



ECONOMIC ASSESSMENT OF NET BENEFITS OF REHABILITATING AND DEVELOPING IRRIGATION & MELIORATION SYSTEMS IN A PILOT AREA OF BELARUS

Technical workshop

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Today's presentation



1. The project at a glance
2. Should irrigation be resumed in the Gomel oblast? – taking into account hydraulic constraints and economic considerations
3. The basis for the assessment
4. The results of the assessment

The project at a glance



The ultimate objective of this study is to help Belarus to **adapt its agri-food and irrigation sectors** to the negative impacts of growing climate variability and climate change on water resources.

Operational objectives:

- (i) Assess the **economic and social benefits of rehabilitating and developing water storage, irrigation and melioration systems in the pilot area** of Gomel oblast; and
- (ii) Help develop local capacity for implementing similar studies in other parts of Belarus.

Pilot areas → **Kalinkovichskiy and Khoinikskiy rayons** of Gomel oblast (as suggested by local stakeholders)

→ **Petrikovskiy rayon** (added because of promising results)

Should irrigation be resumed in the Gomel oblast?



→ In Belarus, overall, water resources are abundant, but distribution of local runoff within the year is uneven – seasonal shortages are possible



→ Irrigation infrastructures already exist from soviet time, but irrigated area has been declining: from 114 100 ha in 2006, down to 30 300 in 2019 → **Irrigation can be resumed only if it will not threaten sustainability of water bodies and related eco-systems and will make economic sense.**



→ Discontinuous production trends in recent years for grains and legumes

Should irrigation be resumed in the Gomel oblast? - 2



→ Due to irrigation, crop productivity is expected to increase!

Crops	Average yield on non-irrigated land, tonnes/ha	Yields on irrigated land, tonnes/ha	Growth/increase, %
Sugar beets	43.4	49.5	14.0
Potatoes	20.2	26.0	28.7
Vegetables	24.2	30.2	24.8

The basis for the assessment

Total possible irrigated area by crop, in ha

(Source: CRICUWR, 2020 – assuming that the full irrigated area is used for one crop only)



Crops	Total possible irrigated area by crop, ha		
	Kalinkovichi	Khoiniki	Petrikov
Cabbage	102,24	20,24	11624,48
Cucumbers	133,85	26,5	15217,5
Tomatoes	138,03	27,32	15693,05
Potatoes	158,77	31,43	18052,13
Beetroot	122,69	24,29	13949,38
Carrots	149,95	29,69	17049,23
Apple orchards	258,29	51,13	29367,11



The basis for the assessment



Two scenarios

All production is
exported to the EU



(Source export prices: EUROSTAT)

All production is
sold on the
domestic market



(Source for average agricultural producer
prices: BelStat)

The basis for the assessment



Parameters assessed (per rayon and crop)

- Expected production on the agri land spots **where availability of surface water allows for irrigation** - without and with irrigation
- Value of production without and with irrigation
- Costs of rehabilitating the existing irrigation system (total investment costs) → annualized
- Costs of new development of irrigation systems (total investment costs) – not required, but assessed for comparison (in the report only) → annualized
- Approximated operation and maintenance (O&M) yearly costs:
(i) low; and (ii) high
- **Net value of production with irrigation (gross value – costs)**

