



Environment Center  
Charles University  
in Prague

# **Jaká adaptační opatření ke zmírnění dopadů povodní a sucha Češi upřednostňují?**

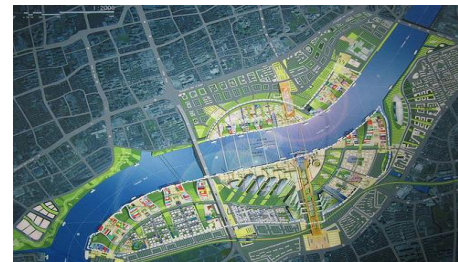
## **What adaptation measures to limit damages from floods and droughts do Czech citizens prefer?**

Iva Zvěřinová, Milan Ščasný, Zuzana Martínková

Seminář ADAPTACE NA ZMĚNU KLIMATU V ČESKÉ REPUBLICĚ,  
Praha, 9.2.2017

# OBJECTIVES

- to examine preferences of inhabitants of the Czech republic, Italy and the United Kingdom for adaptive options (plans)
- *zkoumat preference obyvatel ČR, Itálie a Velké Británie pro veřejné adaptační programy a opatření*
- preferences for:
  - technical,
  - natural,
  - non-structural (soft)measures to reduce impacts of floods or draughts



# SURVEY

- 1) Qualitative presurvey – personal face to face interviews
- 2) **Questionnaire survey** in Italy, the Czech Republic, the UK
  - Data collection in July 2016
  - the country subsamples are representative of national populations aged 18 to 69 years in terms of gender, age, region and education
  - **7,042 valid questionnaires** (after excluding „speeders“)
  - sampled from members of internet access panels

Country	N
UK	3 073
Italy	2 655
CZ	1 310

# Themes of this presentation

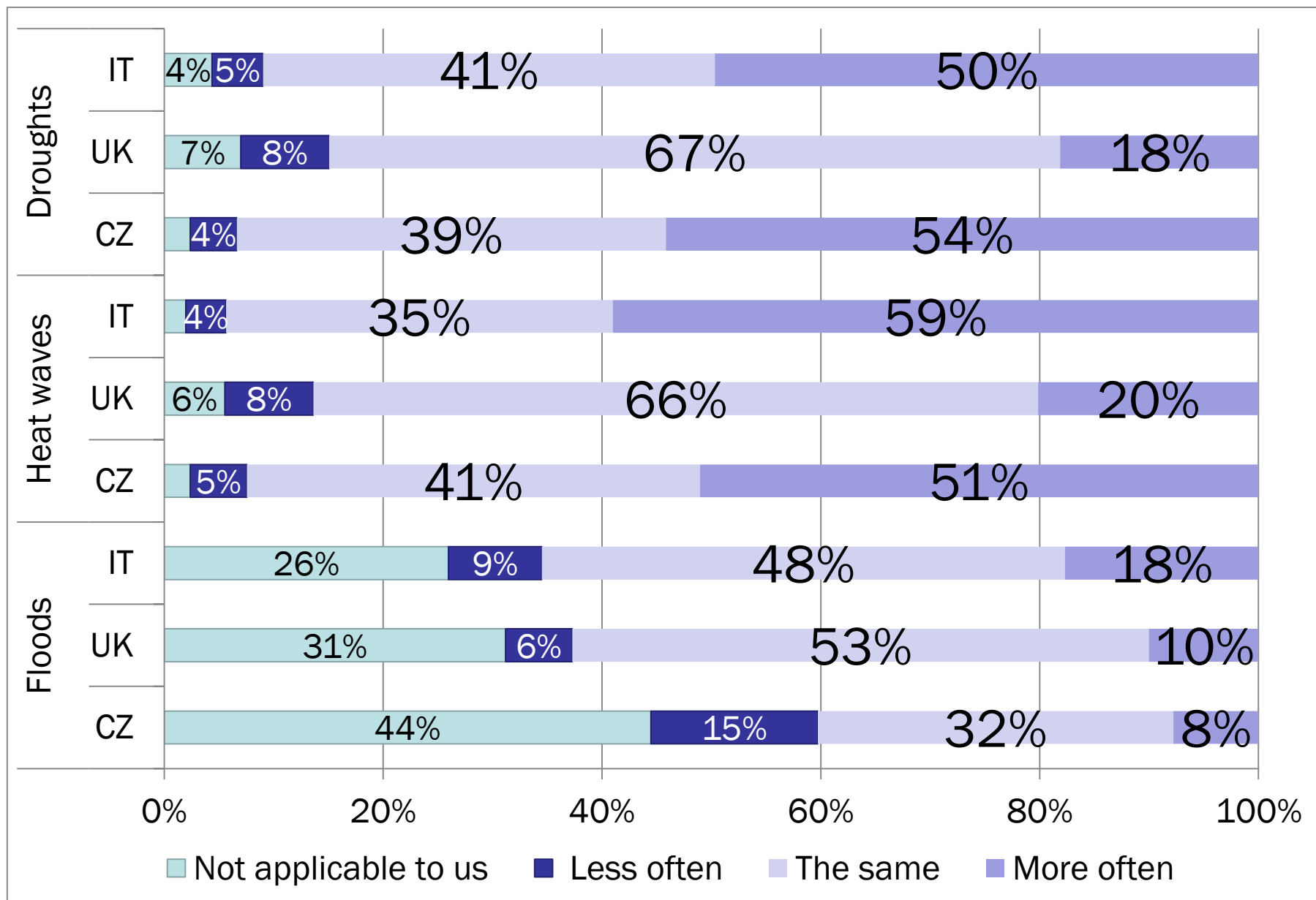
I. What changes do Czechs expect?

