SUB-REGIONAL CAPACITY BUILDING WORKSHOP ON SUSTAINABLE FINANCE AND RESOURCE MOBILIZATION FOR BIODIVERSITY FOR CARICOM MEMBER STATES
ST. JOHN'S, ANTIGUA AND BARBUDA
18 - 21 MAY 2015

Ecosystem Natural Capital Accounting (4)

SEEA-EEA/ENCA-QSP:

The way forward in the context of small developing states

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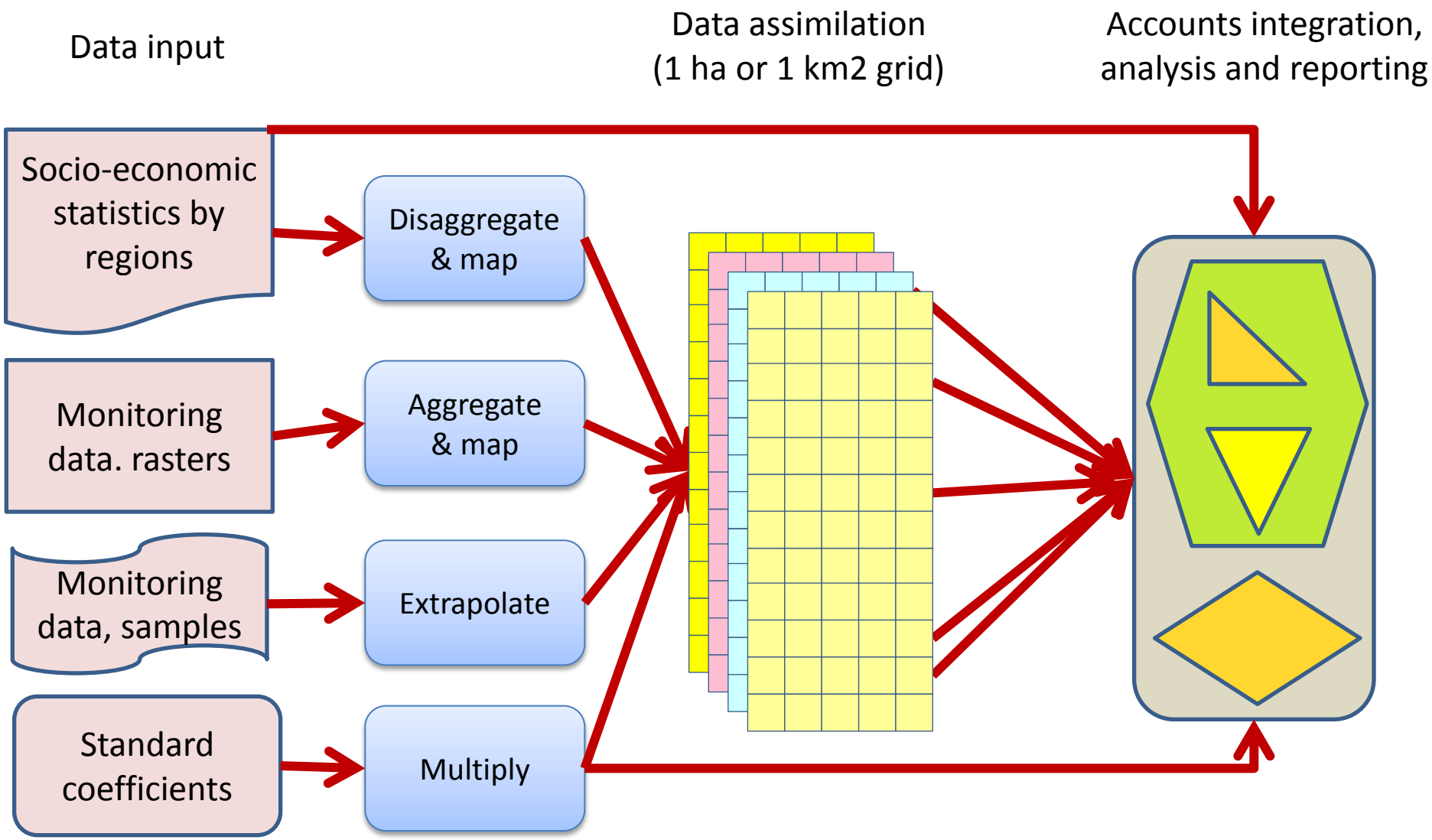
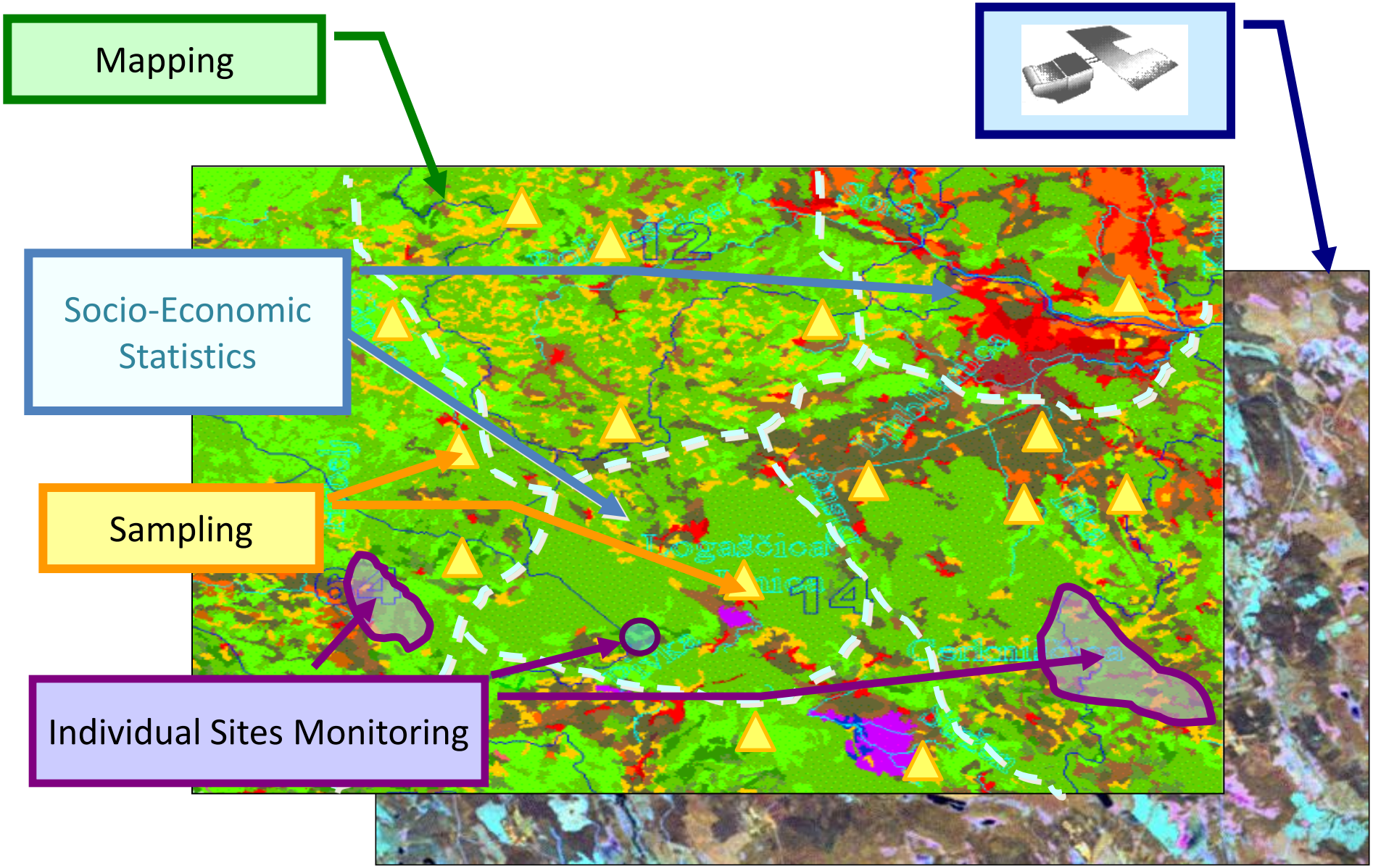
Main data flows to compile ecosystem capital accounts

