



NEXUS ASSESSMENT OF THE DRIN RIVER BASIN – PHASES I AND II

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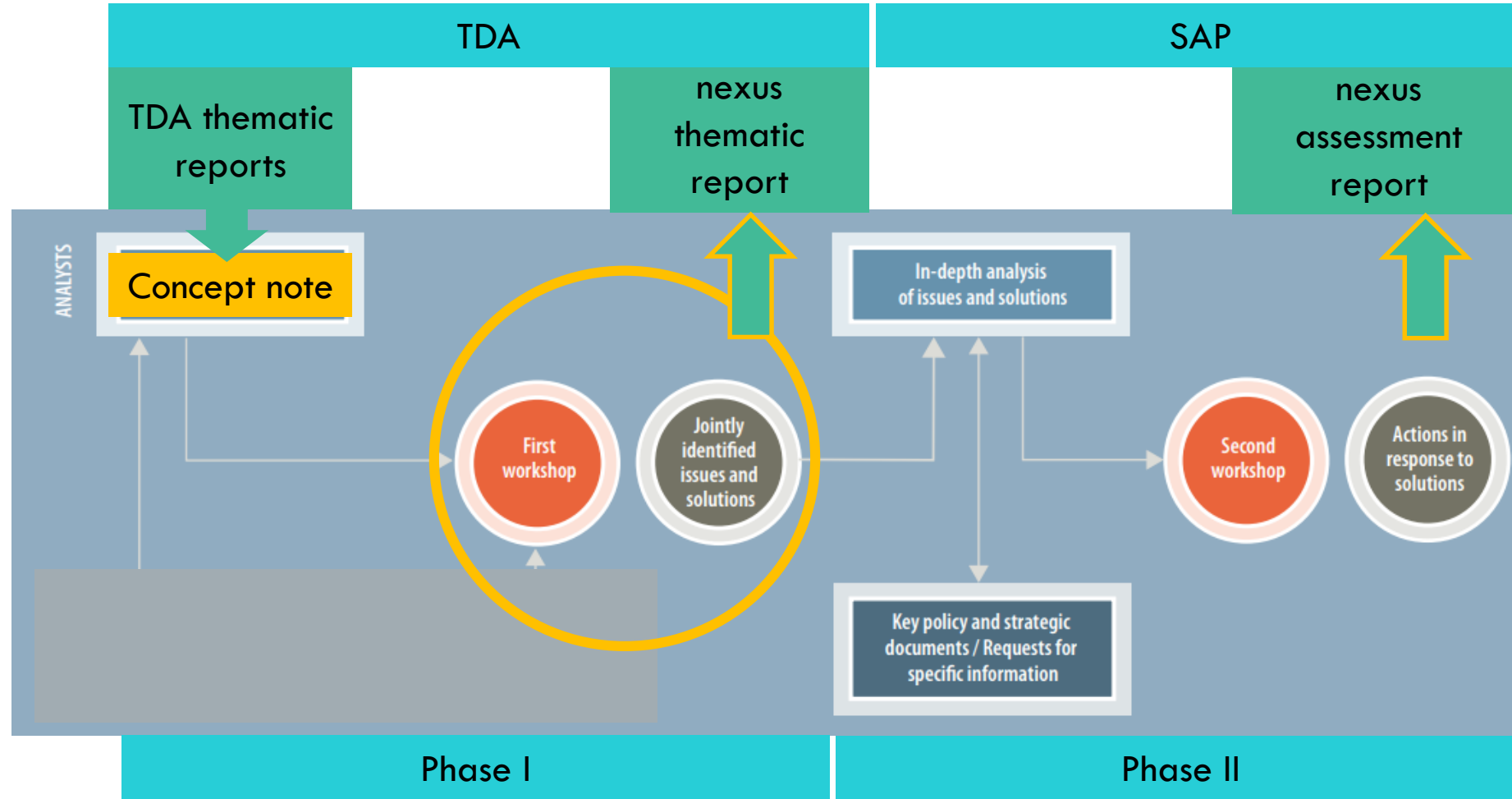
**8th Expert Working Groups Meeting
17th Meeting of the Drin Core Group**