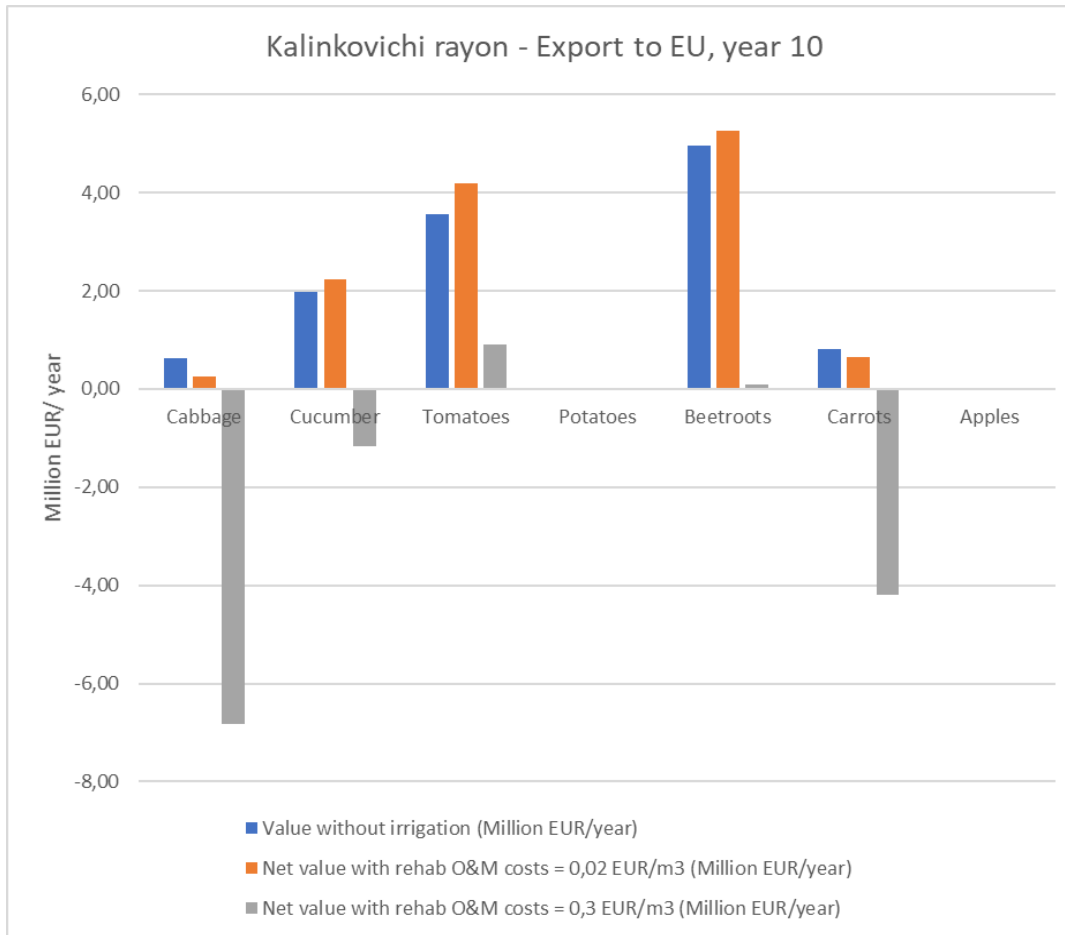
Limitations and assumptions

- Productivity of apple gardens with irrigation (estimation based on EU data)
- Costs of rehabilitation or new development of irrigation systems: estimation based on FAO unitary values from other regions of the world
- O&M costs → approximated based on irrigation water prices (EU data) – two values were used (low: 0.02 EUR/m³ and high: 0.3 EUR/m³) to appreciate the influence of O&M costs on the overall gains of irrigation
- Annualized investment costs decrease year after year – the assessment considers yearly costs in year 10, as this is a medium- to long- term investment