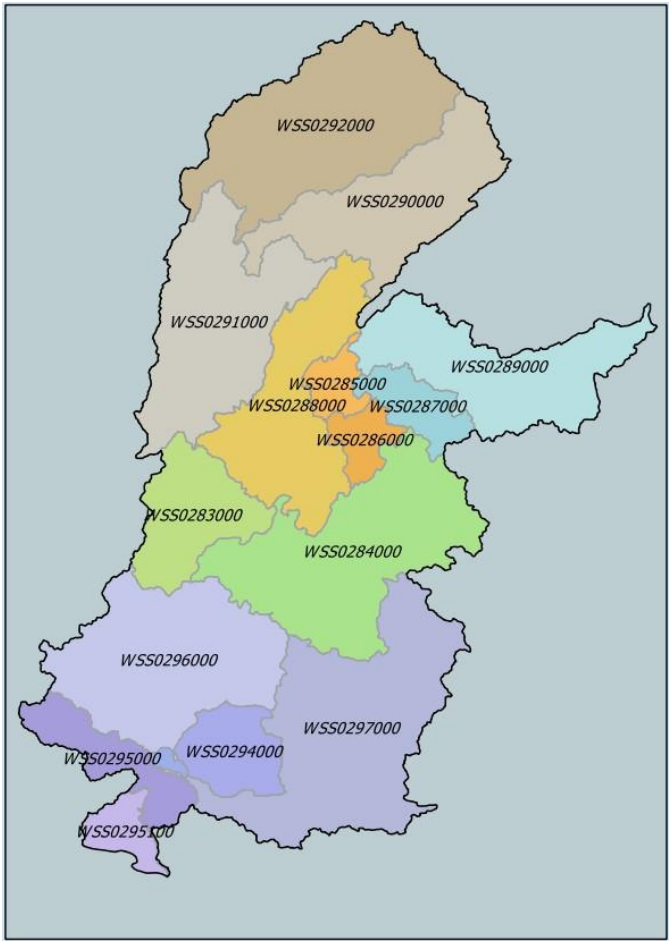


Spatial Integration of Environmental & Socio-Economic Data



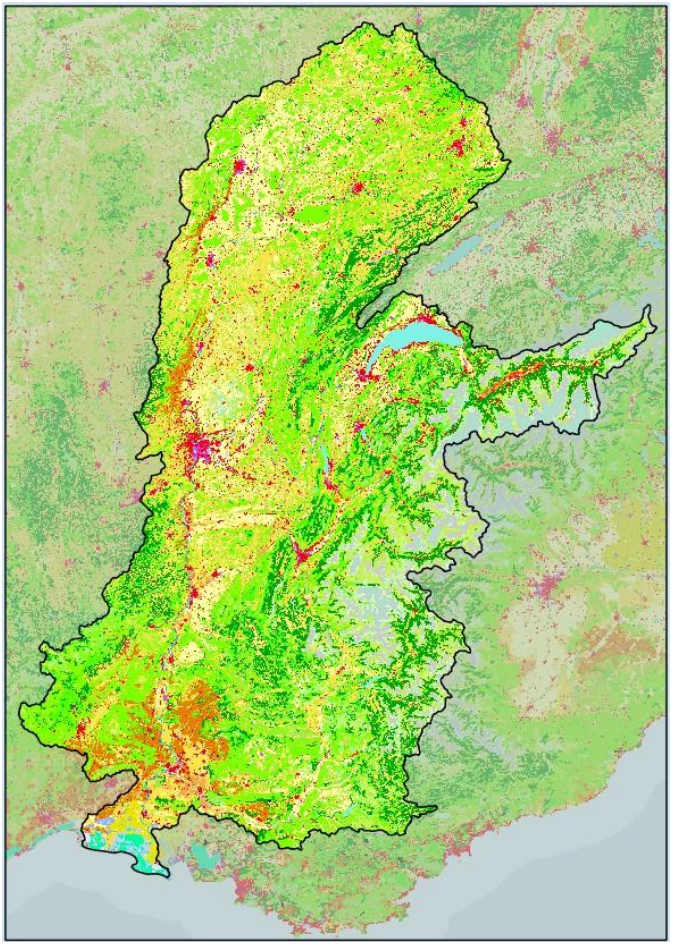
GIS Integration of area and linear ecosystem accounting units

