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UNDP-GEF PROJECT:

„REDUCING BARRIERS TO ACCELERATE THE DEVELOPMENT OF BIOMASS MARKETS IN SERBIA“

The Utilization and Re-Appropriation of Marginal Land as a Sustainable Bioenergy Solution

March, 2019

Calliope Panoutsou, PhD

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Contents:

- Setting the scene
- Programme for marginal land as a sustainable bioenergy solution in Serbia
  - Context
  - Focus & Objectives
  - Baseline
    - Resources: marginal land and energy crops in Serbia
    - Market
    - Policy & financing landscape
    - Institutional capacities
- Recommendations for policy & investors

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SETTING THE SCENE

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Marginal Land as a Sustainable Bioenergy Solution

- Marginal land, (according to FAO) is land having limitations which in aggregate are severe for sustained use due to:
  - increased inputs to maintain productivity,
  - low fertility, salinity, steepness of terrain, unfavourable climate
  - difficult market accessibility, small holdings, poor infrastructure,
  - limited options for diversification.
- These areas in EU are defined as Areas with Natural Constraints (ANC).
- With improvements (both of bio-physical and socio-economic nature) such land types may be cultivated with non food/ energy crops for bioenergy.
- Future policy and financing must provide detailed system prescriptions- support in one sector may cause conflicts to another. Attention to trade-offs and displacement effects.

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Framework conditions

- Policy & financing for sustainable bioenergy from marginal lands has **cross sectoral nature** and is driven by supply demand interactions.
- Policy makers & investors must understand the **key characteristics**, measure them and prioritise actions with a 'value chain' perspective
- Effort is required to map **current policy & financing landscape** to understand both the **typology** and interactions.
- Future policy should be balanced both for supply and 'rising' demands ensuring that the 'system' supplying capacity is not exceeded.
- An **integrated approach** is required.

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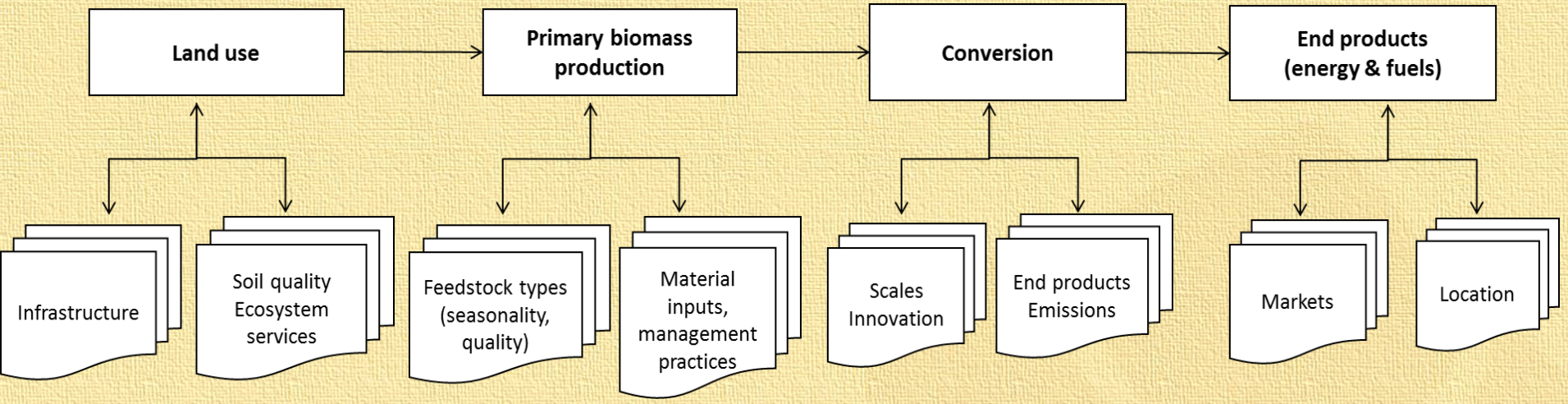
Policy for marginal land and bioenergy is cross sectoral



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PROGRAMME FOR MARGINAL LAND AS A SUSTAINABLE BIOENERGY SOLUTION IN SERBIA