*II. Jaké změny Češi očekávají?*

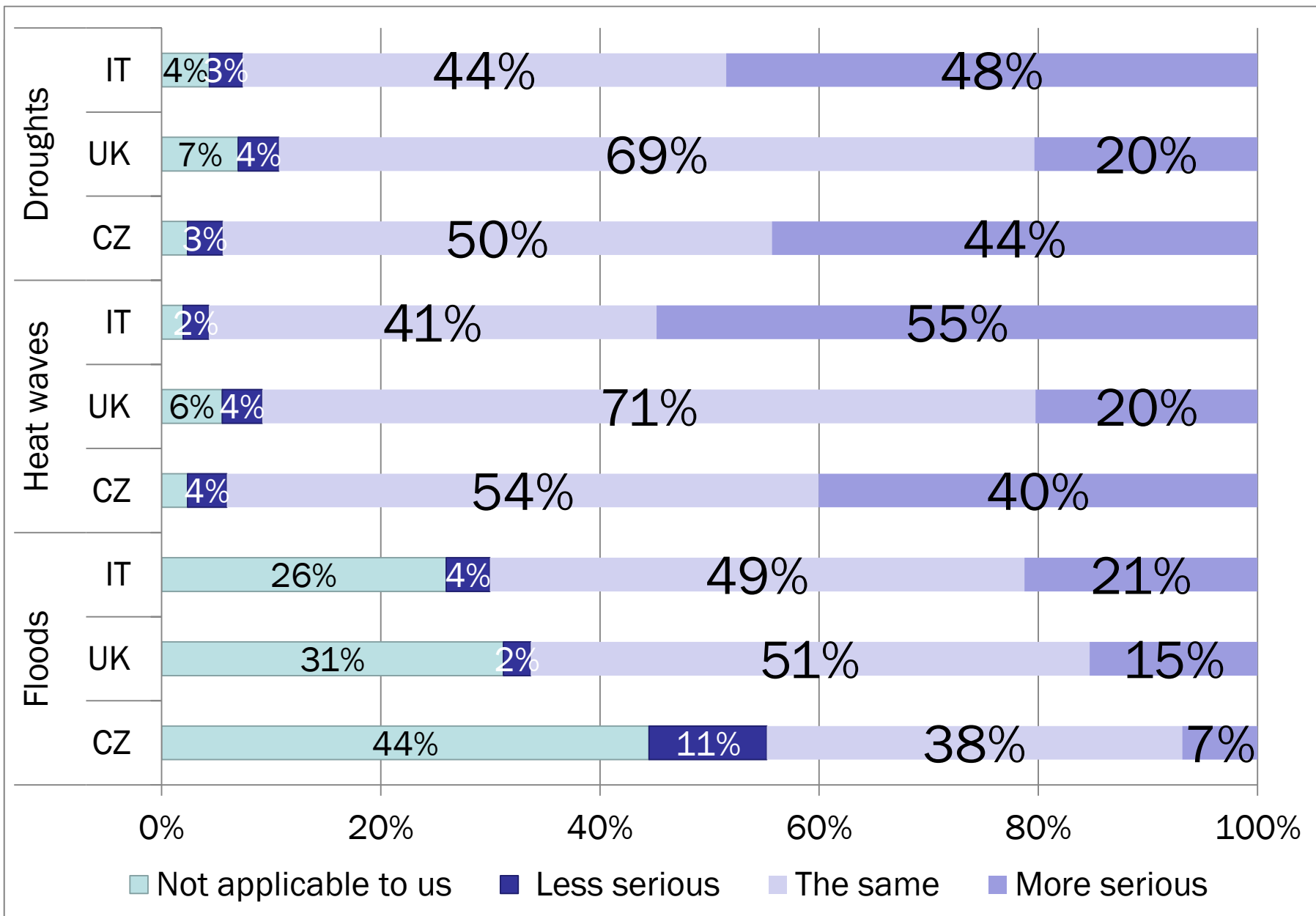
II. What adaptation measures do Czechs prefer?

