IRRIGATION STRATEGY OF SERBIA

Supporting the development of an irrigation strategy for Serbia

Economic opportunities, value drivers and key risks of public and private investment in irrigation

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Key messages

- Irrigation can enable a transition to higher value-added crops and increased crop yields (both on new irrigated areas and in areas where irrigation is improved). As such **it should be seen as an instrument for development where the economic opportunities are clear.**
- **Irrigation is not a panacea.**
- Investments in irrigation **can result in high adoption and have a high impact, but it can also see little interest from farmers and cause little change.**

Key messages

- **The benefits of irrigation** – intensification, shift in crops, adaptation to climate change – **will be different depending on the context.**
- **Costs of irrigation will also depend on a number of factors**: water source, technology choice, topography, etc.
- **Adoption** of irrigation will be a **measure of the incentives and risks** each farmer perceives regarding such change.
- **Available infrastructure does not translate automatically in adoption.**

Introduction

A number of key factors influence financial and economic feasibility:

Benefits:

- Intensification existing crops systems
- Transition towards higher value agriculture
- Climate change adaptation

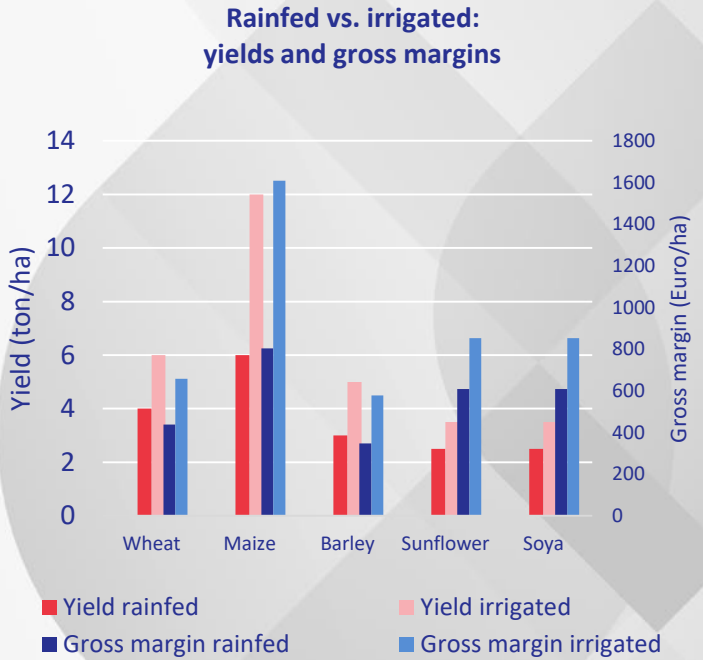
Costs:

- Water sourcing and conveyance (groundwater, adjacent surface water, canal system, pressurized system)
- On-farm technology (surface, typhoon, center pivot, localized)

Drivers for adoption

Cropping systems intensification

- Irrigation **reduces inter-year variability**, which can lead farmers to increase the use of inputs, further increasing yields.
- Irrigation could **increase average** maize **yields** from 6 to 12 tonnes/ha and gross margins by € 770/ha.
- Nationally, of the holdings with irrigation, **only 2.5 % irrigate maize.**
- Increase in margins may not be enough an incentive for small farmers.
- **Farmers may prefer shifting to HVC** once able to irrigate.