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CONTEXT

Biomass energy:

- **a key source among renewables contributing the highest shares for the overall RES targets.**
- **stimulates sustainable rural development and creates green jobs.**

Energy crops:

- **significant outlets to rural poverty,**
- **diversification of agricultural activities and land abandonment, especially with the cultivation of suitable species, adapted to the existing abandoned and marginal land types.**

Among energy crops, perennials (grasses and short rotation tree species) in particular are considered suitable options that could contribute substantially to biomass production with subsequent land rehabilitation as well as alleviation of global problems in climate change and energy security

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FOCUS & OBJECTIVE

- **Focus:** the use of abandoned/ marginal land for energy crops to generate heat and electricity and increase biomass supply opportunities in the country.

- **Objective:** develop a multi-annual government support programme for growing energy crops in Serbian marginal land. The programme will focus on the establishment, cultivation and use of energy crops for direct energy conversion.

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BASELINE FOR RESOURCES

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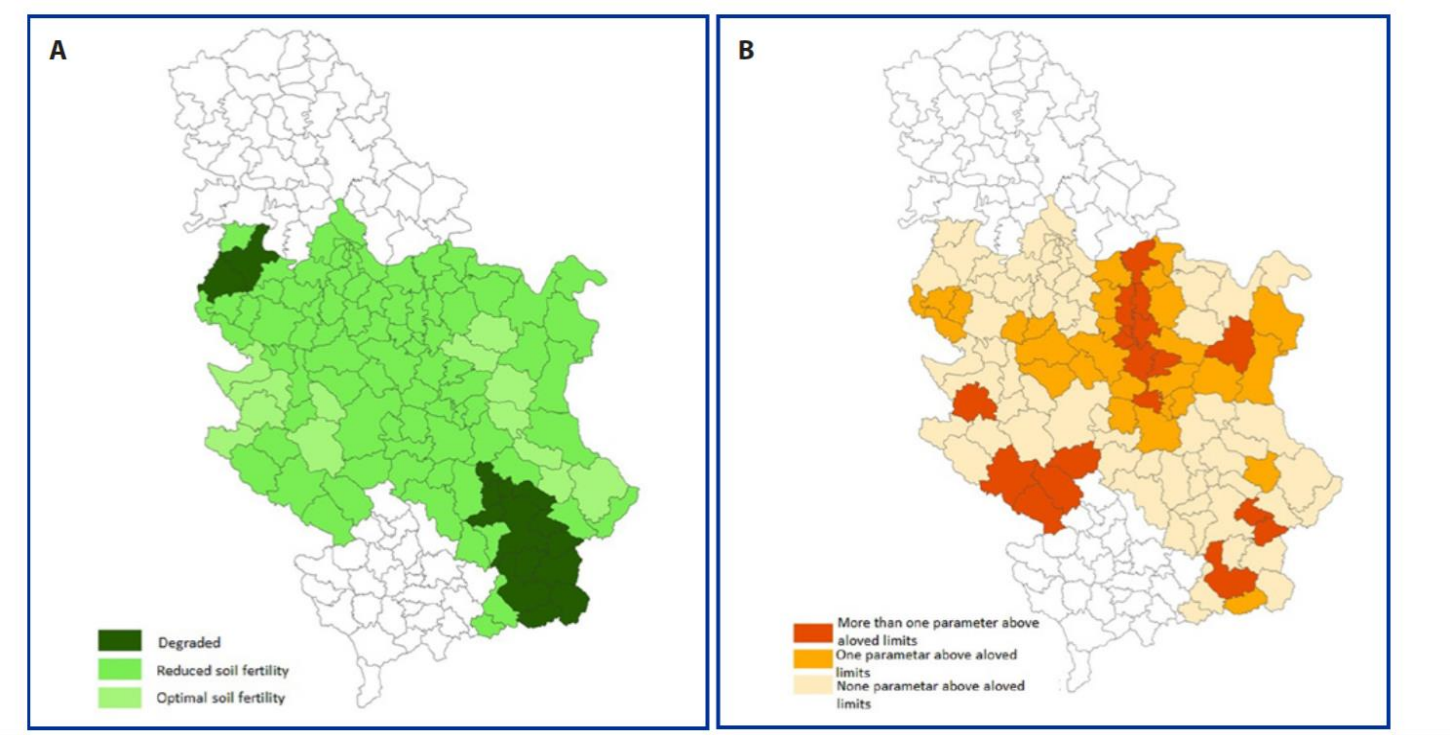
MARGINAL LAND IN SERBIA