The Rhône river catchment



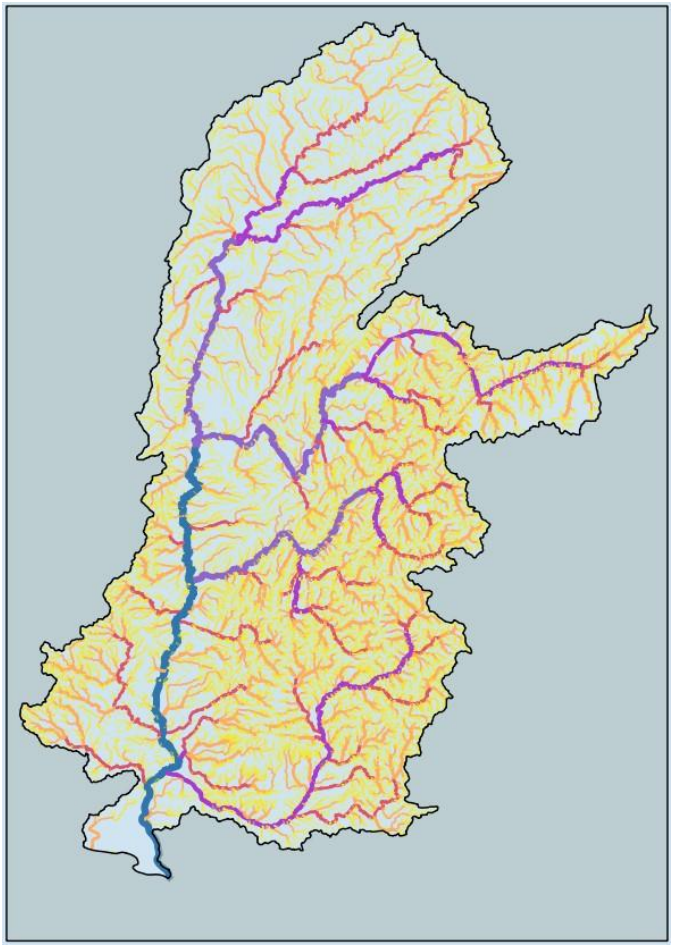
Ecosystem natural capital accounts being produced for the Upper Rhône river catchment, and France, by École Polytechnique Fédérale de Lausanne (Switzerland) and École Normale Supérieure de Lyon (France).

The land cover area units - LCEU



Ecosystem's skin

The rivers system units



Ecosystem's arteries and veins

Example of integration of area (landscape units) and linear (rivers) accounts

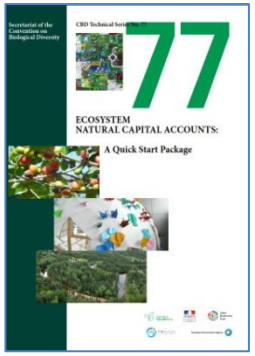
	Ecosystem Accounting Unit Types	Socio-Ecological Landscape Units (SELU) / Dominant Land Cover Type (DLCT)							s/total landscape ecosystems	River System Units (RSU)/ Homogeneous Stream Reach Units (HSRU) classes					s/total river systems	Total inland ecosystems
		UR *Urban/ developed areas*	LA *Large scale agriculture*	AM *Agriculture mosaics*	GR *Grassland*	FO *Forest cover*	NA *Other natural land cover*	ND *No dominant land cover*		HSR1 *Large rivers, main drains*	HSR2 *Medium rivers, main tributaries*	HSR3 *Small rivers*	HSR4 *Brooks, small streams*	HSR5 *Canals*		
II. Accessible ecosystem infrastructure potential																
LC1	**Opening stock of land cover in km2**															
LEP01	*Green background landscape index (GBLI) (average by km2)*															
LEP02	*Landscape high nature conservation value index (average by km2)*															
LEP03	*Landscape fragmentation index (average by km2)*															
LEP04	*Landscape green ecotones index (average by km2)*															
LEP05	*Other LEP index (average by km2)*															
LEP_avg	***Average LEP composite index by km2***															
NLEP1	**Net Landscape Ecosystem Potential = LC1 x LEP_avg**															
RS1	**Opening stock of rivers in standardized river measurement units (SRMU)**															
REP01	*River ecosystem background index*															
REP02	*Rivers nature conservation value index*															
REP03	*Rivers fragmentation index (obstacles by km2)*															
REP04	*Rivers green ecotones index*															
REP05	*Other REP index*															
REP_idx	***REP composite index***															
NREP1	**Net River Ecosystem Potential = RS1 x REP_idx**															
REP_avg	***Average NREP by km2***															
LREP1	**Landscape River Ecosystem Potential = LC1 x REP_avg**															
TEIP1	**Opening stock of Total ecosystem infrastructure potential =NLEP1+LREP1**															