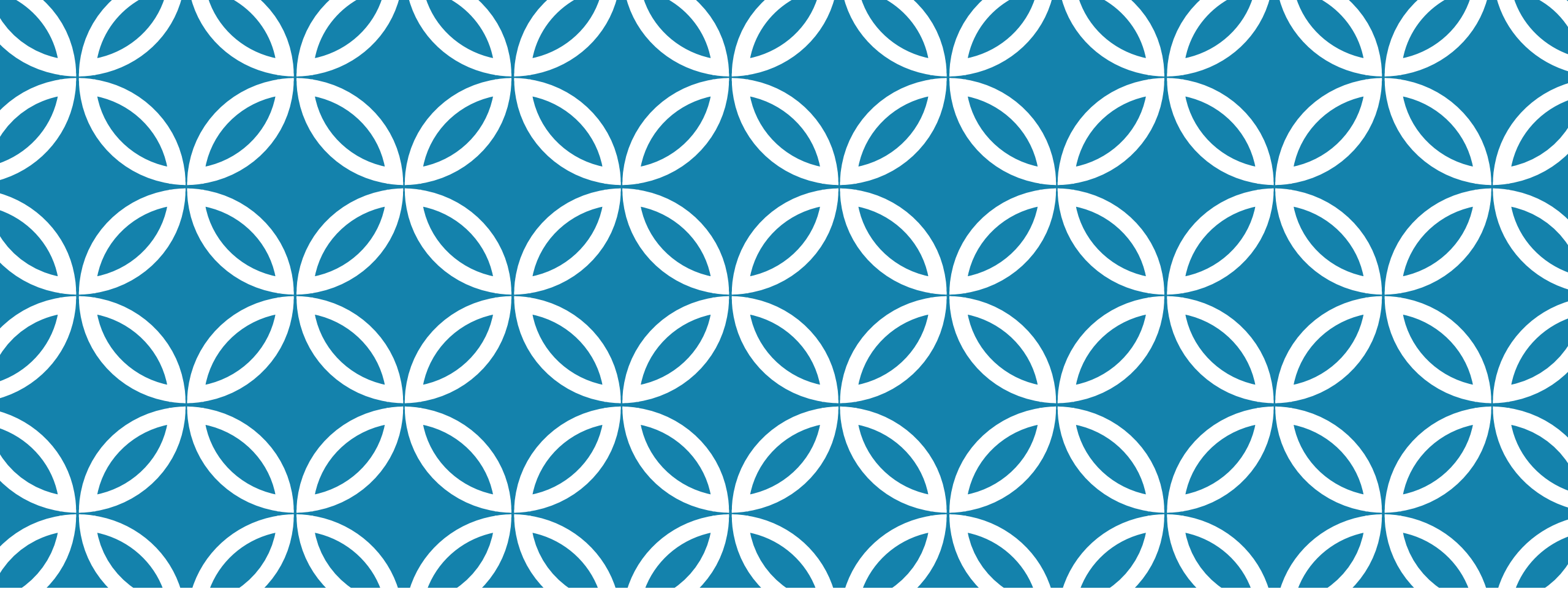
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OUTLINE

1. Process: Nexus and TDA/SAP
2. Scoping the nexus assessment
3. Phase I: The Drin Nexus Thematic Report
4. Phase II: Deepening the analysis with quantitative elements
5. Supporting SAP implementation

THE NEXUS ASSESSMENT PROCESS FOR THE DRIN





**NEXUS THEMATIC REPORT
FOR THE DRIN RIVER BASIN (PHASE I)** |

SCOPING THE NEXUS ANALYSIS (1): ENERGY AND AGRICULTURE AND DRIN TB ISSUES

How do Energy and Agriculture developments affect the issues reflected in the Drin MOU?

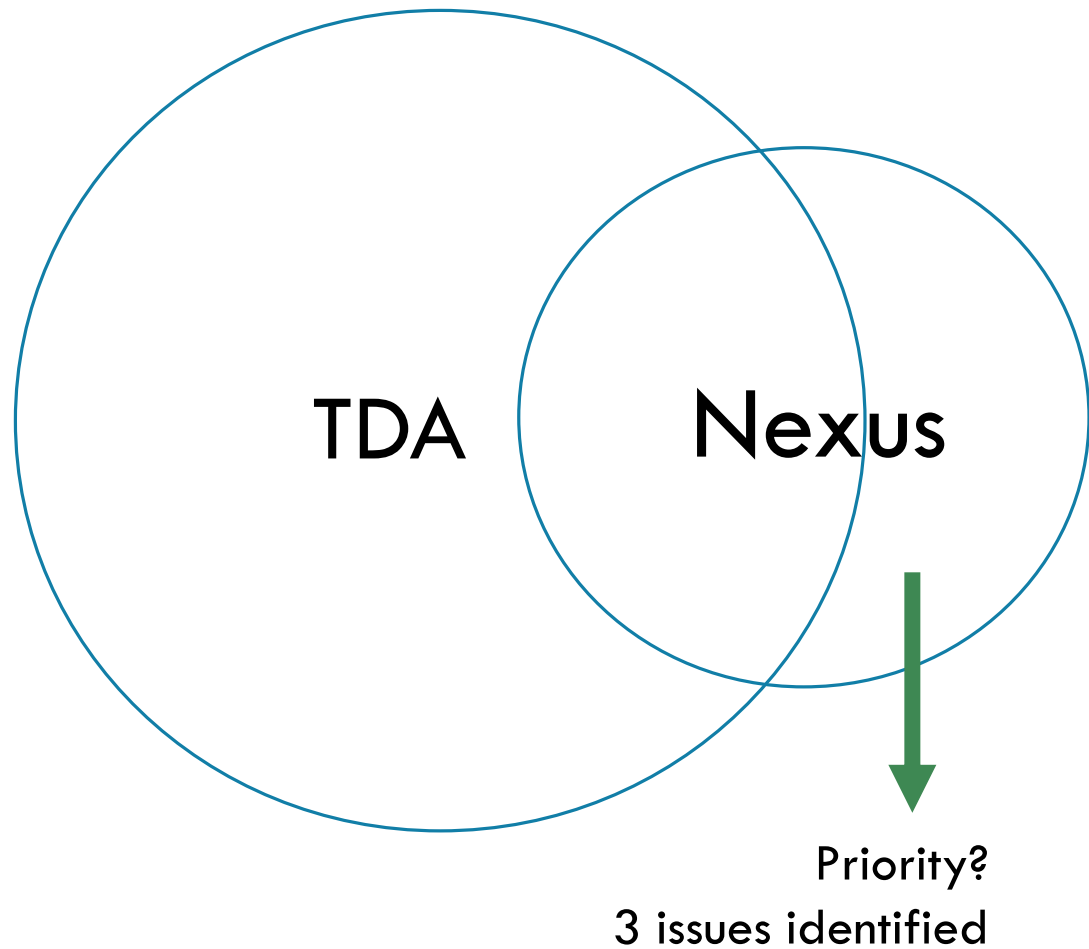
Main challenges in the basin (<http://drincorda.org/drin-river-basin/the-challenges>):