- **Almost 424,000 ha of agricultural land are being abandoned and another 12,000 ha degraded due to activities related to coal mining**
- **Municipalities in northern Serbia have less than 10% unused agricultural land, while in the municipalities of eastern and southern part of Serbia this percentage is between 20 and 50%.**



RADOJEVIĆ et al., 2015

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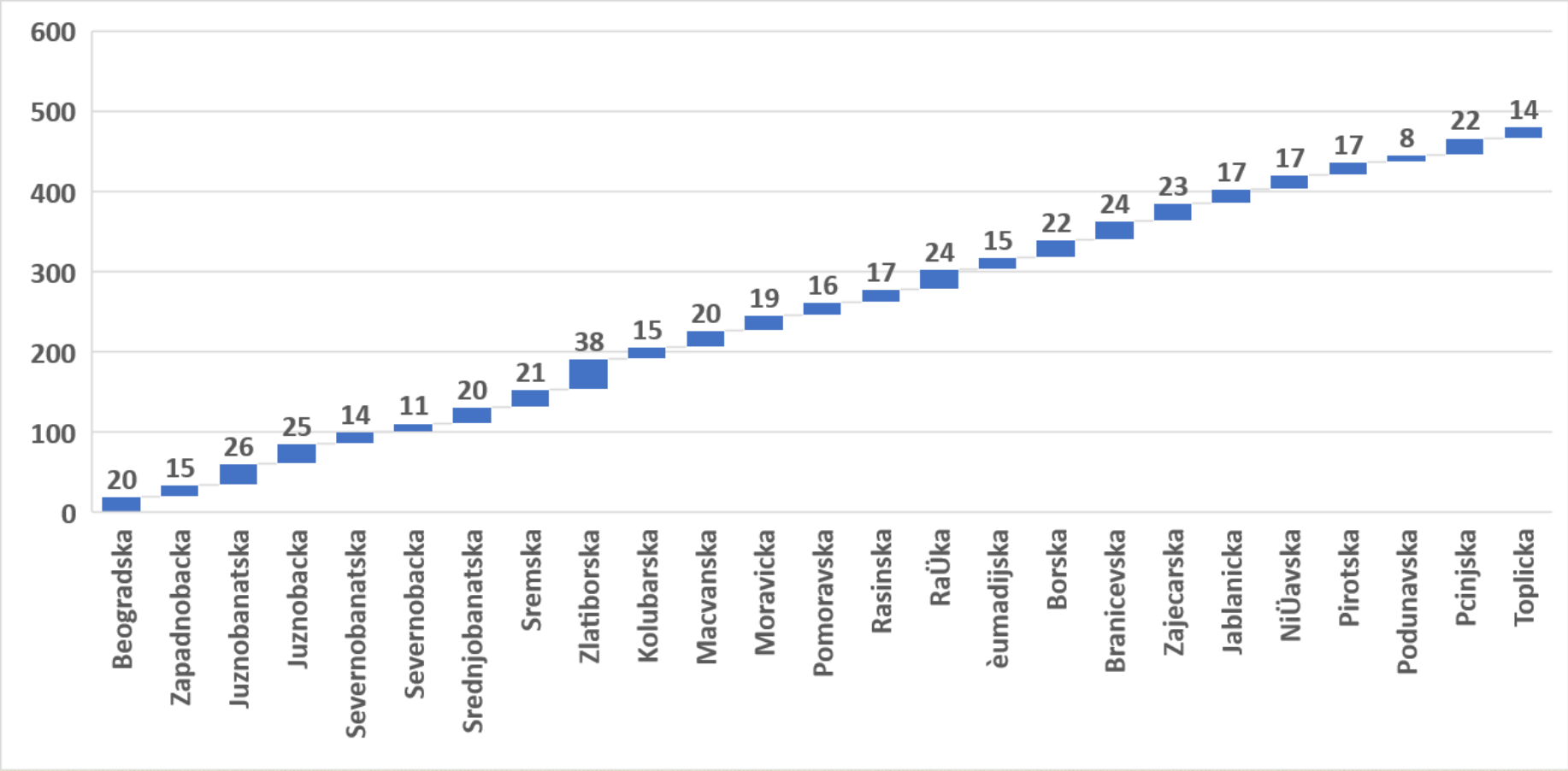
Low quality land (in 1 ,000 ha) that can be used for energy crops in Serbia.