The results of the assessment



Scenario I: all production is exported to the EU

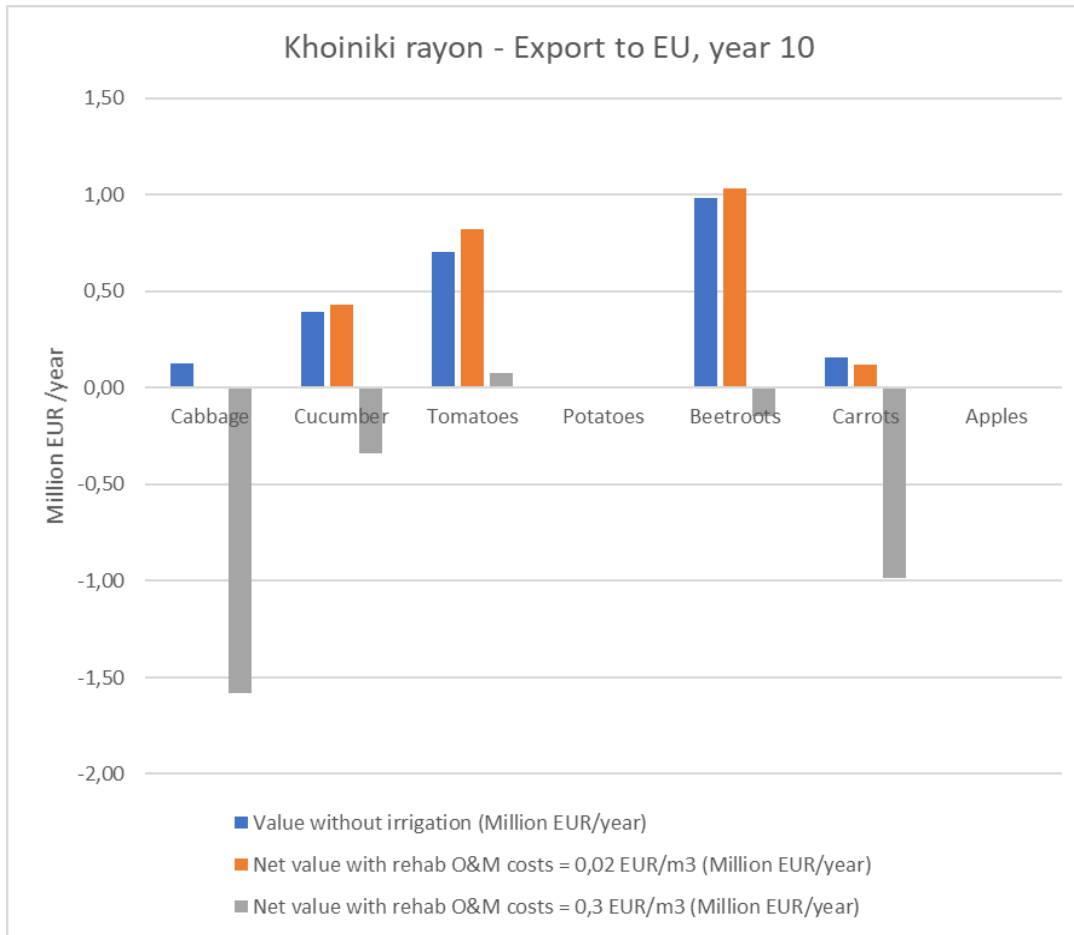


- Resuming irrigation might be worthy if tomatoes and beetroots are planted in the area.
- However, profitability strictly depends on the magnitude of O&M costs → to be carefully considered as part of the ex-ante feasibility assessment.