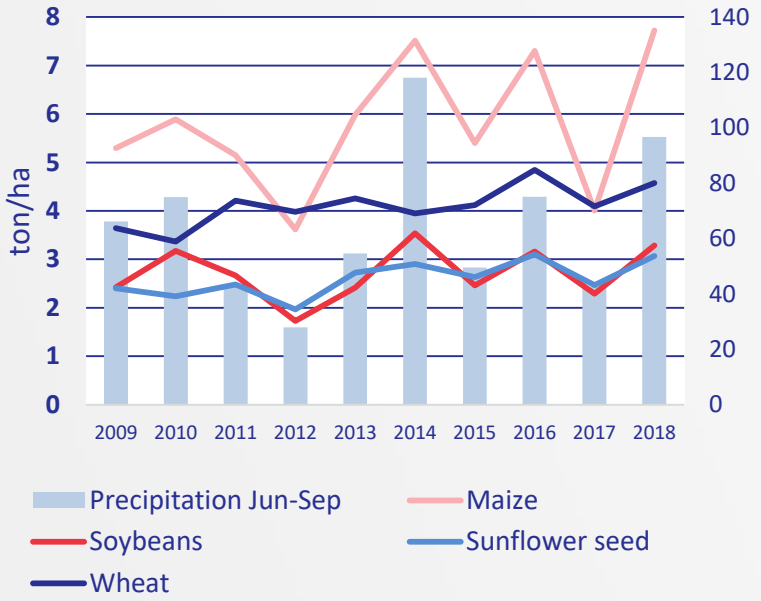
Drivers for adoption

Transition to higher value crops

- Serbia has potential to **grow crops with larger returns** on investment than the country's key export crops.
- There is also an opportunity for **lowering costs** and improve efficiency **of existing irrigation systems** of fruit and vegetables.
- New irrigated areas can convert from arable crops to fruits and vegetables.
- But, higher value crops imply **new risks** and **technological sophistication.** Large farms, absent and part-time farmers, etc. may not transition, even with available water.

Drivers for adoption

Adaptation to climate change – build resilience



Average temperature and rainfall

- Some crops are more sensitive.
- Strong correlation between yield and rainfall from June to September for maize and sunflower seed.
- Impact on sunflower yields is low, though
- No correlation or strong impact for other key arable crops.
- Complementary irrigation could be interesting in some arable crops, but NOT a general immediate need.

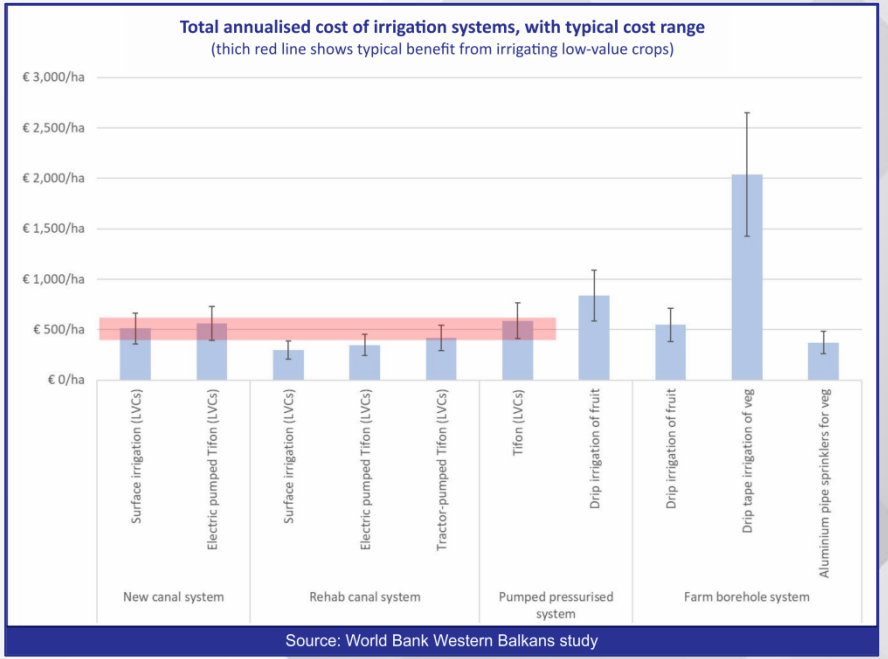
Costs, Benefits and adoption rate

Costs

For the same on-farm technology, the **annualized cost of irrigation** generally increases from canal rehabilitation to new canal systems to pressurized systems.

On-farm technology: wide gap in annualized costs between surface and drip.

The feasibility and competitiveness of each option will depend on the increase in benefits they will produce in each context.