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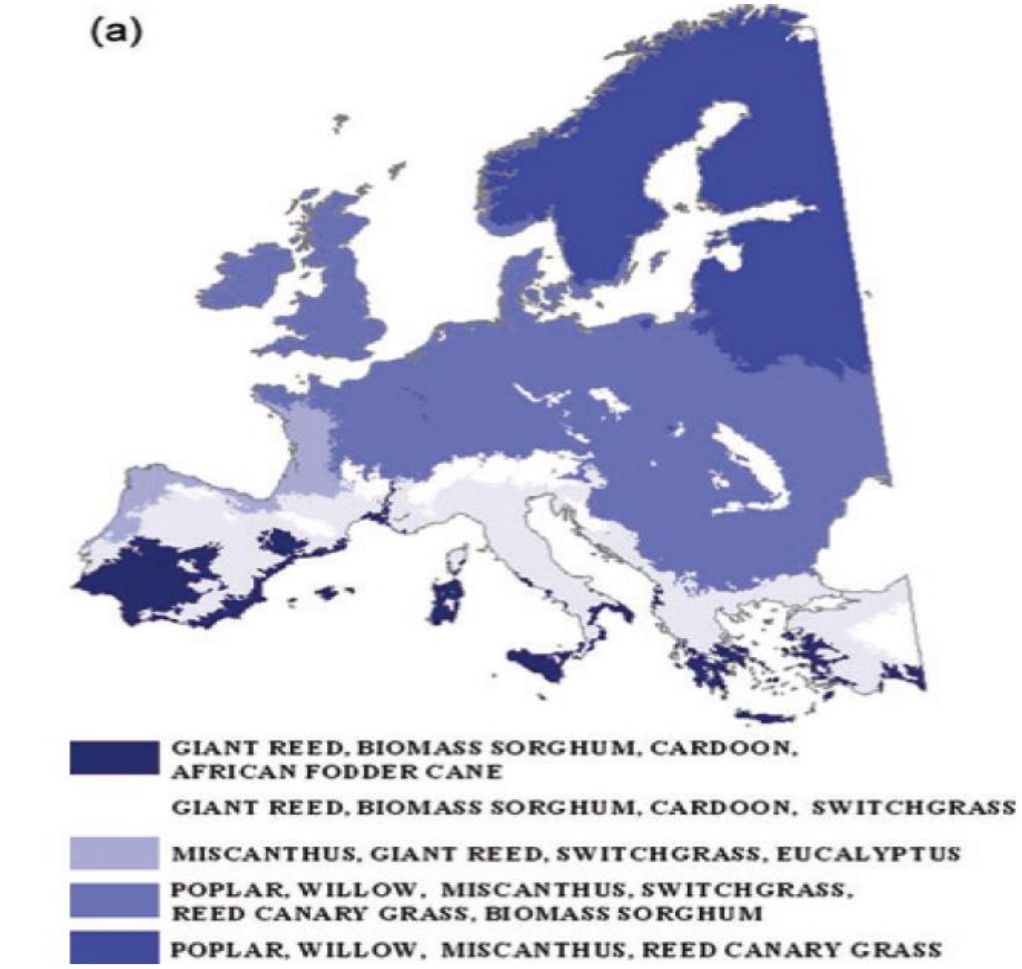
ENERGY CROPS IN EUROPE & RS



The potential cropping areas were determined according to the crop climatic requirements taking in consideration the bioclimatic zones determined by Metzger et al.

The data source for the elaboration of the present map was taken from Mücher et al.