The results of the assessment



Scenario I: all production is exported to the EU

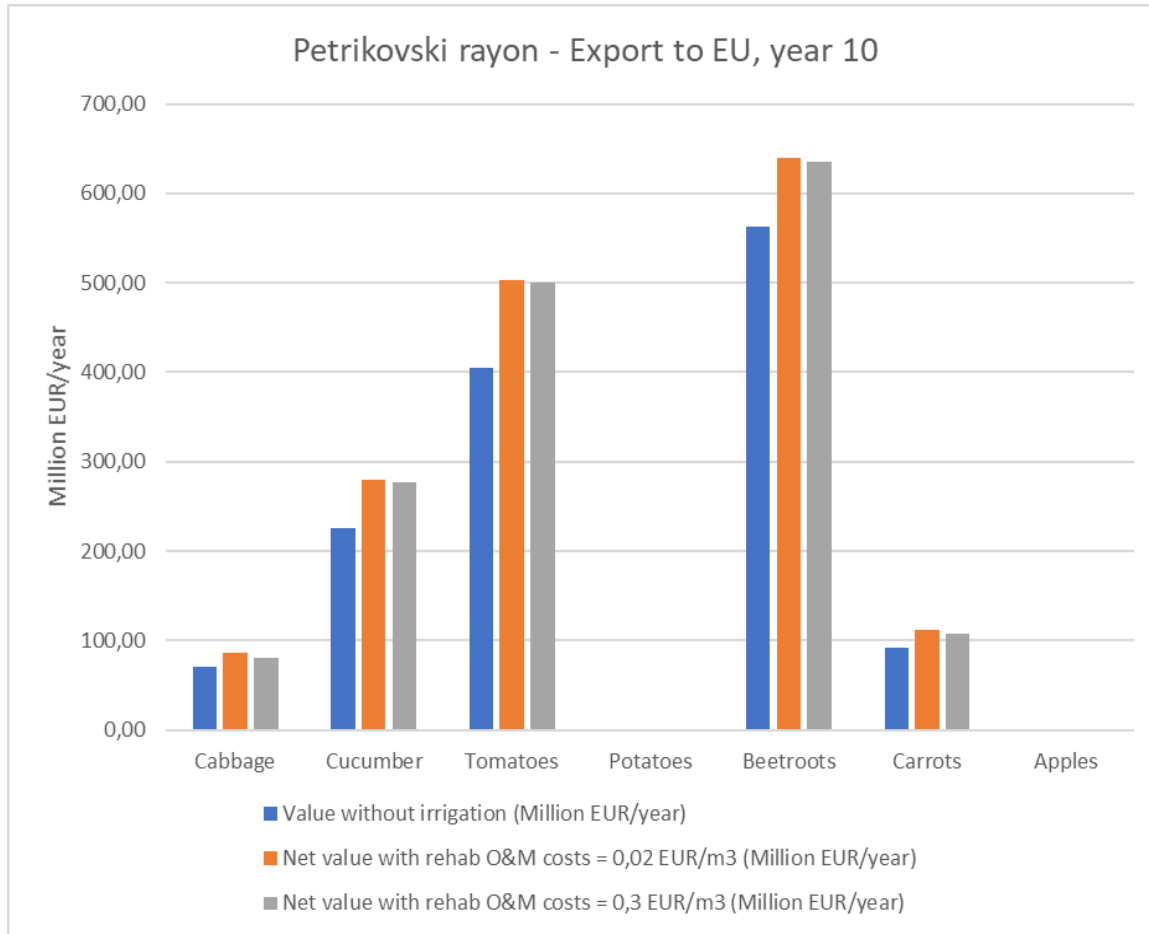


Overall, investing in the rehabilitation of the irrigation system in the Khoiniki rayon is **not recommended**, even if the produce will be sold at higher export prices.

The results of the assessment



Scenario I: all production is exported to the EU

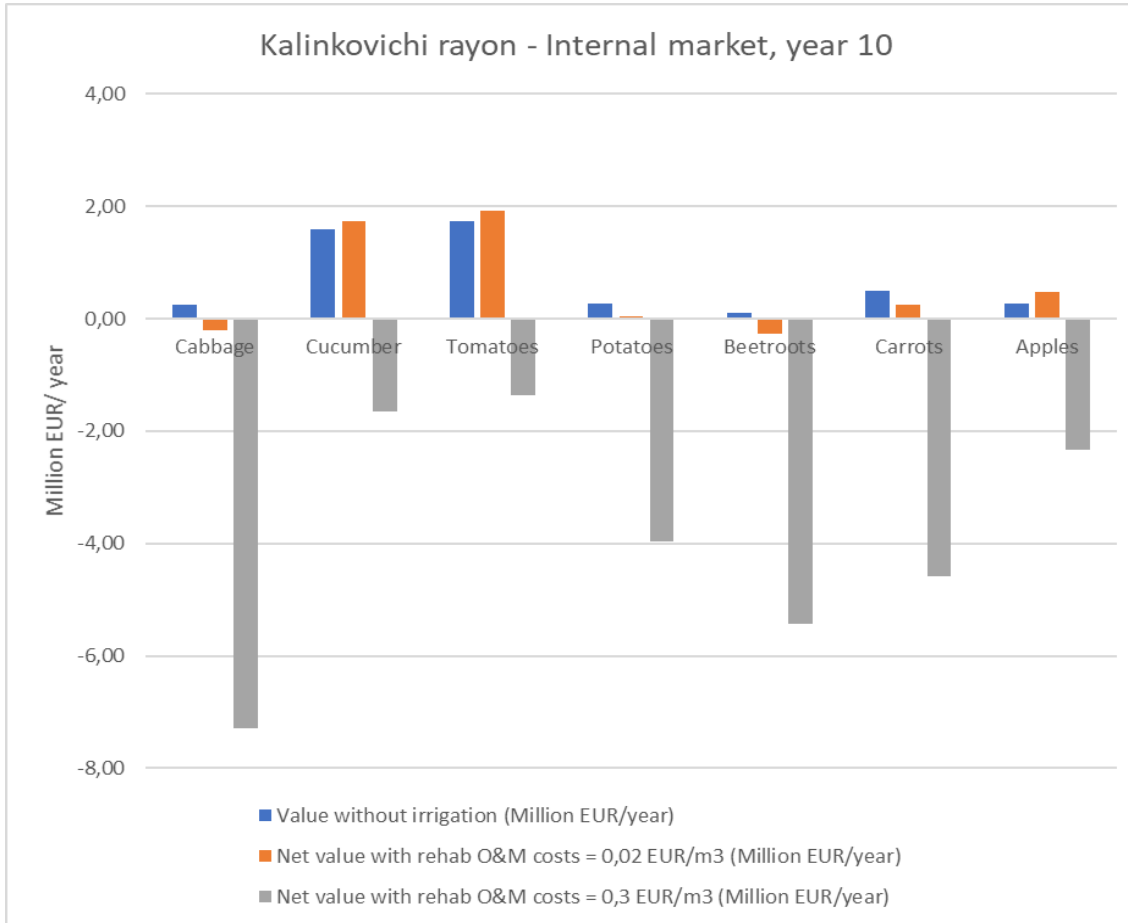


Investing in the rehabilitation of the irrigation systems in the Petrikovski rayon can be a **no-regret investment** in case **tomatoes and beetroots** are grown on the irrigated area. **Cucumber** can also be an option.