NLEP

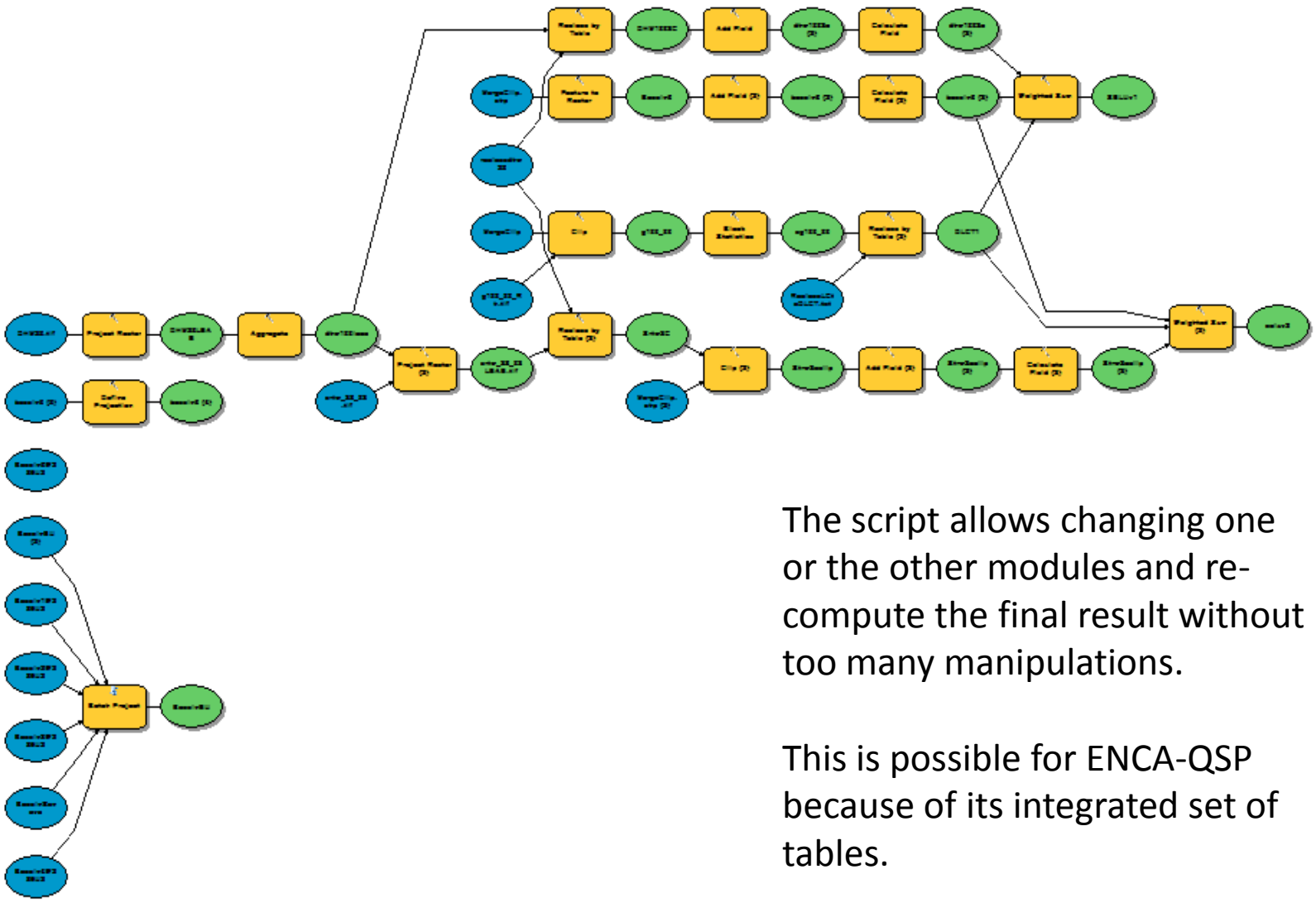
NREP

NREP/ km2

Total ecosystem infrastructure potential



A sketch of the script used to produce ecosystem accounting units



The script allows changing one or the other modules and re-compute the final result without too many manipulations.

This is possible for ENCA-QSP because of its integrated set of tables.