Source: World Bank Western Balkans study

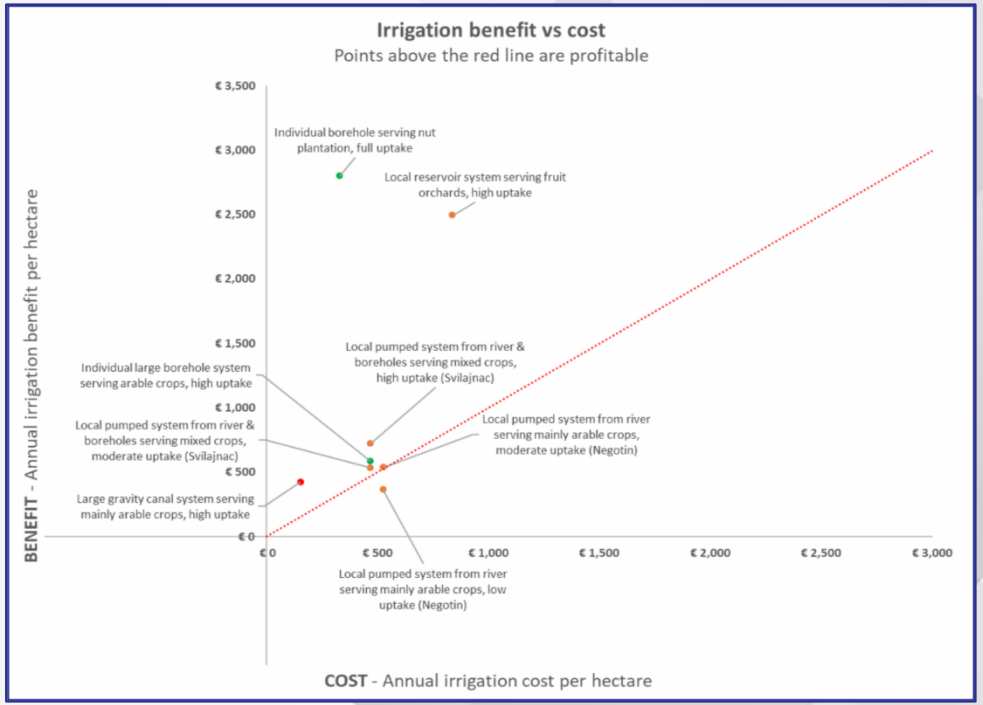
Costs, Benefits and adoption rate

Adoption

The feasibility of multi-user schemes will largely depend on a third factor: the level of adoption.

The level of adoption will depend on the level of benefits, costs and risks perceived by farmers.

90 % of rural household income comes from outside agriculture. Irrigation Systems with high (investment and operating) costs per hectare require larger uptake.



Costs, Benefits and adoption rate

Overview

Irrigation in Serbia can produce very different results:

- **Individual boreholes serving fruits crops** can produce annual benefits of over 2500 Euros/ha with annual costs of around 500 euros.
- **Multi-user systems serving fruit crops** with annual costs of around 1000 euros/ha are able to produce annual benefits of about 2500 euros.
- **Multi-user systems serving arable crops** need moderate to high uptake to break even at around 500 euros (costs and benefits) per hectare.
- **High adoption rates cannot always be expected** due to farmers age, absenteim, farm size, etc.
- Hence, multi-user systems with moderate adoption rates may in many cases require at least a mix of arable and high value crops to be feasible.

Existing opportunities

- **Well-regulated and well-monitored individual irrigation** - with abundant water resources, boreholes and direct intakes from rivers in lowlands may be the least costly option and the most feasible for low-value crops.
- **Drainage systems converted for dual-purpose (drainage and irrigation)** – the large extension of drainage infrastructure in the country provides an opportunity to irrigate (if water quality is not an issue), while containing investment and operating costs. These systems could be feasible for a mix of high and low value crops.
- **New canal systems and pressurized systems** – interesting when enabling large increases in gross margins and secure high rates of adoption.
- **Multi-user schemes** in general – can reach farmers with no local source and allow easier control of water use.

Key risks

Individual irrigation - fast and unmonitored development of direct intake from boreholes or rivers can:

- compromise availability of enough water in drier periods,
- reduce supply downstream or for human consumption, and
- cause environmental damages (land subsidence, reduced biodiversity, increased pollution, etc).

Multi-user schemes:

- Require well-tested assumptions on the motivations to shift cropping systems and for adoption as some may be unfeasible.
- Overlooked agency costs and governance issues, may result in over optimistic feasibility studies.

Recommendations for the Strategy and Action Plan

- **Map out opportunities for investments with low risk and interesting returns** in the short term – identify illustrative examples and undertake detailed costs benefit analysis to test their feasibility.
- **Identify** complementary investments and new **institutional arrangements that will increase the sustainability (lower the risk)** of identified investments.
- **Provide directions on policies that may accelerate a decrease in risk factors and an increase potential benefits** of investments that are, for the moment unfeasible – e.g. promote a gradual increase in farms size and support the development of markets for high value crops.

Conclusions

1. Irrigation is not an end in itself
2. Technical feasibility is not sufficient for success
3. Costs and benefits depend on context
4. Not always feasible for LVC
5. Governance plays an important role

No widespread use of irrigation without clearly perceived benefits

Thank you for your attention