*II. Jaká opatření Češi preferují?*

# I. Perception of risk: exposition of respondent's household over the next 10 years to the impacts of the disasters



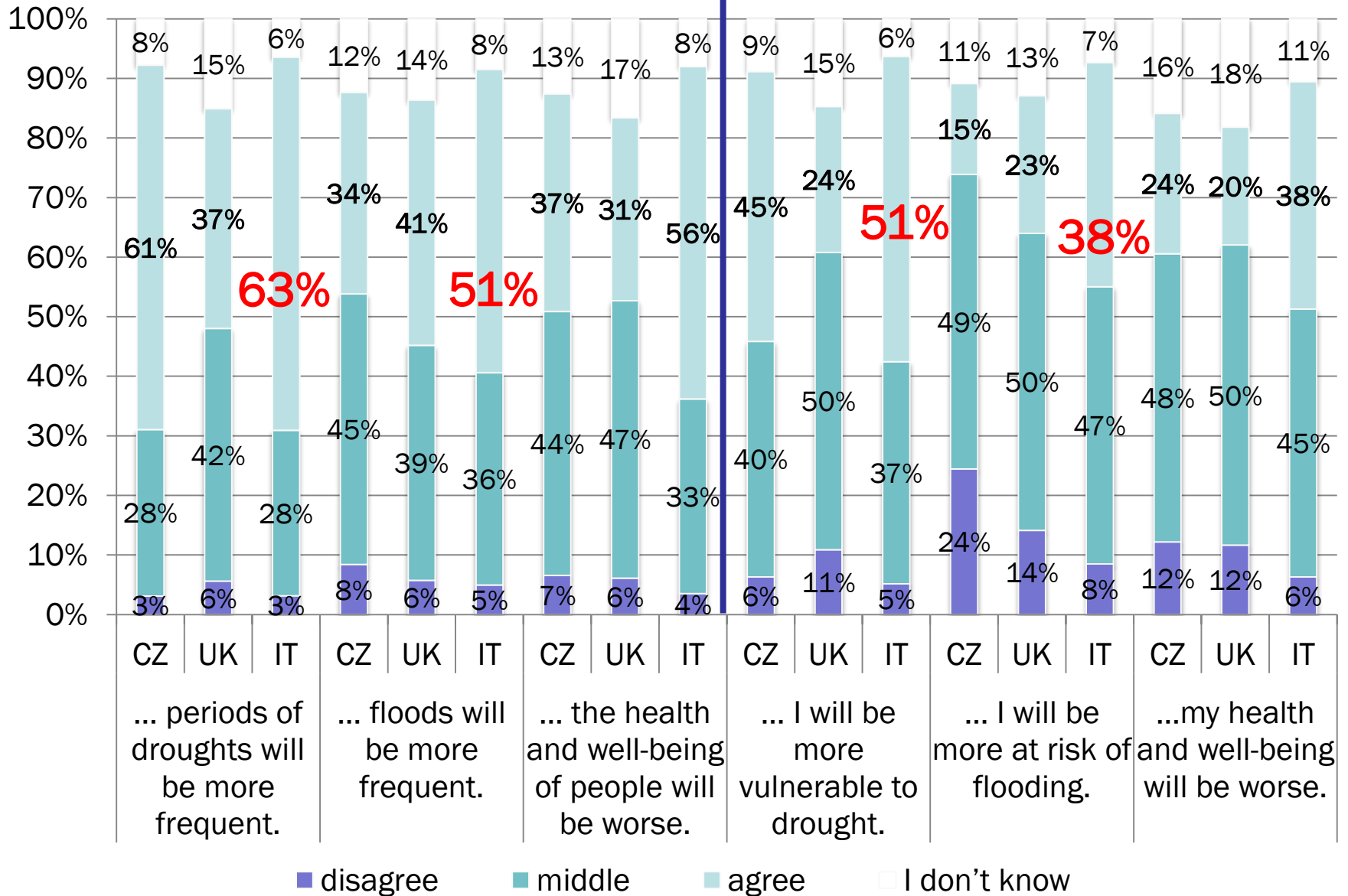
# I. Perception of risk: seriousness of the disasters during the next 10 years



# I. Perception of impacts of climate change

... on region

... on respondents





# Droughts:

## Types of **structural** measures

### Technical

#### Ex-ante

- Large reservoirs and dams
- Small water reservoirs and ponds
- Rainwater harvesting and irrigation systems

### Natural

#### Ex-ante

- Creating marshlands/wetlands to hold rainfall for agricultural and domestic use
- Changes in the use of agricultural land to retain water





# Droughts: Types of **non-structural** measures

## Ex-ante

- **Information** provision regarding efficient water use
- Drought risk **management plans**
- Improved **land use planning** (managing competing pressures on land – domestic, commercial and agricultural)
- Tax relief on water **efficient technologies**
- Higher **charges** for large water extraction