- i. Unsustainable use of water and other natural resources;
 - ii. Hydro-morphologic interventions altering the nature of the hydrological system and the supported ecosystems, as well as exacerbating flood incidents;
 - iii. Untreated or poorly treated wastewater and unsustainable agricultural practices;
 - iv. Unsustainable solid waste management;
 - v. Unsustainable forestry management and deforestation, as well as fishing practices and hunting;
 - vi. Unsustainable tourism;
 - vii. Non-integrated policies, management schemes and cooperation efforts at national and transboundary level.
- **The energy sector** contributes to issues (ii) and (v) (respectively in terms of hydropower operations and logging for fuelwood production) and more generally to issue (vii).
- **The agricultural sector** plays a role in issues (i) (iii) and (v), as well as (vii).

SCOPING THE NEXUS ANALYSIS (2): MAPPING INTERSECTORAL LINKAGES

Sector	Water	Agriculture/land	Ecosystems/environment
Energy	<ul style="list-style-type: none"> - Role of hydropower in flood management - Impact of energy policy and power trade on water resource use in the basin 	<ul style="list-style-type: none"> - Role of biomass production in sustainable forest management 	<ul style="list-style-type: none"> - Impact of logging on forest degradation, erosion, and sedimentation - Environmental impact of hydro development - Incoherencies between renewables plans/climate action/ energy security and environment preservation
Water		<ul style="list-style-type: none"> - Water demand for irrigation (likely to increase due to climate change and potentially driven by trade) 	<ul style="list-style-type: none"> - Poor/inexistent wastewater treatment, exacerbated by urbanization and tourism (at given locations and seasons)
Agriculture/land			<ul style="list-style-type: none"> - Impact of agricultural pollution on water related ecosystems (e.g. eutrophication) - Illegal or uncontrolled fishing, hunting, and logging

SCOPING OF NEXUS ANALYSIS: FILLING GAPS, AVOIDING OVERLAPS WITH OTHER THEMATIC REPORTS



OVERLAPS

Thematic report on socio-economics of the Drin River Basin (2017); **resources, drivers and policies**

Thematic report on biodiversity and ecosystems for the Drin River Basin (2017); **environmental impact of various sectors**

Thematic report on hydrology and hydrogeology for the Drin River Basin (2018); **issues of water allocation, impact of hydropower**

Thematic report on pollution the Drin River Basin (2018); **water quality issues**

Thematic report on legal and institutional setting in the Drin River Basin (2019) **governance of water and environment**

GAPS

energy policy and governance

agriculture/forestry policy and governance

hydropower cooperation and development

trade aspects (energy and agricultural products)

PHASES I AND II

The Nexus analysis of the Drin River Basin is carried out following the Transboundary Basin Assessment Methodology.

The analytical work will be divided in two phases:

- ❖ Phase I includes the *identification* of Nexus issues of priority *and a qualitative assessment*, for each of the priority issues of linkages/benefits/trade-offs, among the Nexus sectors.
- ❖ Phase II comprises the use of modelling tools to support the *quantitative assessment of selected key linkages/benefits/trade-offs* via an analysis of resource flows and their development under different developmental/climatic scenarios.

CONTENT OF NEXUS THEMATIC REPORT (PHASE I)

Part 1: Overview of socio-economic situation; nexus resources (i.e. energy, water, agriculture/use of land resources, ecosystems); governance frameworks (sectoral, multi/sectoral; national, regional, Drin river basin).

Main sources: other thematic reports to the TDA, direct input from national experts.

Part 2: Three topics that emerged as central in the energy-resource nexus interface in the basin:

- 1. Hydropower and flooding** (and broader energy cooperation)
- 2. Biomass and forest management** (and its environmental implications)
- 3. Evolution of agriculture and irrigation** (and trade aspects)

These are analysed by looking at resource flows/uses and related mechanisms of governance.

