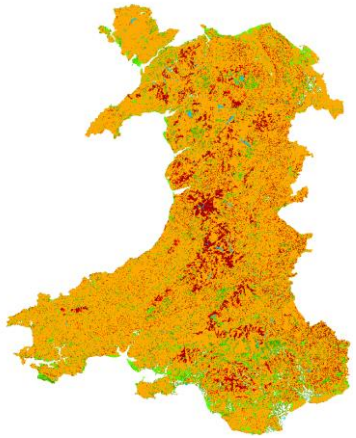
Carbon emissions



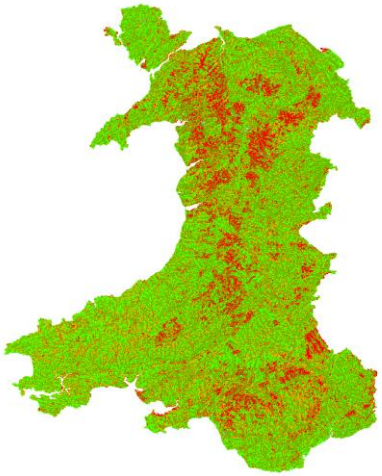
Nitrate in rivers



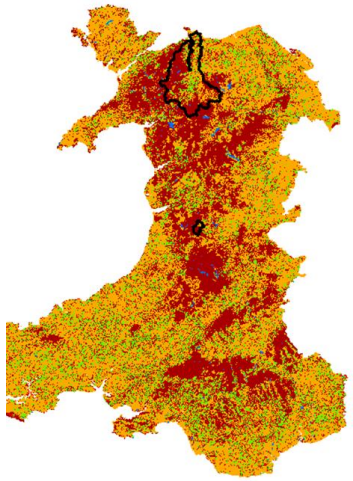