Land cover: a critical item

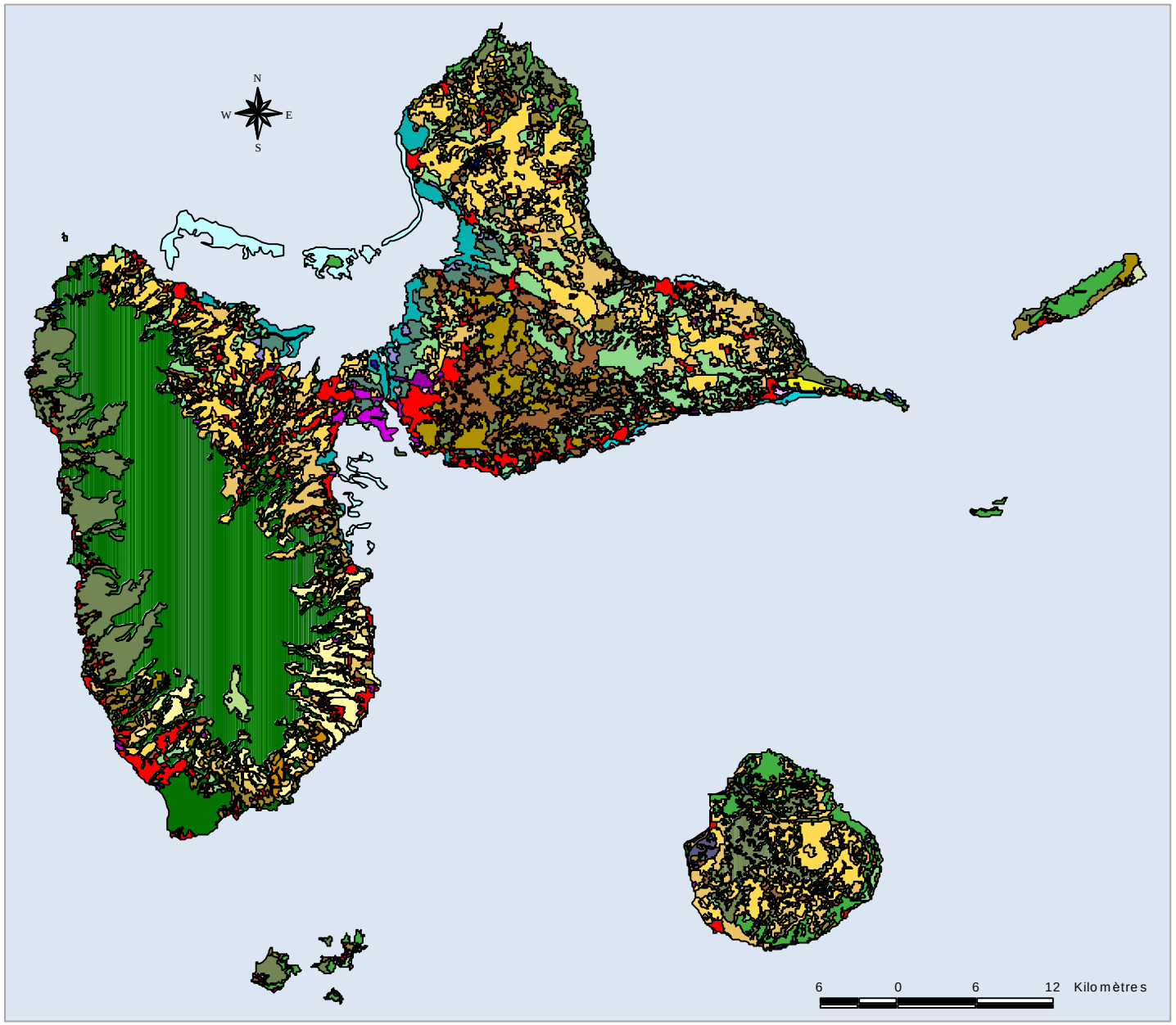
- Land cover ➔ structuring the whole accounting system
- Land cover change ➔ the easiest to monitor
- Land cover ➔ a proxy of land use
- Land cover needed to map socio-ecological landscape units

➔

- Need of good land cover maps
- Should include see bottom when mappable (sea grass, algae beds, coral reefs etc...
- Need of time series ➔ very good <u>land cover change</u> monitoring
- Time series since ~ 1975 ?