1. HYDROPOWER AND FLOODING

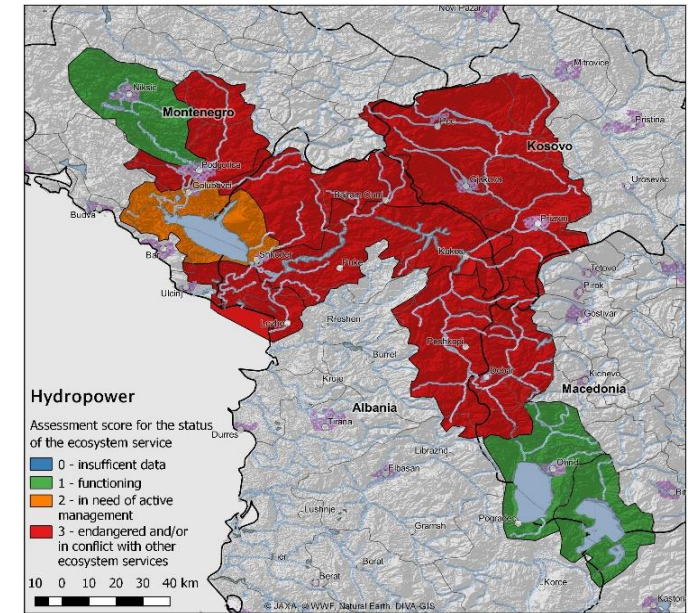
Today there are four large hydropower plants* (> 100 MW), three medium ones* (> 20 MW) and 22 small ones (> 1 MW) in DRB

*2 cascades, one o along Black Drin - FYR Macedonia, and the other along Drin – Albania

Rule of operation: commonly, max energy output in each plant.

Key role of hydropower operators in managing and protecting from floods. Regardless of future hydropower developments, flood management today depends on:

- 1) the way existing dams are operated
- 2) the extent and effectiveness of cooperation among the operators of such dams



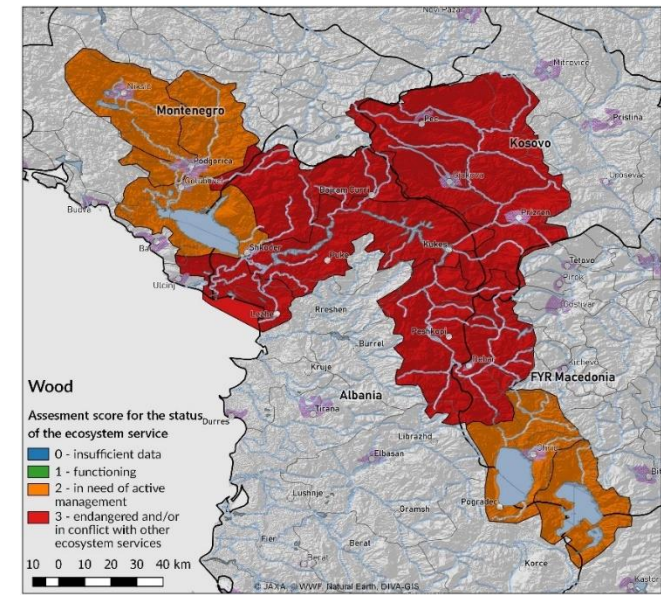
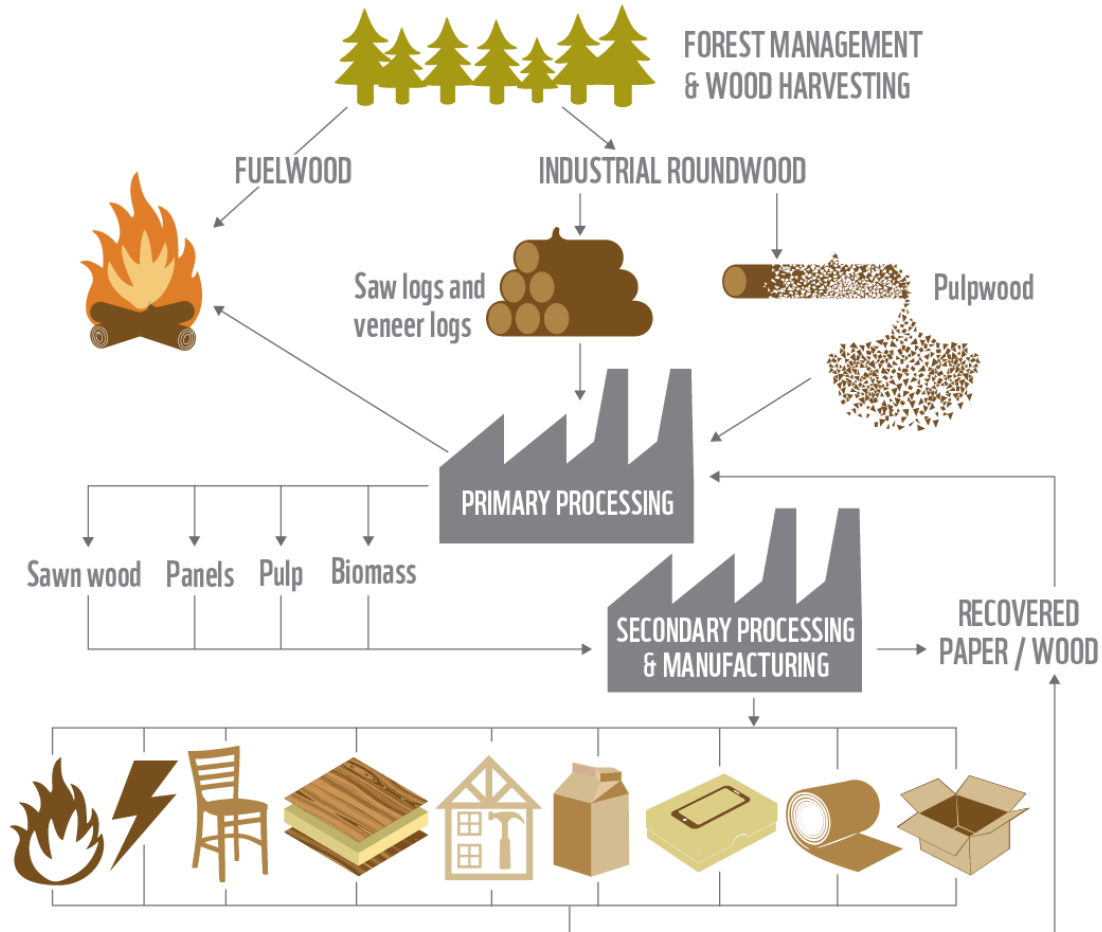
(1.) HYDROPOWER COOPERATION AT TRANSBOUNDARY LEVEL