Agricultural use



Flood mitigation



Woodland priorities

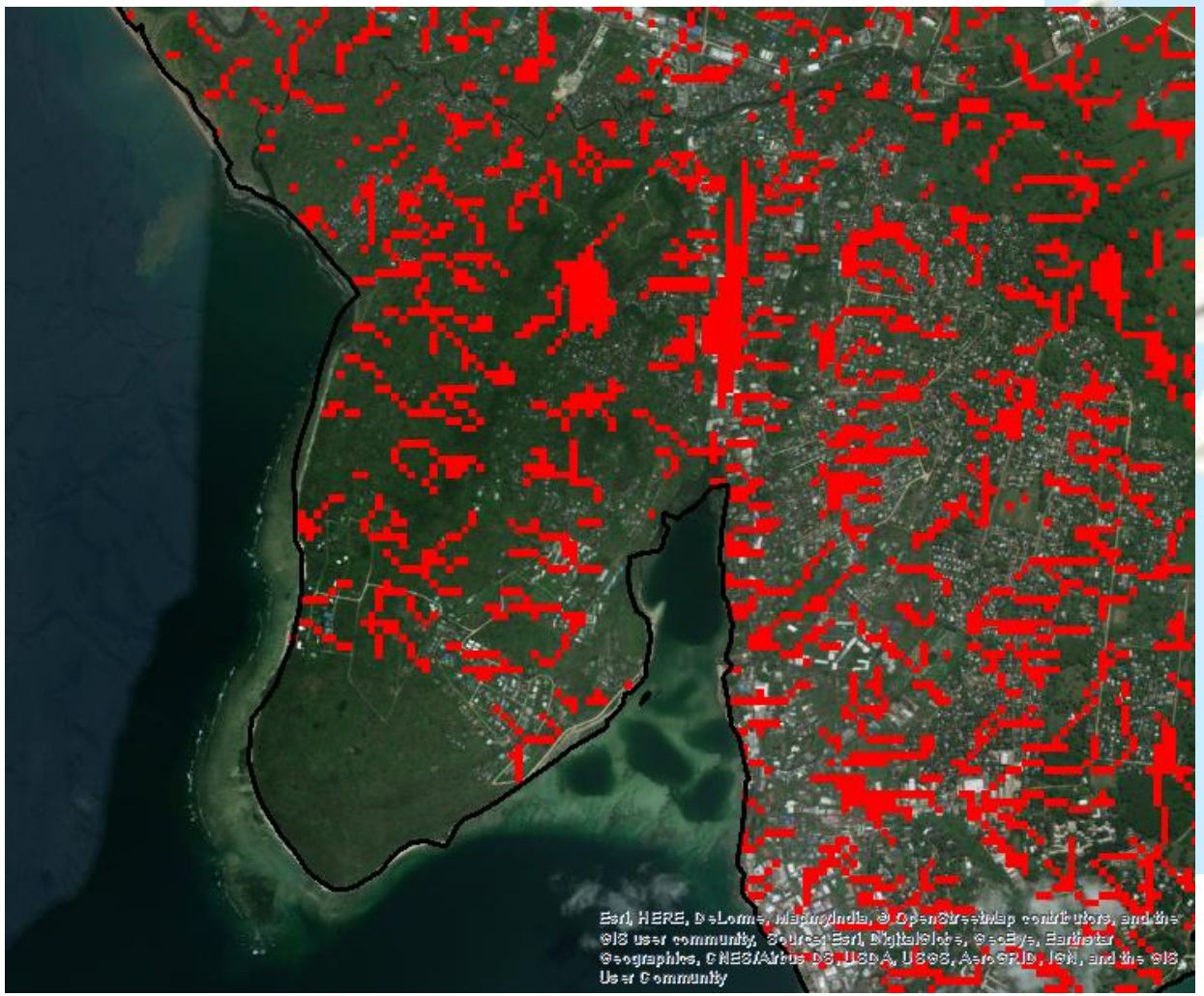


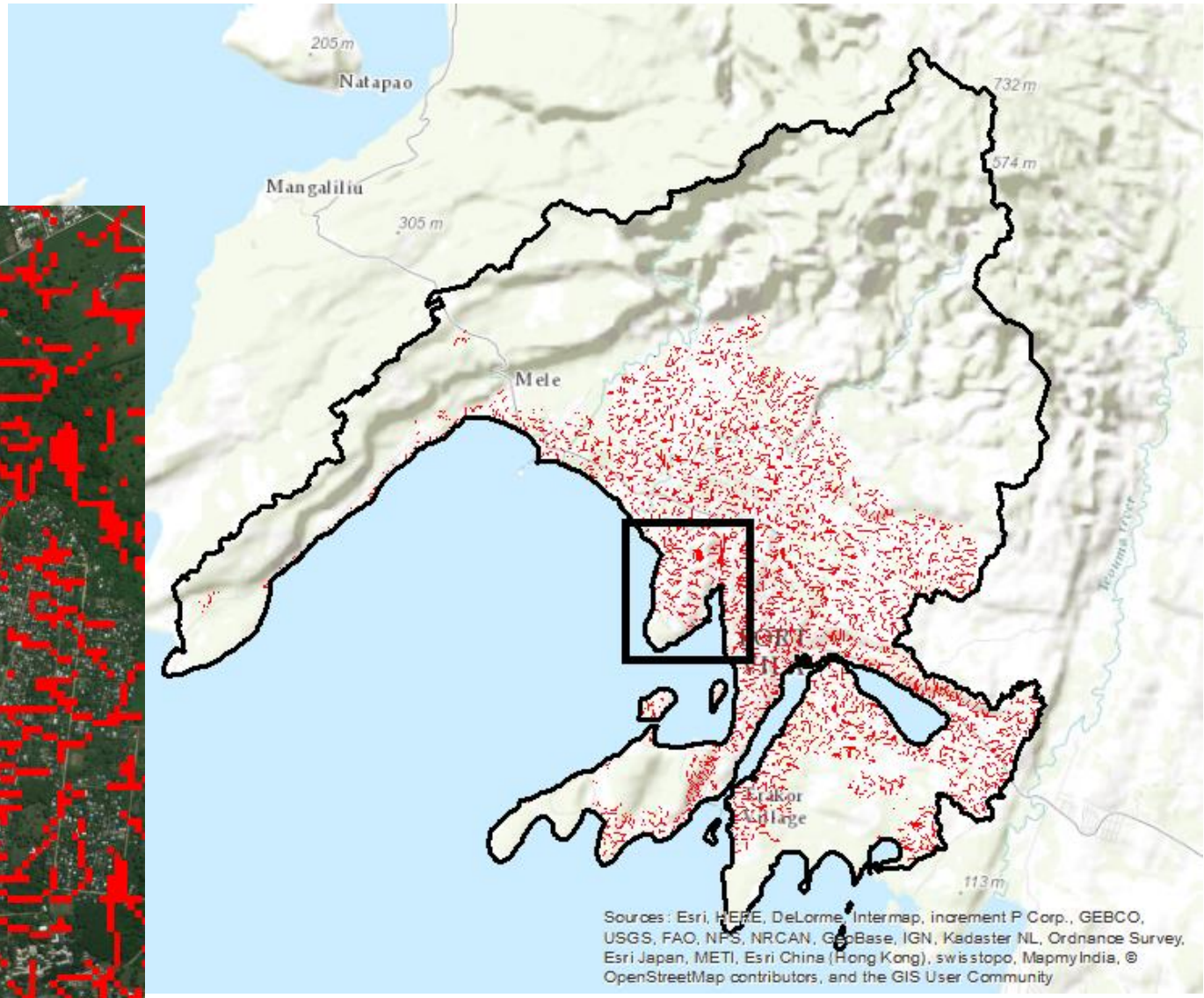
Feasibility of global application?