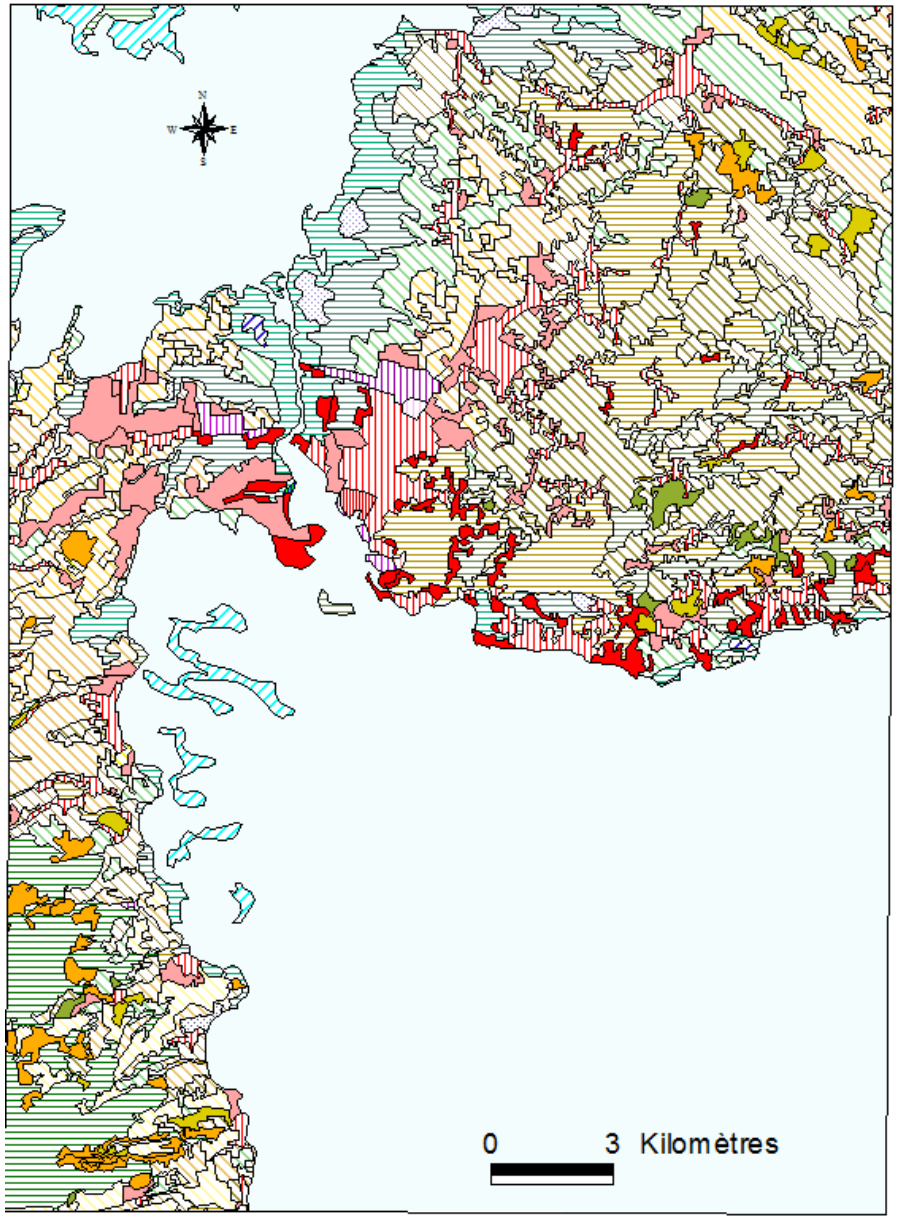
Example for Guadeloupe

CORINE Land Cover Guadeloupe 2000, 1/50 000e



- Tissu urbain continu
- Tissu urbain discontinu
- Tissu urbain précaire
- Zones industrielles et commerciales
- Zones portuaires
- Aéroports
- Grands equipements touristiques
- Extraction de materiaux
- Décharges
- Chantiers
- Equipement sportifs et de loisirs
- Cultures annuelles hors périmètres d'irrigation
- Bananeraies
- Cultures permanentes de plantes arbustives
- Cultures permanentes de plantes arborées
- Cannes à sucre
- Prairies
- Systèmes culturaux et parcellaires complexes
- Systèmes culturaux et parcellaires complexes
- Territoires occupés par l'agriculture, avec presence d'espaces naturels : territoire agricole occupant 50 à 75% de la surface totale
- Système agroforestier
- Forêts de feuillus sempervirentes
- Forêts mixtes semi-décidue
- Mangroves
- Forêts marécageuses
- végétation arbustive basse
- Végétation sclérophylle
- Forêts et végétation arbustive en mutation
- Formation arbustive ou herbacées avec présence d'espaces agricoles (moins de 25 % de la surface totale)
- Plages,dune et sable
- Végétation clairsemée
- Marais interieur
- Marais maritimes
- Plans d'eau naturels
- Lacs et retenues artificiels
- Plan d'eau saumâtre
- Lagoons
- Récifs coraliens
- Cours et voies d'eau

Land cover change 1970-2000, area of Pointe-à-Pitre



Change processes (land cover flows)

- Intensification agricole
- Extensification agricole
- Déforestation et mises en cultures
- Artificialisation sur zone naturelle et semi-naturelle
- Artificialisation sur zone agricole