The crops are listed in order of importance from left to right. (from Zegada-Lizarazu, 2010)

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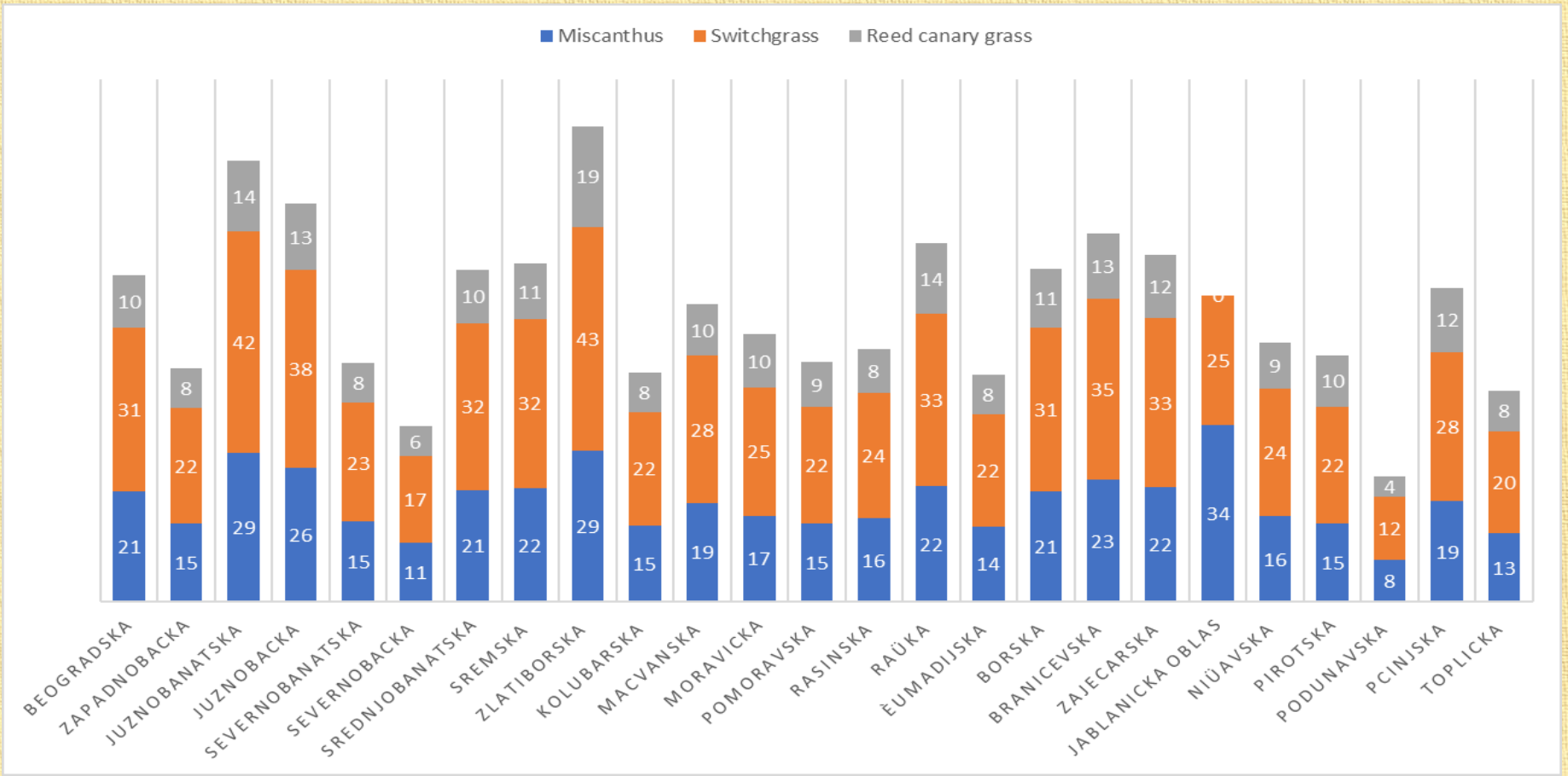
Estimated annual sustainable biomass potential (in ,000 tonnes dry biomass) for perennial energy crops in Serbia - 1.4 million dry tonnes/ year.