## Ex-post

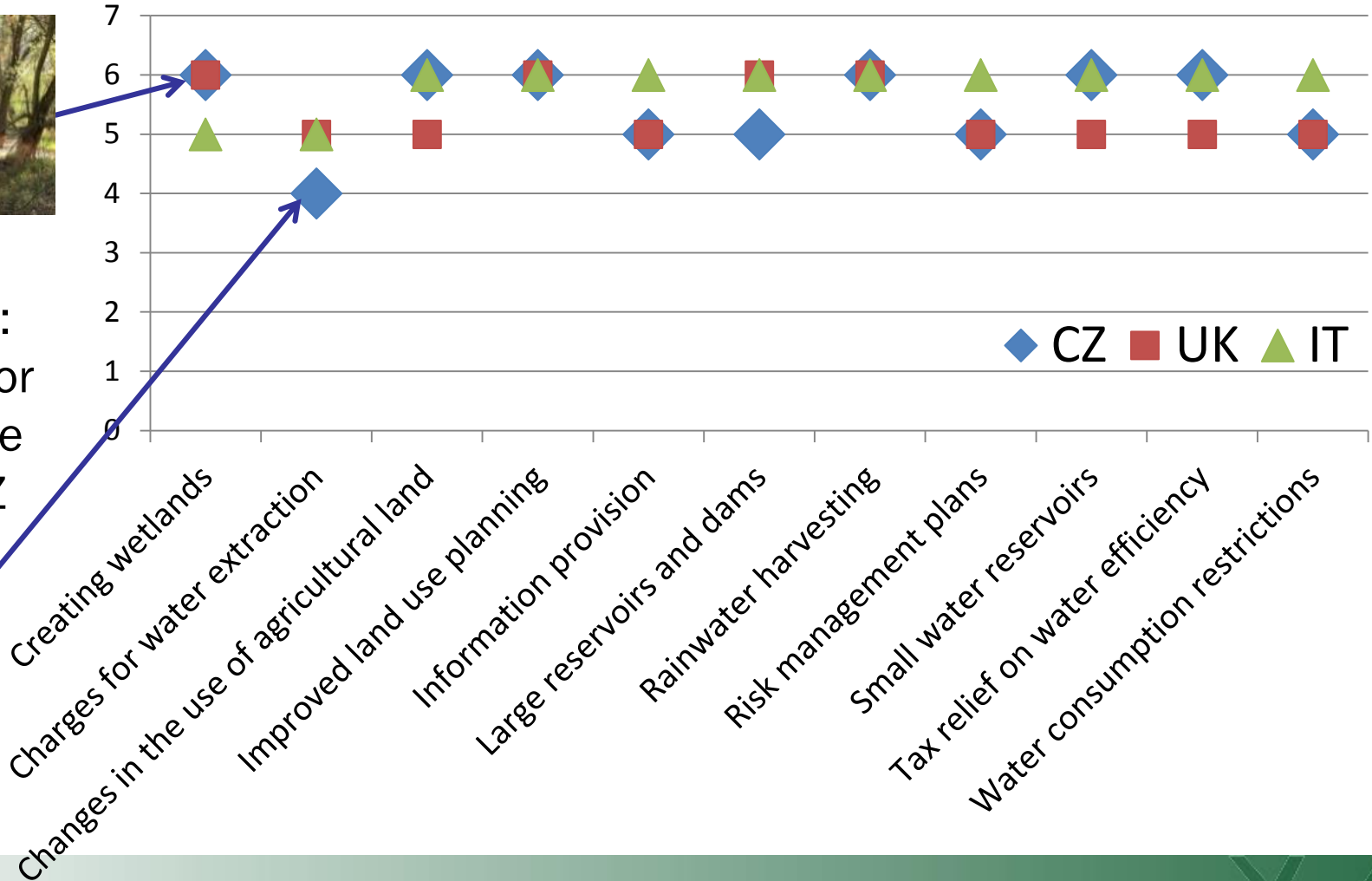
- Water **consumption restrictions** during droughts (e.g. restrictions on watering gardens, filling swimming pools, etc.)

