

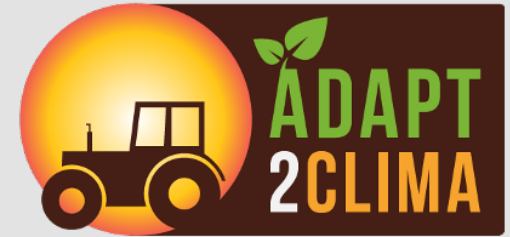
# Cost-Benefit Analysis of Climate Change Adaptation Measures in Bosnia and Herzegovina

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- The main goals of the analysis:
  - quantify and present financial consequences of flood and drought,
  - present costs and benefits of adaptation measures,
  - rank and prioritize the climate change adaptation measures.
- Challenges: collect valid data for quantification and financial presentation of the positive effects of the measures.
- Source of information: reports of the authors providing technical support to the TNC.
- Benefits: avoided damages and losses in different sectors due to the use of adaptation measures.

- ▮ Most vulnerable sectors: agriculture, biodiversity, tourism, forestry, water resources and health.
- ▮ Institutional-organisational measures,
- ▮ Structural measures and
- ▮ Educational-informative measures.

## CLIMATE CHANGE ADAPTATION MEASURES

### ***Institutional- organisational measures***

- ▮ Institutional-organisational measures should improve:
  - ▮ the quality and availability of data aimed at climate monitoring, data collection and modelling,
  - ▮ analysis and climate related data forecasts,
  - ▮ development of the administrative and technical capacities of public institutions addressing climate change,
  - ▮ legislation to the actual needs (climate change adaptation, European Union accession process and other sectorial organisations in the world),
  - ▮ integration of adaptation measures into all strategic documents.
- ▮ 18 measures, 126 million € initial costs and 1,68 million € for annual operating and maintenance costs.
- ▮ The water resources sector takes the biggest share per value (>95%) of the foreseen adaptation measures.

# CLIMATE CHANGE ADAPTATION MEASURES

## *Structural measures*

- ▮ Structural measures: use of certain technical and technological solutions.
- ▮ Sectors: agriculture, tourism, forestry and water resources.
- ▮ 11 measures, 4 billion € initial costs and 61 million € for annual operating and maintenance costs.
- ▮ Cost-Benefit Analysis.
- ▮ Profitability Index (PI) - respected the present value of all cash inflows (benefits) and outflows (operating and maintenance costs) and the initial value of the investment.
- ▮  $PI > 1$

$$PI = \frac{\sum_{n=0}^N \frac{(b_n - c_n)}{(1 + \frac{p}{100})^n}}{I_0};$$

*PI- Profitability Index;*

*N- project / measure life;*

*b<sub>n</sub>- benefit (inflows) at the end of period n, b<sub>n</sub> ≥ 0;*

*c<sub>n</sub>- cost (outflows) at the end of period n, c<sub>n</sub> ≥ 0;*

*p-discount rate;*

*I<sub>0</sub>-initial value of investment;*

# CLIMATE CHANGE ADAPTATION MEASURES

## *Structural measures*

Ran k	Sector	Measure	Profitability Index
1	Tourism	Develop alternative programmes of touristic supply (develop new tourism potential) aimed at improving the overall tourism product and extending the tourist season in affirmed winter tourism centres in B&H.	14,15
2	Forestry	Establish intensive plots (energy plots and plantations). Establish intensive plots under poplar tree in the basins of the large rivers.	9,48
3	Forestry	Increase the surface area under forest through afforestation of the significant surface area evaluated as favourable for afforestation.	2,11
4	Agriculture	Reconstruct and build the irrigation system in agriculturally developed areas.	1,51
5	Agriculture	Reconstruct and build the irrigation system in floodplains and difficult land.	1,37
6	Agriculture	Build the micro accumulations.	1,23
7	Agriculture	Use of agro technical measures for holding and conserving humidity.	1,13

## CLIMATE CHANGE ADAPTATION MEASURES

### *Structural measures*

Ran k	Sector	Measure	Profitability Index
8	Tourism	Provide all technical conditions for laying artificial snow on ski tracks. Priority areas: Jahorina, Bjelašnica, Vlačić, Kupres and Kozara.	1,11
9	Water resource s	Rehabilitate and reconstruct flood protection facilities.	1,09
10	Water resource s	Construct multipurpose accumulations and redistribute big and small water: flood protection and irrigation. Hydro-energy established.	1,06
11	Forestry	Establish forests on steep and shallow land and on the non-permeable layer, vulnerable to erosion processes.	0,51

## CLIMATE CHANGE ADAPTATION MEASURES

### *Structural measures*

- Measures in the **forestry** sector with PI 9,48 and 2,11 (which means a present value of 9,48 and 2,11 € benefit achieved per each € invested).
- Measures in the **tourism** sector showed very good results with PI of 14,15 and 1,11.
- Measures in the **agriculture** sector showed good PI results ranging from 1,13 to 1,51.
- The **water resources** measures showed satisfactory PI results ranging from 1,06 and 1,09.
- Positive signal for state and other investors to develop the investment potential of these measures.



## CLIMATE CHANGE ADAPTATION MEASURES

### ***Educational- informative measures***

- ▮ Educational-informative measures are preconditions for more specific climate change problem solving.
- ▮ These measures focus primarily on increasing awareness on the consequences of climate change and ways of living under extreme climatic conditions.
- ▮ 2 measures, 6,4 million € costs in the water resources and the health sectors.

# Thank you for the attention!

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