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BARRIERS

- Limited local technical capacity in Serbian enterprises and municipal institutions
- Lack of reliable and comprehensive map of marginal lands in Serbia.
- For energy crops: lack of the methodology to evaluate the adaptability and yielding capacity of the various crop species as well as include data/ information from experimental and demonstration field trials that have been implemented across Serbia for the last twenty years.

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BASELINE FOR MARKET

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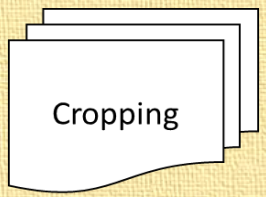
MARKET DEVELOPMENT STRUCTURE



Harvesting

Densification/ pre-treatment (pellets, briquettes, etc.)

Harvesting/ Bales

Storage (Biomass depot/ trade center)

Transport

End Use

Cropping systems design
Ensure year-round supply
Optimise regrowth

Decrease harvest and densification losses
Recycle process residues

Bales or chips?
Indoor or outdoor?
Physical or mechanical drying?
Optimal storage time?

Optimal collection points
Transportation routes

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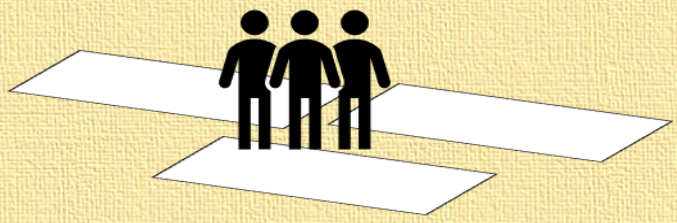
SETTING PRICES

Farmers

Receive establishment grants
Establish & manage crops



Market prices

Market prices are adjusted based on national fuel and energy pricing system
Supply & demand are matched with crop plantations preferentially close to energy plants

Biomass power plant

Plant locations selected in order to meet internal rate of return targets and ensuring sufficient year round supply

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BARRIERS

- The market for perennial energy crops is still at developing stage.
- Lack of knowledge & commitment from the farming communities.
- There is low commercial and industrial activity, and this could present difficulties in the supply of components.
- Attention should be paid to designing its structure and relevant pricing regimes in a way that facilitates transparent, smooth operation and complementarity with the current biomass markets.