## II. Droughts: Perceived effectiveness



Creating wetlands:  
Effective for 60% in the UK, in CZ

Charges the least effective

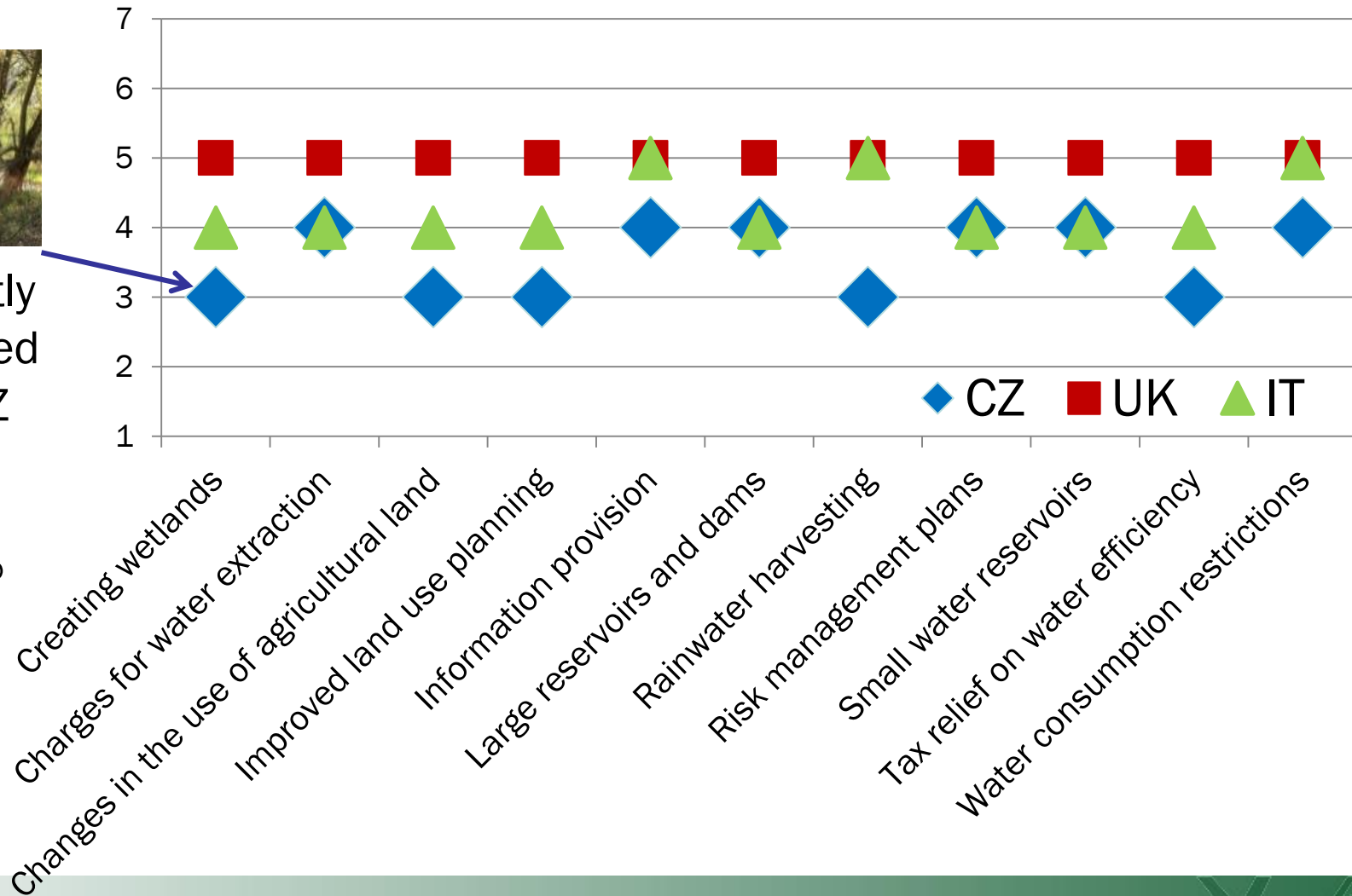


Q: In your opinion, how effective would these measures be if they were introduced in the UK?  
7-point Likert scale (1=ineffective ; 7=effective); medians

## II. Droughts: Perceived degree of implementation



Insufficiently implemented  
29% in CZ



14 % - 25 %  
structural  
measures  
are  
introduced  
sufficiently

Q: In your opinion, to what extent have the following measures been already implemented in the UK? 7-point Likert scale (1=insufficiently ; 7=sufficiently ); medians



## II. Droughts: example of a choice card - choice between national adaptation plans

### FIRST CHOICE



Plan characteristics to limit drought damage:

Technical measures

Natural measures

Non-structural measures

Proportion of people affected by restrictions in water use by 2040 (currently 10 %)

Increased monthly costs for your household (per year)

Plan A
Large reservoirs and dams
Creating wetlands
Higher charges for large water extraction
13 %
£10 (£120)

Plan B
Small water reservoirs and ponds
No new
Improved land use planning
9 %
£15 (£180)

No plan
No new
No new
No new
14 %
£0 (£0)

Which option do you consider to be the best?