1. Coordination under normal flow conditions, In this case, a lack of coordination does not increase flood risk. However it potentially reduces the revenue for hydropower operators. – *evaluation of cost and benefits of cascade optimization on the Albanian side (KfW, EBRD and others - ongoing)*
2. Coordination under high flow conditions (i.e. emergency). Here, lack of coordination can increase flood risk. - *relatively effective both within Albania and North Macedonia; room to technically improve this cooperation with the help of specific modelling tools and a more detailed mapping of flood risk areas*

Both types of cooperation need to be understood at transboundary level where coordination between operators, as well between operators and authorities in charge of flood prevention and management, is lower.

How does this link to the countries' energy plans? → Phase II

2. BIOMASS AND FOREST MANAGEMENT



Forest products and livelihoods:

- wood and wood products (dominant)
- mushroom, berries, herbs
- nature-related tourism (increasingly important)

Forest related ecosystem services bring

- economic, social, and environmental benefits (they overlap)
- carbon capture and storage, water treatment, flood protection

- Only sustainably managed forests can preserve all services
- Modernizing the biomass value chain is a key element for sustainable forest management

(2.) THE BIOMASS VALUE CHAIN

Consumption of firewood in households is a characteristic of the region, too often inefficient, polluting (here below a rapid assessment from Drin Stakeholder Conference)

	Use of fuelwood in households	Environmental impact of fuelwood	Sophistication of biomass value chain	Priority of forestry in national development plans
Albania	3	3	2	1
Kosovo	3	3	1	1
Macedonia	3	3	1	1
Montenegro	3	2	2	3

**What are the alternatives? Costs and potentials? What are the actual benefits? →
Phase II**

3. EVOLUTION OF AGRICULTURE AND IRRIGATION

Types of crops and animals that farmers invest in depend on:

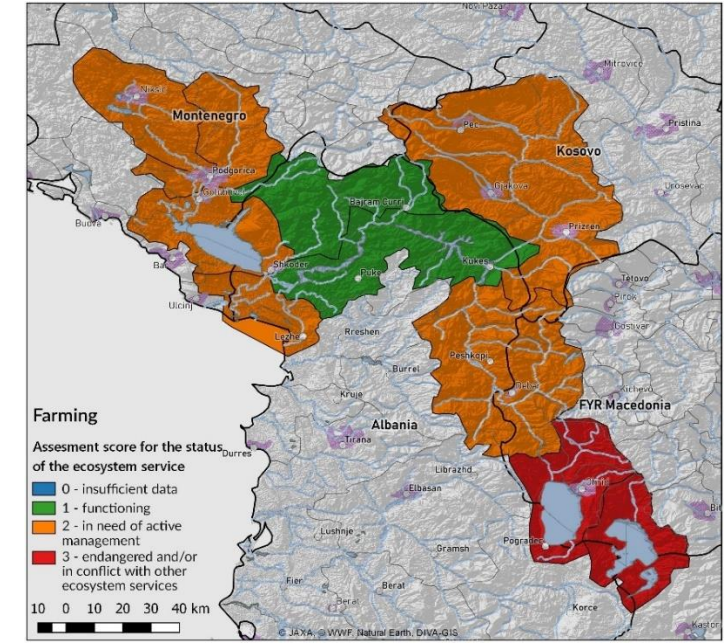
- agricultural markets, support schemes and investment opportunities.

These choices have impact on:

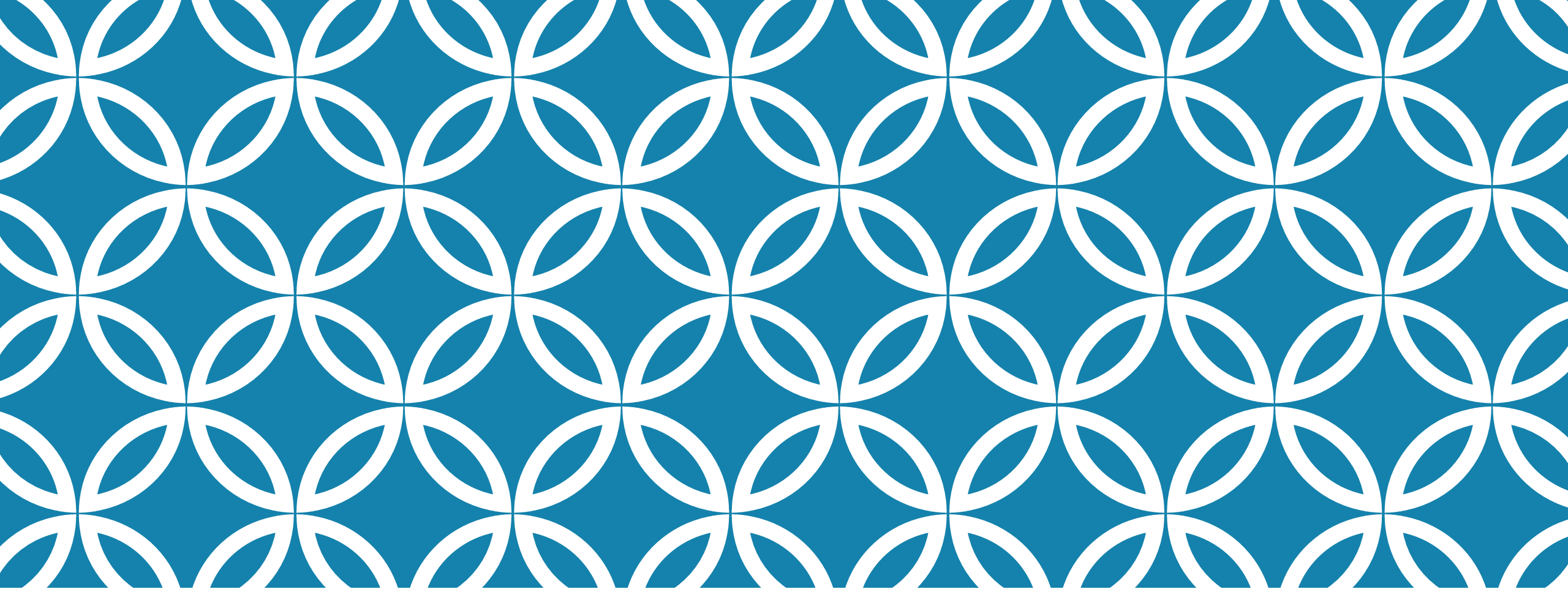
- the demand of water (and other inputs), environment, and local economy.

Climate change impact calls for the sector to be more resilient

The impact of agricultural activities is transboundary, need to understand the broad implications of future agricultural policies and the regional potential of sustainable agriculture.



Products	Demand on the local market	Value for export	Level of technological sophistication needed (e.g. cold storage)	Environmental impact of input required (pesticides, fertilizers)	Water intensity	Land quality requirement (prime, marginal)	Energy intensity (irrigation, processing, fertilizer)
Wheat							
Apples							
Plums							
Cow (milk)							
...							



CONCEPT FOR PHASE II OF THE NEXUS ASSESSMENT



PROPOSALS FOR PHASE II

Following the three topics raised in the Nexus Thematic Report, a quantitative assessment of:

1. Costs and benefits of hydropower coordination

- Transboundary model of hydropower cascades
- Proposed scenarios include cooperation scenarios and flood containment (energy production losses? How much?)

2. Benefits of improved efficiency in biomass use and more sustainable use of forest

- + CO₂ capture, + jobs, - air pollution

3. Trade opportunities in the agri-food sector and implications of different crop choices on resource use

- Complementarities of resources?
- a GIS based analysis?

→ Transboundary nexus trade-offs and synergies?

IMPLICATIONS OF A “FLOOD-SMARTER” HYDROPOWER SECTOR

Cost and benefits – difficult to assess the real cost of floods and the real losses from changing operations (GIZ, 2016).

Implications for the broader energy regimes – hydro vs non-hydro (costs and reliability)? Regional integration? Impact of climate change on water availability?

Impact of transboundary hydropower cooperation on flood risk?

→ Phase II

IMPACT OF REGIONAL ELECTRICITY MARKET

Energy Community. The WB-6 countries (i.e. the Drin riparian, plus Serbia and Bosnia and Herzegovina) have laid out a roadmap for the implementation of a common, regional electricity market (Vienna Summit, 2015).

Regional integration of the power systems. Need to assess:

- direct effect on the demand of natural resources
- increased pressures on the environment

HYDRO IN THE ENERGY MIX OF THE COUNTRIES

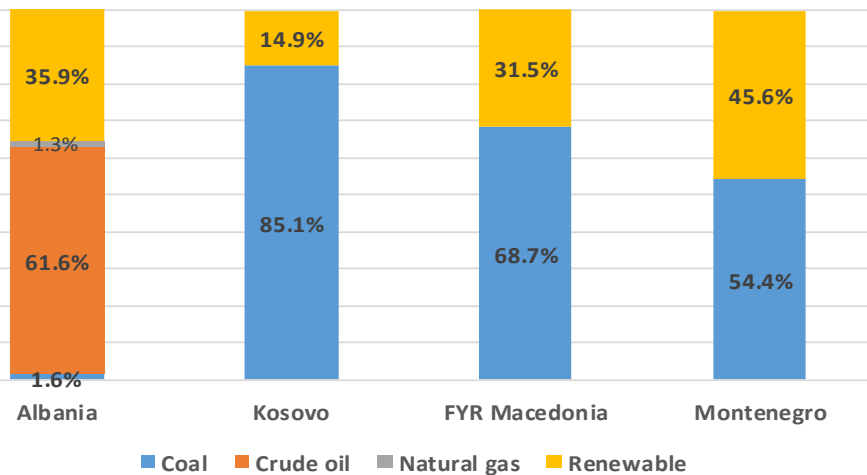
National strategies:

- climate action, low-carbon development, diversification, RE, EE..