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BASELINE FOR POLICY, FINANCING & INSTITUTIONAL CAPACITY

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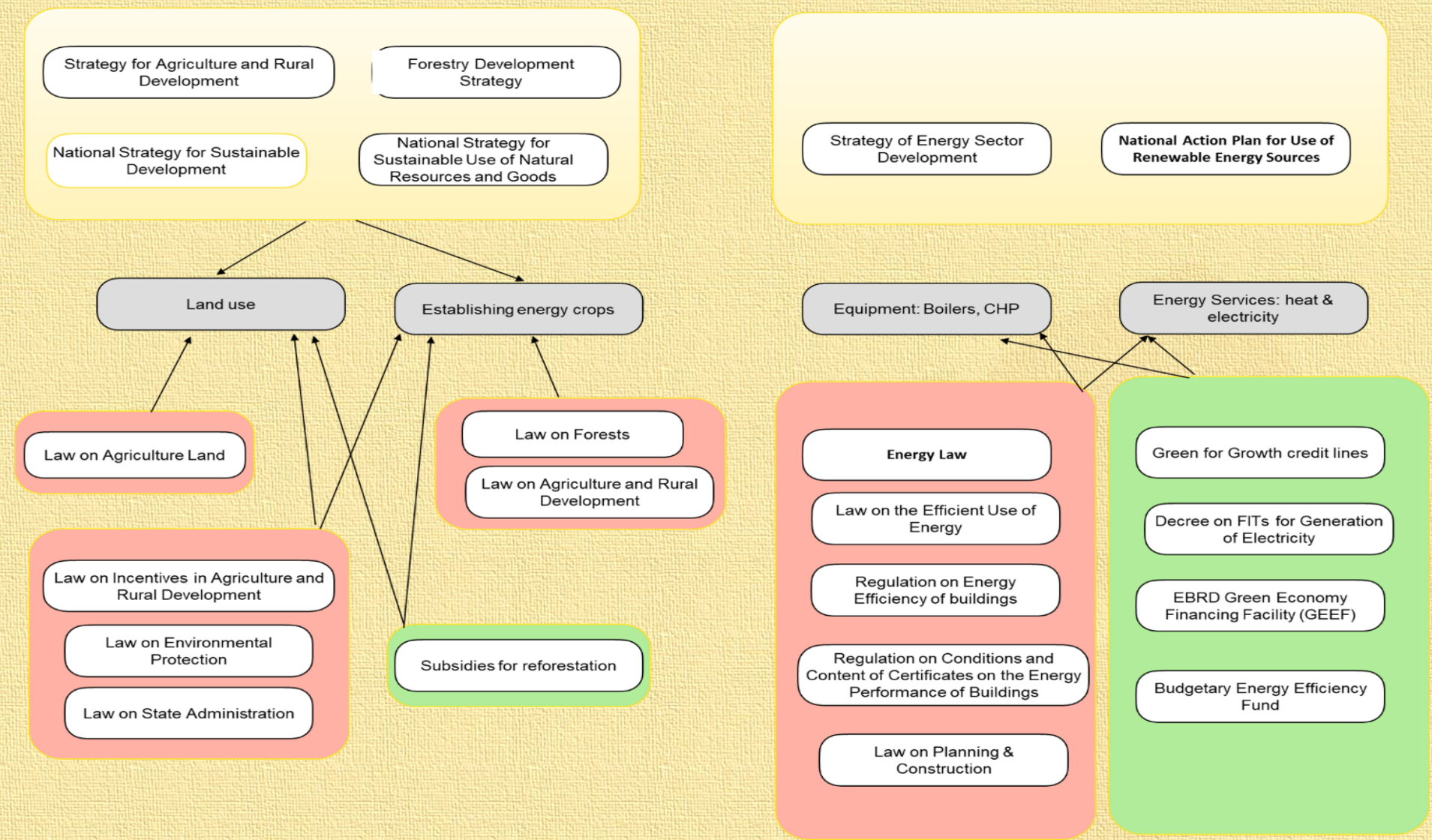
POLICY & FINANCING LANDSCAPE IN SERBIA

(regulations are highlighted pink; financing in green and information provision in yellow)