Plan A

Plan B

No plan



# II. Sucho: Výběrový experiment na opatření

## PRVNÍ VOLBA



Vlastnosti opatření na zmírnění škod ze **sucha**:

Technická opatření

Přírodní opatření

Ne-stavební opatření

Podíl obyvatel ohrožených omezením užívání vody do roku 2040 (v současnosti 10%)

Zvýšené měsíční náklady Vaší domácnosti (za rok)

**Plán A**

Zadržování dešťové vody

Změny způsobu hospodaření na zemědělské půdě

Plány zvládnutí rizik souvisejících se suchem

11 %

150 Kč  
(1 800 Kč)

**Plán B**

Malé vodní nádrže a rybníky

Žádná nová

Daňové úlevy na technologie účinně využívající vodu

11 %

400 Kč  
(4 800 Kč)

**Žádný plán**

Žádná nová

Žádná nová

Žádná nová

14 %






0 Kč  
(0 Kč)

Kterou možnost považujete za nejlepší?

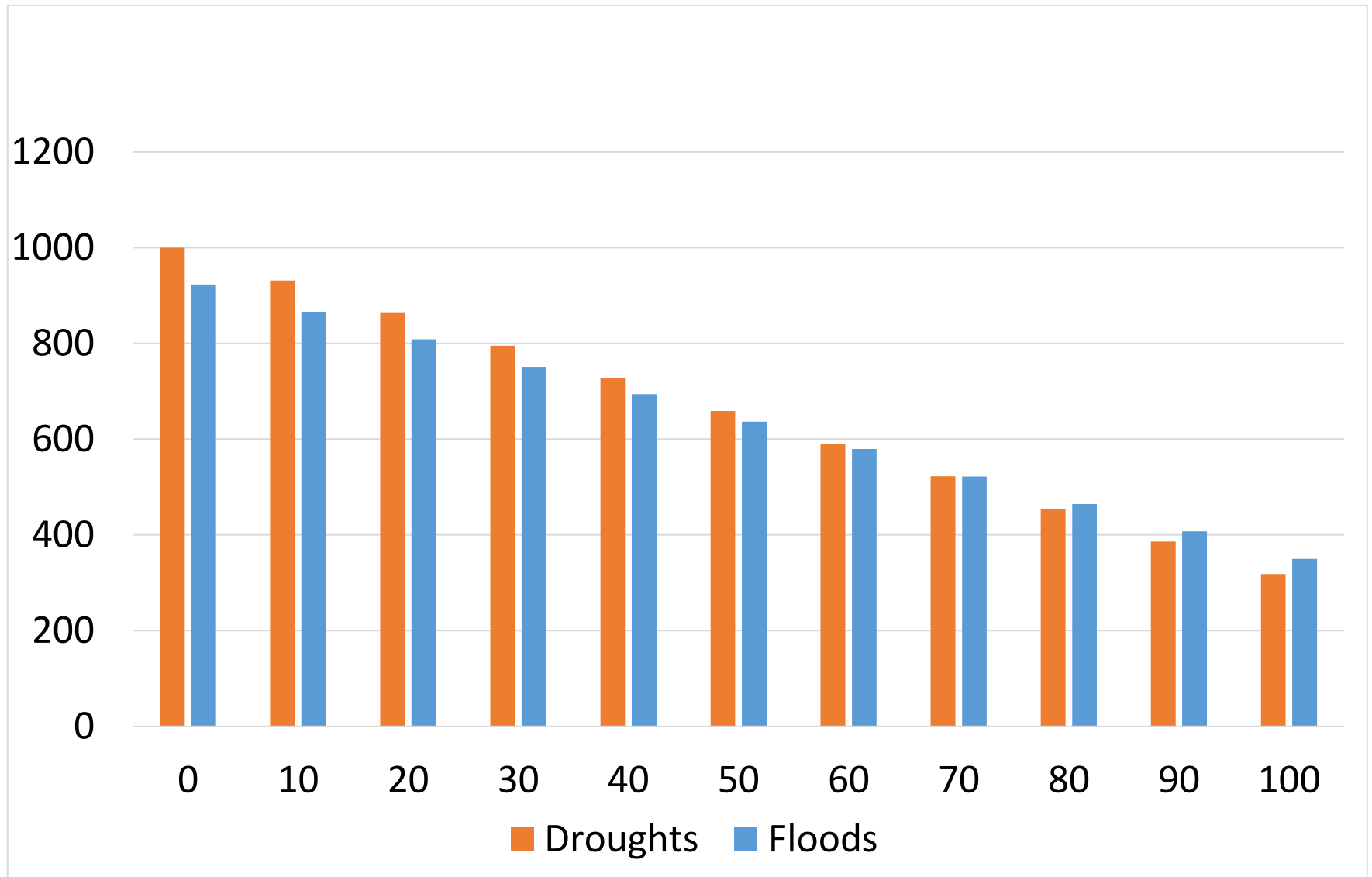
Plán A

Plán B

Žádný plán

<b>Droughts: WTP monthly in PPS EUR per household, mean, (s.e.) MXL model</b>	UK	ITALY	CZECH
Large reservoirs and dams	10.52 (0.8)	10.33 (1.66)	11.04 (1.57)
Small water reservoirs and ponds	8.96 (0.75)	12.82 (1.56)	19.01 (1.62) 
Rainwater harvesting	9.38 (0.79)	20.67 (2.00)	19.4 (1.66) 
Creating wetlands	9.61 (0.68)	10.20 (1.32)	18.53 (1.49) 
Changes in the use of agricultural land	8.97 (0.66)	12.69 (1.46)	18.00 (1.5)
Information on efficient water use	5.48 (0.99)	17.75 (2.3)	6.25 (1.72)
Drought risk management plans	4.67 (0.95)	14.96 (2.18)	7.75 (1.76)
Improved land use planning	6.28 (0.88)	13.08 (2.01)	8.78 (1.7)
Tax relief on water efficient technologies	4.69 (0.87)	17.13 (2.07)	7.01 (1.62)
Higher charges for large water extraction	5.52 (0.89)	7.65 (1.92)	3.39 (1.6) 