Summary: 5 steps for implementing ecosystem natural capital accounts

Objective	*Datasets/ Accounts*	*Tasks to the accountant*
Step 1: Create the data infrastructure needed for accounting		
Collect reference geographical datasets and create the database of Ecosystem Accounting Units	Geographical features/zonings • Physical boundaries (coastline, river basins & sub-basins limits, climate zoning, elevation classes) • Administrative boundaries (municipalities, districts, regions) • Transport network • Hydrological network, rivers, aquifers • Sea/fisheries zoning(s) Regular grid(s) for accounting (1 ha and 1 km^2)	*Collect from relevant organisations the basic geographical layers which will structure the physical accounts. Check their consistency (geometry, projection). Produce a set of regular grids (based on official geographical standards).* *Create the database of **Ecosystem Accounting Units** for terrestrial ecosystems, rivers, marine coastal units and other sea accounting units* *(NB: requires land cover map for the baseline year)*
Step 2: Collect the basic datasets		
Collect the basic datasets for ecosystem natural capital accounting: monitoring data and statistics	• Land cover change (including marine coastal areas) • Meteorological data • Hydrological data • Soil data • Data on forest stocks and growth • Population data • Regular agriculture, forestry and fishery statistics • Data/statistics on water use • Indicators on species and systems biodiversity	*Produce a consistent multi-annual (10 to 20 years period) land cover map/database using satellite images and other sources available (forest maps, cadastre, buildings and roads…).* *Collect and organise the various sets of data needed for accounting. Official data sources are given priority: official statistics, meteorological data, hydrological data…where available, accounts produced for IPCC reporting, REDD+, SEEA Water… are important inputs. Satellite data sometimes as second best.*

Summary: 5 steps for implementing ecosystem natural capital accounts

Objective	*Datasets/ Accounts*	*Tasks to the accountant*
Step 3: Produce the core accounts		
Produce the core ecosystem natural capital accounts, measure total ecosystem capability, assess degradation or enhancement	• Land cover change account • Ecosystem carbon account • Ecosystem water account • Ecosystem integrity and functional services accounts • Ecosystem overall capability account (including exchanges between ecosystems)	*Compile the accounts with basic data collected at step 2, additional data for specific items and physical data modelling. Geo-process datasets. Estimate of missing data. Integrate of the accounts.*
Step 4: Functional accounts in physical units		
Functional analysis of ecosystem capital and services in physical units	• Accountability of economic sectors to ecosystem capital degradation /enhancement • Ecosystem degradation embedded into trade • Ecological Balance Sheet (in ECU) • Social demand for ecosystem services (by ecosystem units, municipalities, regions…)	*Targeted, detailed analysis to be carried out with statistical offices, planning agencies, environment agencies, research sector…* *Compilation of the ecological balance-sheet* *Mapping and assessing ecosystem services*
Step 5: Functional accounts in monetary units		
Functional analysis of ecosystem capital and services in monetary units: measurement of unpaid degradation costs; valuation of ecosystem services	• Unpaid remediation costs: Accountability of economic sectors to ecosystem capital degradation /enhancement • Ecosystem degradation embedded in trade • Ecological Balance Sheet in money • Adjustment of the Final Demand from unpaid costs • Monetary value of key ecosystem services • Total (direct and indirect) value added induced by ecosystem services (agriculture, forestry, fishery, water, tourism…)	*Economic analysis of remediation costs (restoration works, alleviation, opportunity costs of reducing pressure on ecosystems…).* *Economic analysis of ecosystem services monetary value.* *Input/Output analysis of Value Added induced by ecosystem services; sustainability assessment*
Steps 1 to 3 have to be done for all ecosystems and sectors. Steps 4 and 5 can focus on one particular ecosystem, service or economic sector.		

Data and capacity

- Data
  - National: all...
  - International
    - Sources: NASA, ESA, national agencies, GEO/GEOSS, FAO, IUCN, GBIF
    - Important: QA/QC for ecosystem accounting
    - Cloud access to validated data: UNEP?

- Capacity
  - Staffing
  - Technical training (e.g. With the Kangaré Tutorial): ~ 3 weeks
  - Academic training (master level?)
  - Universities support to training, networks, « Massive Open Online Course » (MOOC), summer schools…

Institutional setting

- National: Shared Environmental Information System (SEIS)

- International:
  - Pilot projects
  - Pooling basic processes ... Cloud computing

More info on the WEB http://www.ecosystemaccounting.net/

*https://www.**cbd**.int/doc/publications/**cbd**-ts-77-en.pdf*

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