The results of the assessment



Scenario II: all production is sold on the internal market

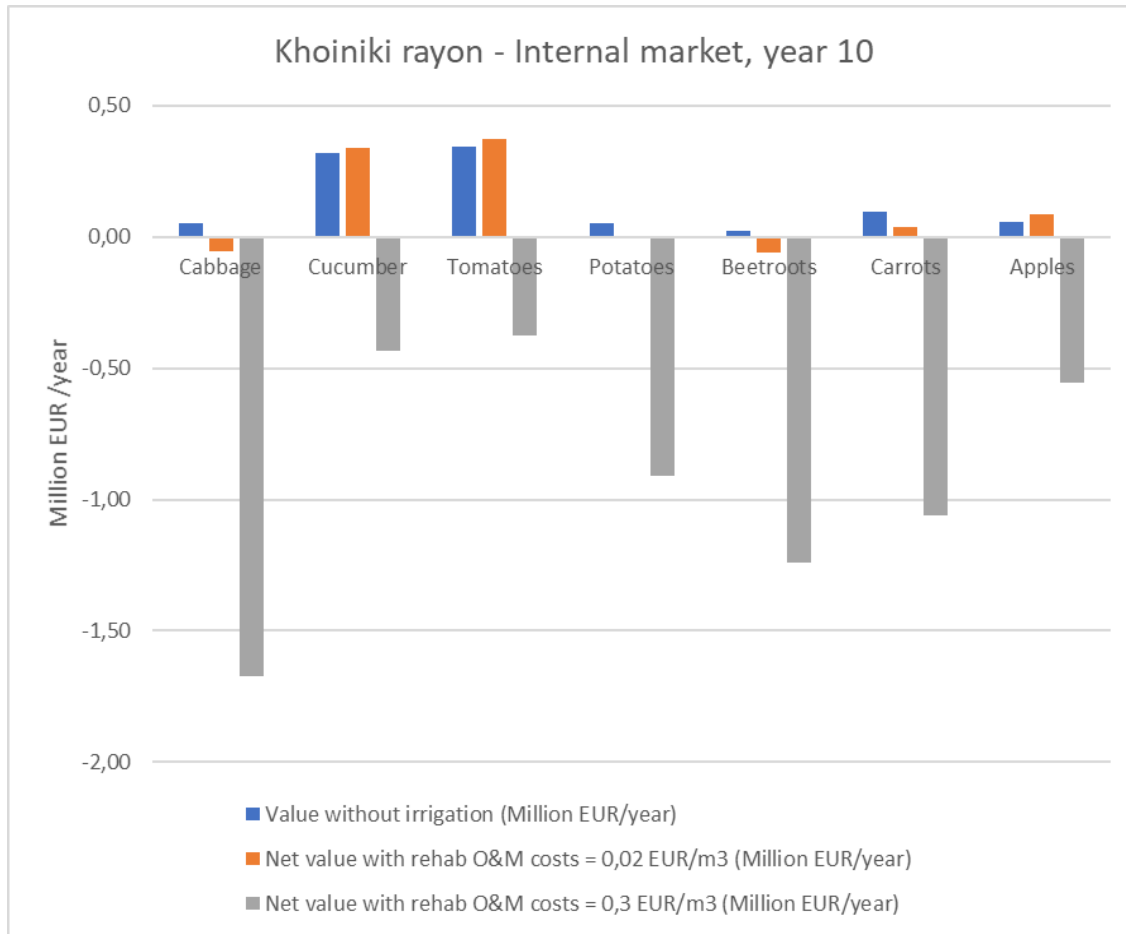


Overall, investing in the rehabilitation of the irrigation system in the Kalinkovichi rayon is **not recommended**, if production is fully sold on the internal market.