- 1.5 days on 1 PC to run LUCI at 5 by 5m over all of Wales *for all services*
- *Server enabling speeds this 100-fold+*

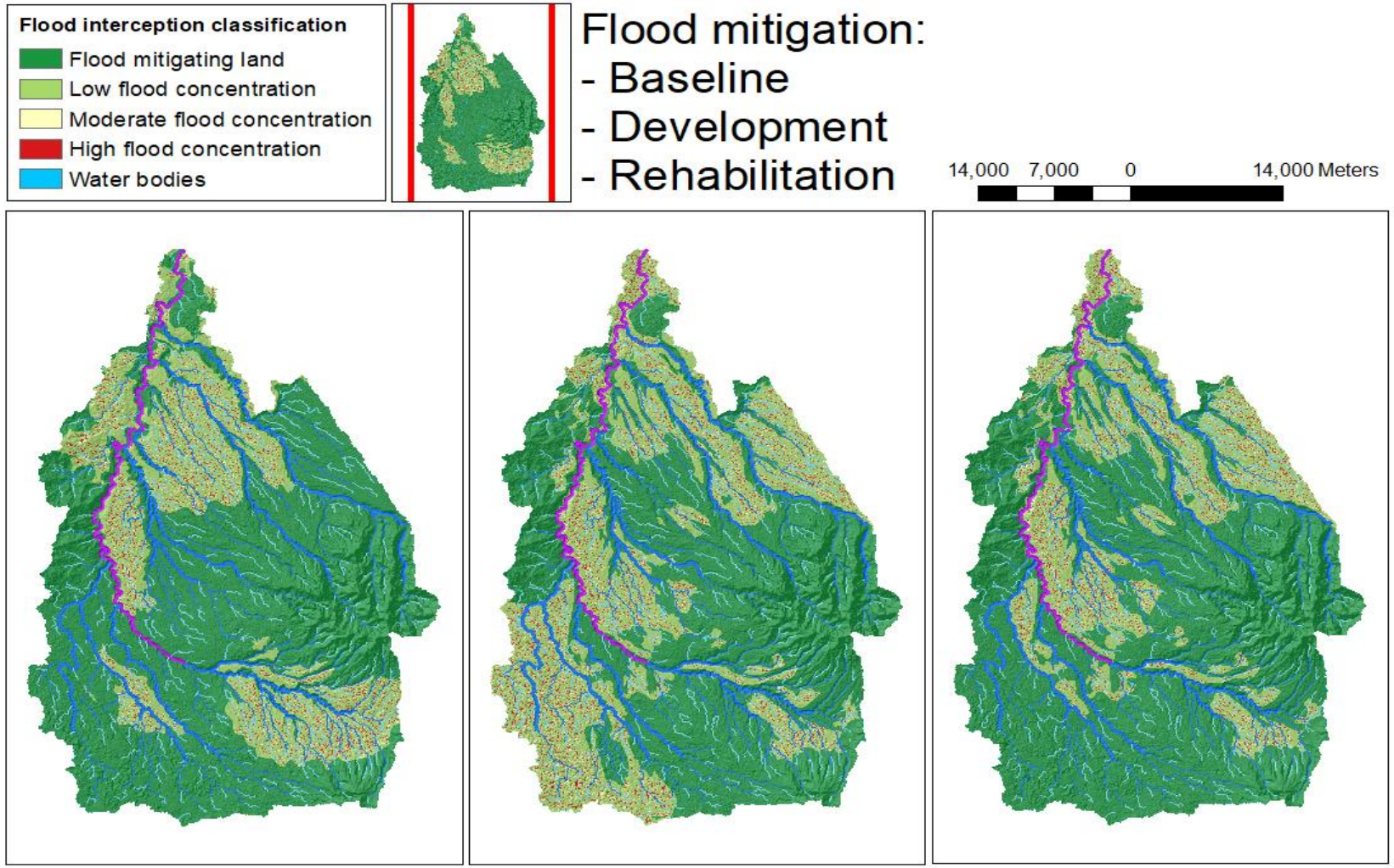
Coverage	**Resolution**	**Area (sq km)**	**No. pixels**	**"Home PC" time**
Wales	5m x 5m	2.1×10^4	0.84×10^9	1.5 days
New Zealand	15m x 15m	2.7×10^5	1.2×10^9	2.1 days
World (SRTM)	90m x 90m	1.5×10^8	18.5×10^9	33 days
World (ASTER GDEM)	30m x 30m	1.5×10^8	167×10^9	298 days