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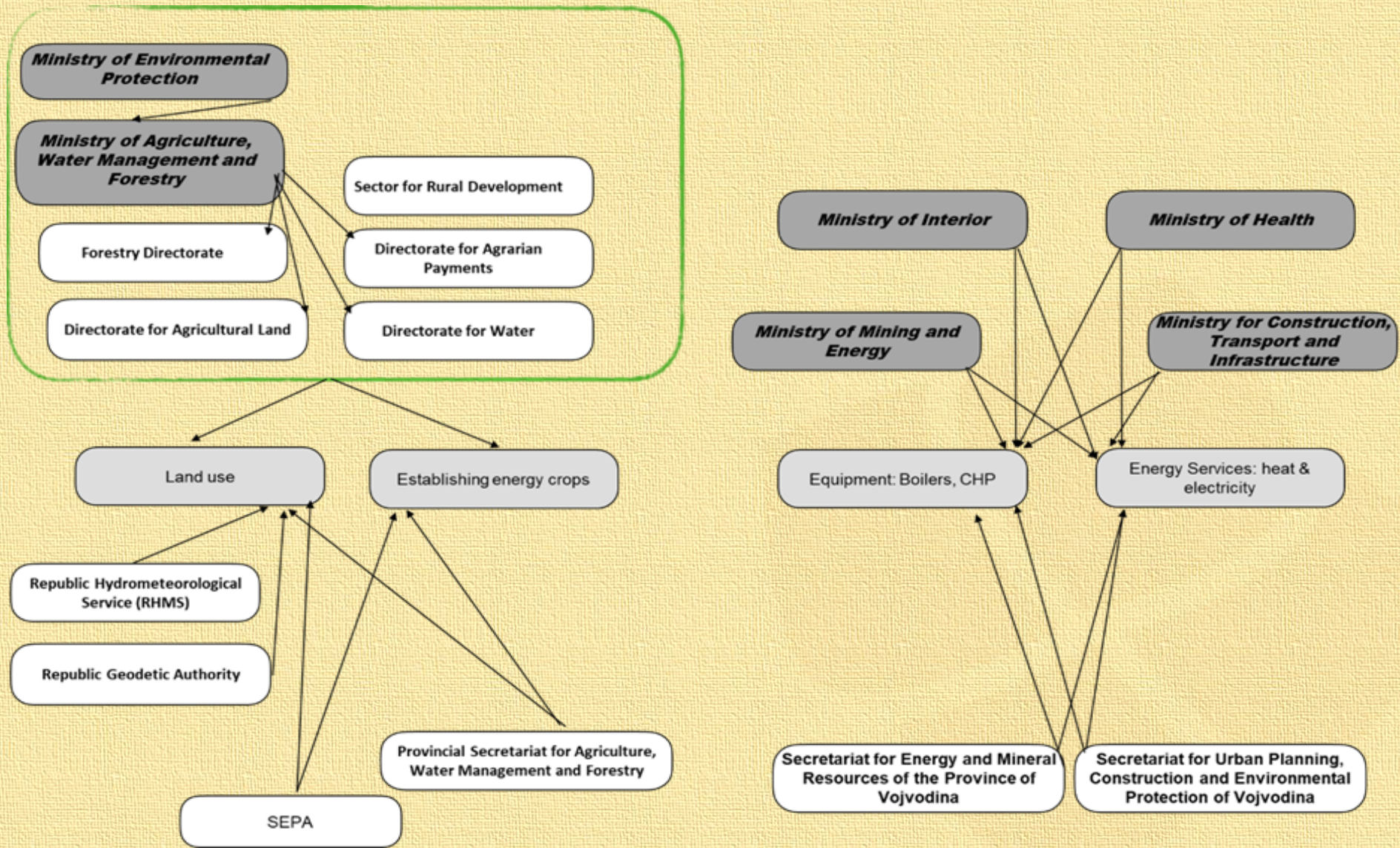
INSTITUTIONAL CAPACITIES IN SERBIA



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BARRIERS

- Lack of legislation to regulate sustainable development of energy crops in marginal land.
- Low development of cooperation between ministries prohibits the implementation of national programmes for the development of the sector.
- Deficiencies in institutional capacity across the spectrum of the monitoring and evaluation system.
- Investors lack knowledge for such value chains.
- High upfront investment costs and lack of affordable financing.
- Serbia needs strong long-term economic incentives in place to allow the efficient and long-term rehabilitation of marginal land with energy crops and a secure, reliable regulatory framework conditions over a medium/longer term.

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RECOMMENDATIONS FOR POLICY

- **Understand the context in terms of region, land uses, marginality factors and infrastructures.**

- **Analyze current policy:**
  - Are certain policy types under- represented (economic, regulatory, expenditure, institutional policy instruments)?
  - Are policies not focusing on key drivers, pressures, the state or the impacts?
  - What improvements are necessary to improve their overall effectiveness
  - Are relevant policies missing?

- **What are the key sectoral policy inter-linkages and are they positive or negative?**

- **Look for policy 'success' stories**

Approach for developing an integrated framework for the sustainable exploitation of biomass for bioenergy from marginal lands

Step 1: Analysis & Direction setting

Marginal land types

Energy crop options

Value chains

National infrastructures

Step 2: Policy aim & justification

Current policy

Challenges to turn marginal land into productive systems

Why is the government intervention necessary?

Policy objectives and intended effects

Step 3: New policy for improved competitiveness

Targeted interventions for domestic biomass & efficient value chains

Impact assessment: why these instruments- what they can achieve? Value added.

Integrate recommended instruments in existing or form new policy measures?

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RECOMMENDATIONS FOR INVESTORS

Strong financial support is required to develop the infrastructures required whilst ensuring sustainable management practices.

- **Understand domestic capacities in terms of land and crop options**
- **Prioritise 'tested' value chains with good performance at local level**
- **Learn from good practices in other countries**
- **Communicate with farmers and local government: 'invest' in close collaboration with them!**

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Thank you for your attention

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