Hydropower and biomass (wood in particular) strategic renewable sources for DRB

Long-lasting impact of energy activities: hydromorphologic alteration to natural watercourses, erosion and sedimentation

Drin Basin: Primary energy production by fuel, share of total 2015 (%)



Shares of primary renewable energy production

	Hydropower	Biomass	Solar	Geothermal	Wind
Albania	61.8%	30.2%	1.7%		
Kosovo	4.5%	95.4%			
FYR Macedonia	40%	53.7%	0,5%	2%	2.6%
Montenegro	39.3%	60.7%			

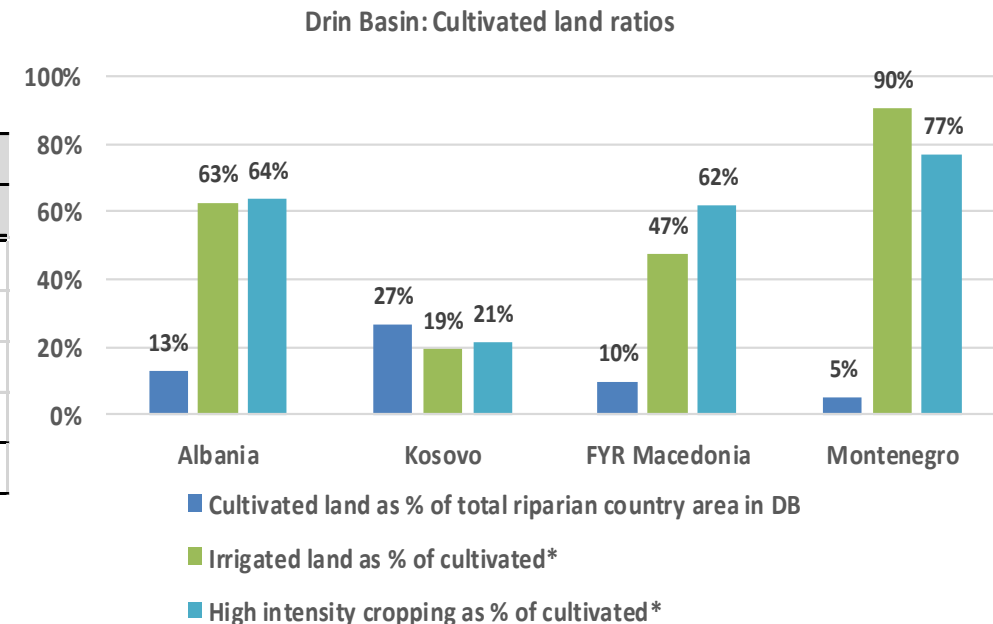
AGRICULTURAL SECTOR

Socio-economic pillar, employment and livelihoods

Agriculture: water use and impact on water quality

Constraints to the agro-sector's development and trade: SMEs access to finance, small farm size, low productivity and technological level in most sub-sectors

Country	Yields (t)						
	Cereals	Forage crops	Gardens	Ind. crops	Orchards	Vineyards	Meadows
Albania	169,783	68,969	230,734	431	48,634	33,833	0
Kosovo	207,134	64,908	119,070	0	15,839	19,517	95,076
FYR Macedonia	25,877	9,670	23,525	79	91,234	5,664	11,279
Montenegro	1,549	1,982	36,179	63	1,907	3,521	13,732
TOTAL	404,343	145,527	409,507	572	157,614	62,535	120,086



FOOD TRADE AND TRENDING PRODUCTS

All riparians are net importers of food. Riparians depend on imports especially when it comes to high-added value products

Food trade increasingly important:

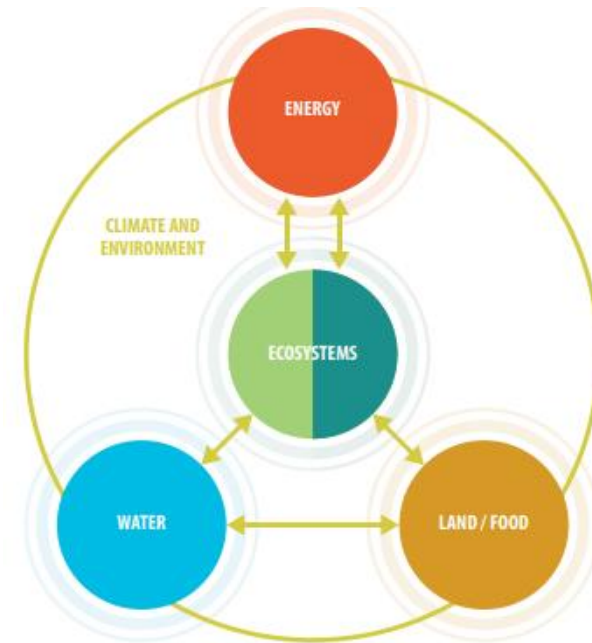
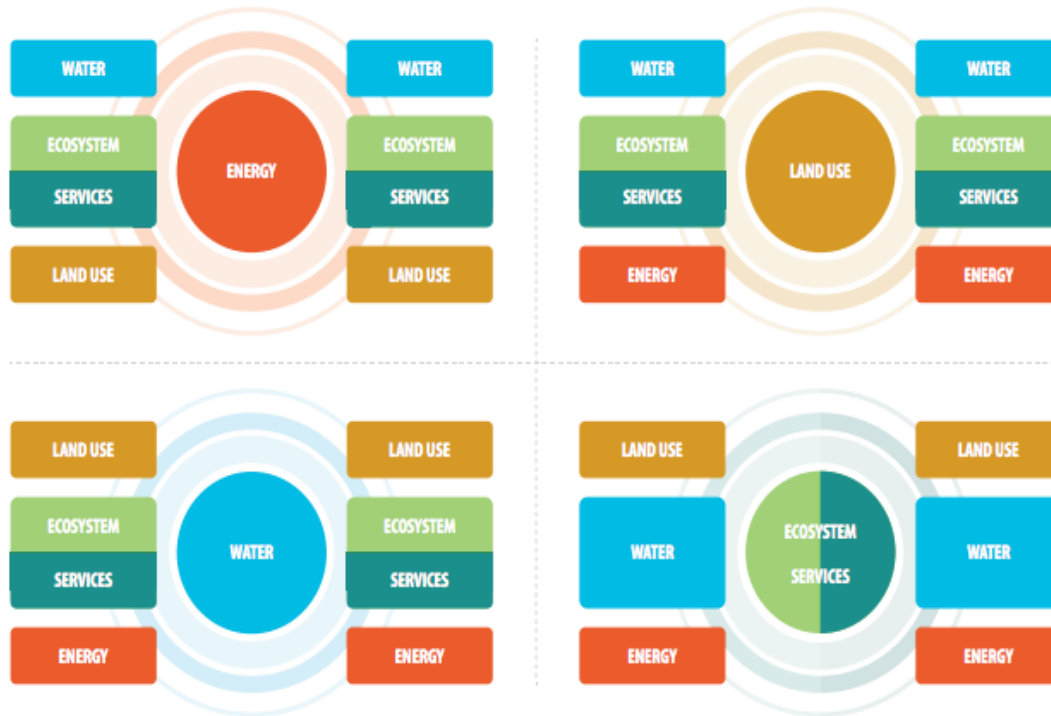
- proportion of agri-food exports in total exports has increased in all countries in the period 2010-2015 (in FYR Macedonia, stable)
- while the proportion of imports has remained stable

High-value opportunities (e.g. wine Montenegro) and trending products (e.g. meat and dairy products)

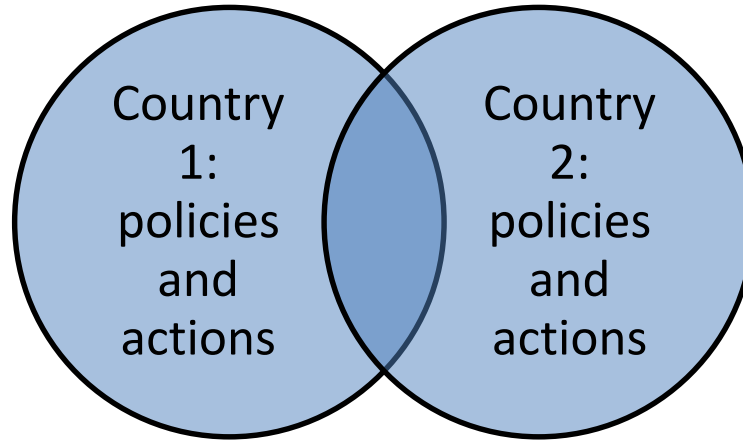
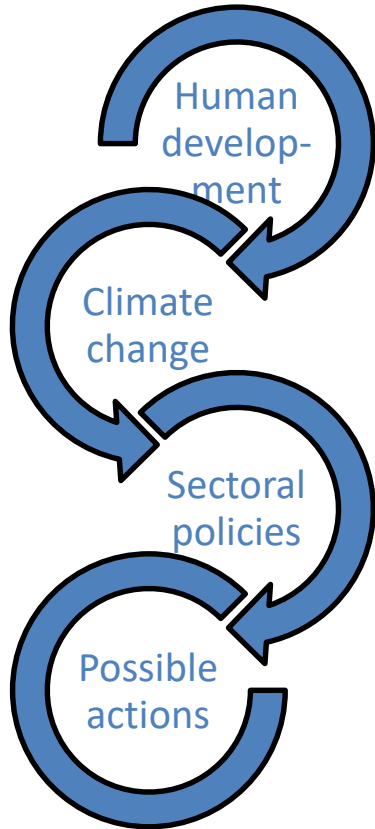
Opportunities for export food products – incl. for EU market (but EU standards)

Forest products (wood in particular) also traded across countries

NEXUS DIALOGUE



THE TRANSBOUNDARY NEXUS



Need for communication, collaboration and joint action!



nexus dialogue
inter-sectoral,
cross-country

on water-food-energy-ecosystems:
resources, uses,
security, and governance