Continuing to expand to different countries

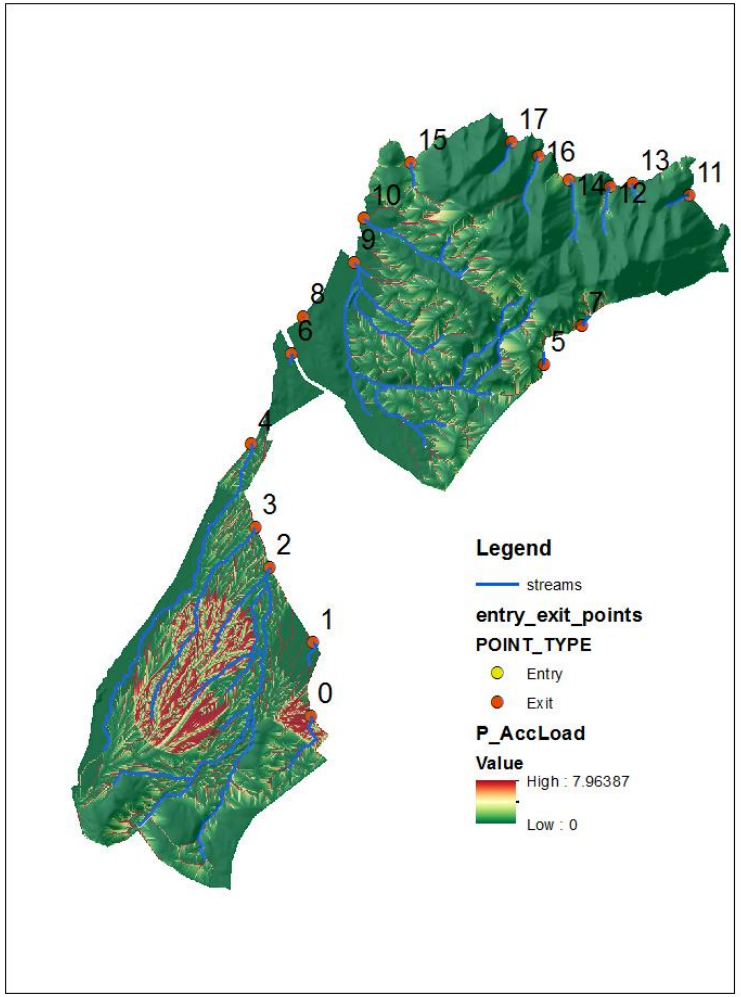


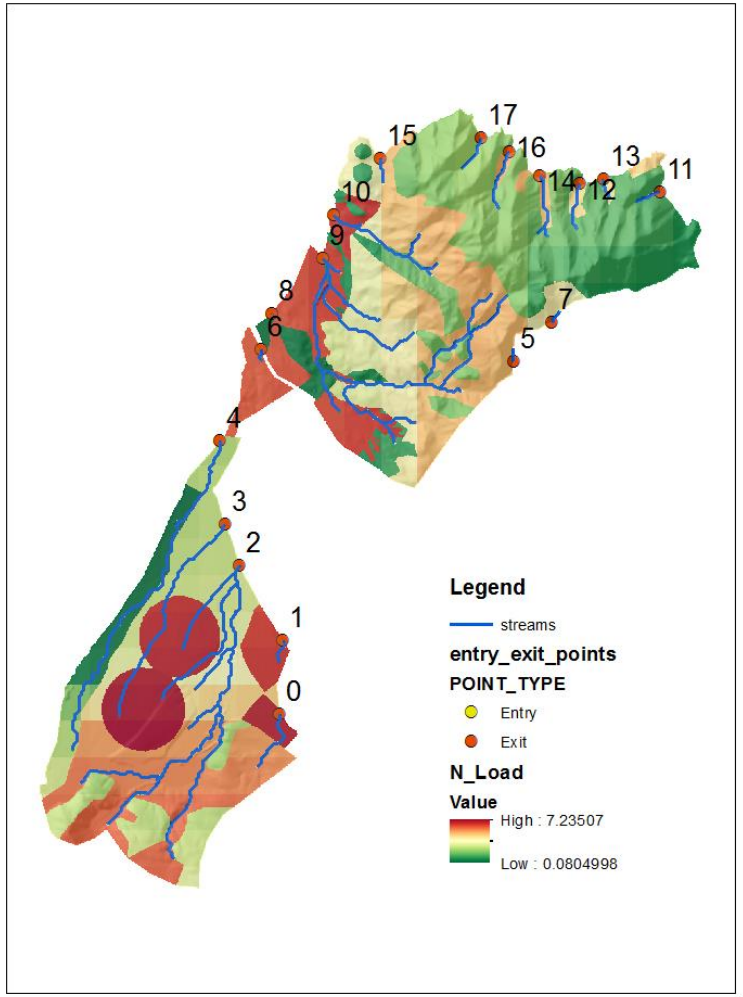


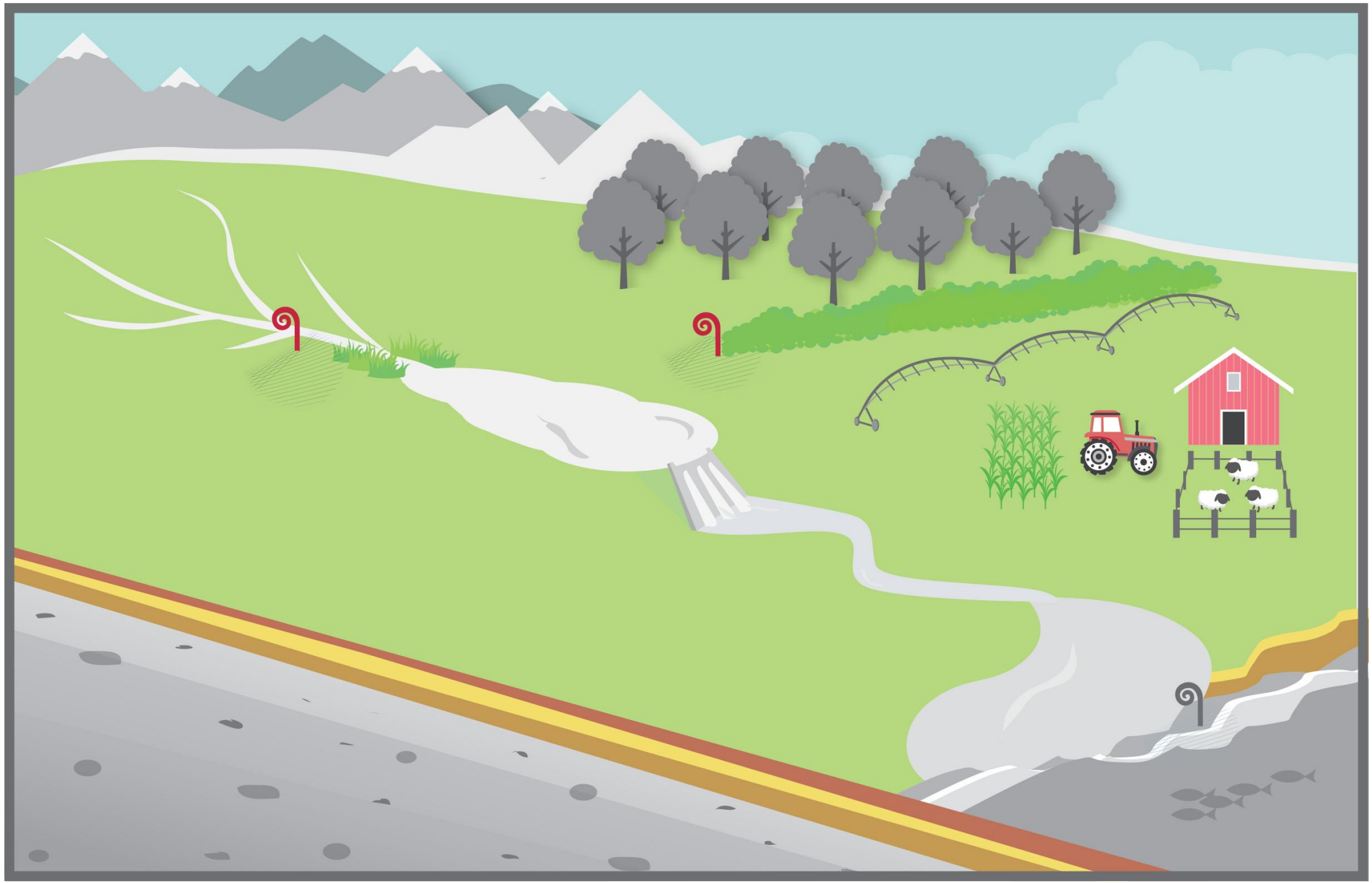
Philippines application: Cagayan de Oro

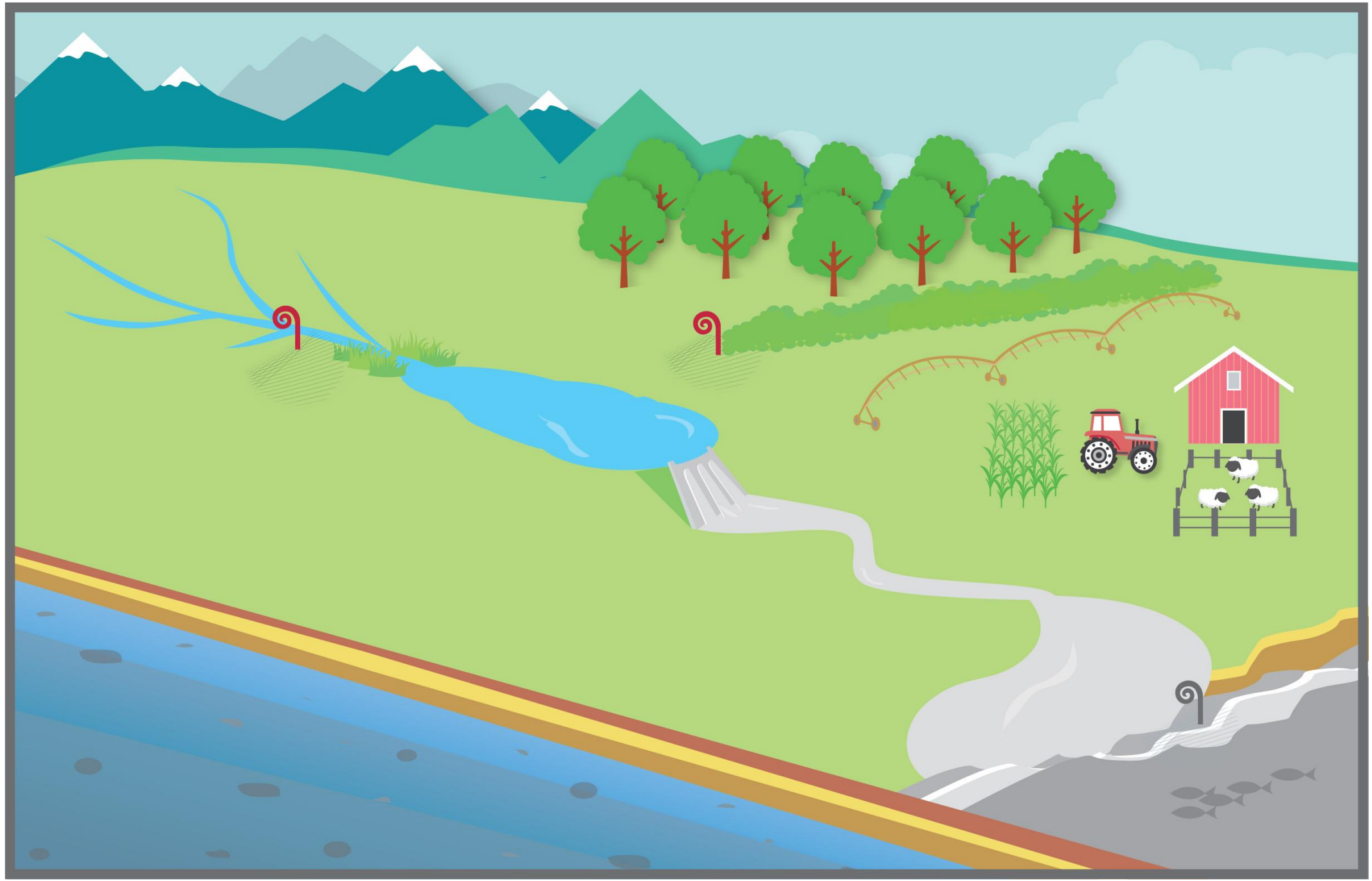


Much greater management and infrastructure detail; entry and exit point analyses









Services currently modelled by

Service	Method
Production	Based on slope, fertility, drainage, aspect, climate
C stock/emissions	IPCC Tier 1 compatible – based on soil & vegetation
CH_4/N_2O emissions	IPCC Tier 1 compatible– soils, veg, stocking rate, fertiliser
Water supply and floods/ droughts	Topographical routing of water accounting for storage and infiltration capacity as function of soil & land use.
Erosion	Slope, curvature, contributing area, land use, soil type
Sediment delivery	Erosion combined with detailed topographical routing
Water quality	Export coefficients (land cover, farm type, fertiliser, stocking rate info) combined with water and sediment delivery models
Habitat Approaches	1) Cost-distance approach: dispersal, fragmentation, connectivity. 2) Identification of priority habitat by biophysical requirements e.g. wet grassland 3) Measures of habitat richness, evenness, patch size etc
Coast/ floodplain inundation risk	Based on topography and input height of storm surge/long term rise etc: surface and groundwater impacts estimated
Tradeoffs/synergy identification	Various layering options with categorised service maps; e.g. Boolean, conservative, weighted arithmetic, distribution plots