The results of the assessment



Scenario II: all production is sold on the internal market

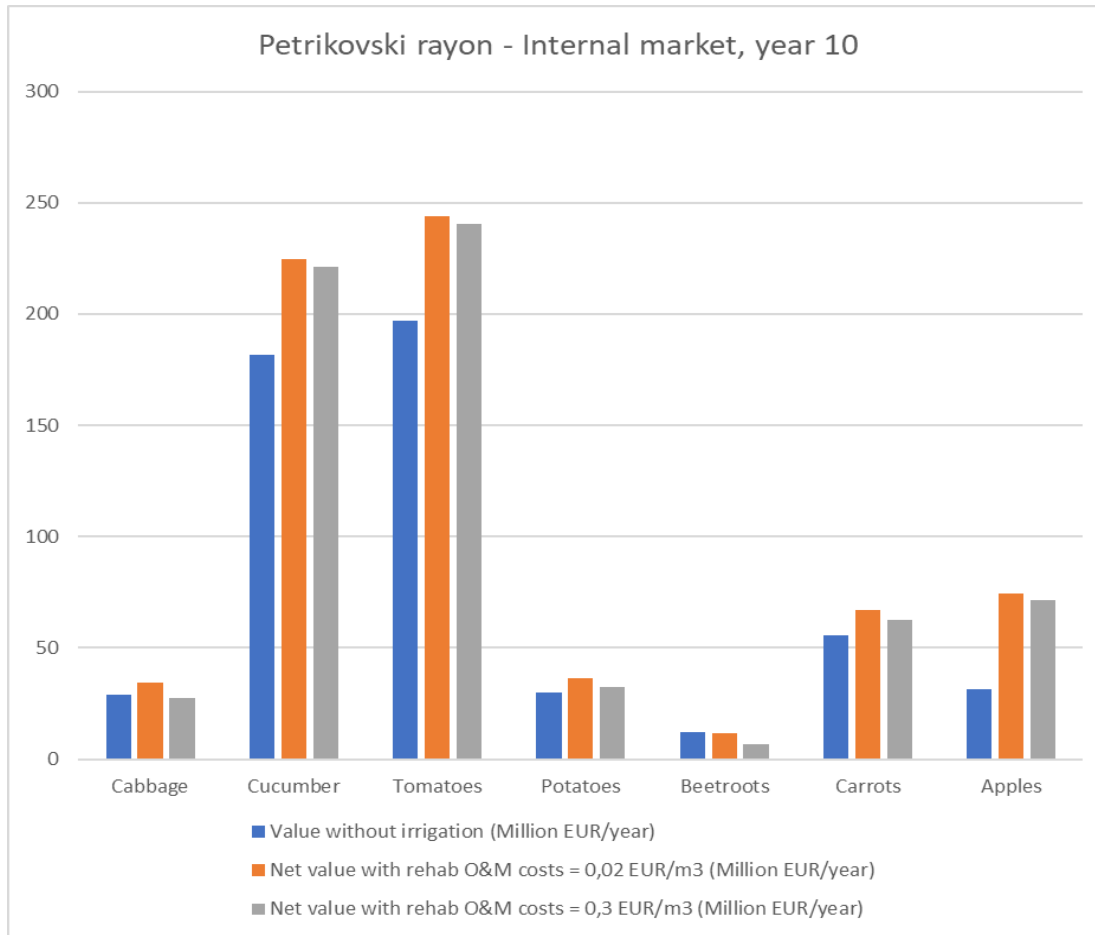


Overall, investing in the rehabilitation of the irrigation system in the Khoyniki rayon is **not recommended**, if production is fully sold on the internal market.

The results of the assessment












Scenario II: all production is sold on the internal market



Even if the produce is sold on the domestic market, investing in the rehabilitation of the irrigation system in the Petrikovski rayon can be a **no-regret investment** in case **tomatoes and cucumbers** are grown on the irrigated area. Apple orchards can also be an option, although gains will be lower.

In conclusion...



Scenarios	Kalinkovichi rayon	Khoyniki rayon	Petrikovski rayon
1. All production is exported to the EU			
<i>Best performing crops</i>		Investment in irrigation not recommended	
2. All production is sold on the internal market			
<i>Best performing crops</i>	Investment in irrigation not recommended	Investment in irrigation not recommended	

→ The results of the calculations also included the economic assessment of developing new irrigation systems from scratches: although the costs are higher, this difference does not have a significant impact on the net value of irrigation in the designated areas – so the **same considerations** also apply in case of **new developments of the irrigation systems**.



**Thanks for your
attention!**