Water consumption restrictions (ex post)	4.13 (0.83)	11.40 (1.92)	4.93 (1.56) 
Proportion of people at risk reduced	0.77 (0.2)	0.34 (0.38)	-0.21 (0.38)

# WTP for adaptation measures in CZK monthly, depending on the share of structural (technical) measures (x axis)



## II. Why do Czechs prefer larger share of nature-based than technical measures in the new adaptation plan?

- Costs are lower
- Some of the nature-based measures can be adopted by people themselves
- Technical measures have been implemented sufficiently

*„...there are many dams that keep water, so enough of technical measures, the plan needs more nature-based measures “*

*„...je hodně nádrží, který zadržují vodu, tak možná těch technických je tam dost, tak by to chtělo možná víc těch přírodních... “*



# Conclusions

## I. What changes do Czechs expect?

- Household will be **more often exposed** over the next 10 years to the impacts of **droughts** (54%) and **heat waves** (51%) and disasters will be **more serious**
- Most of respondents affected by floods think that floods will be **as frequent and as serious as nowadays** (60%, 70%)
- People expect more frequent drought periods, that species of plants and animals will become extinct and the health and well-being of people will be worse in region due to global climate change

# II. What Type of Adaptation Measures Do People Prefer?

## Technical

- the most preferred measure is rainwater harvesting in all countries
- small water reservoirs and ponds in the Czech Republic

## Nature-based

- creating wetlands and changes in the use of agricultural land in the Czech Republic

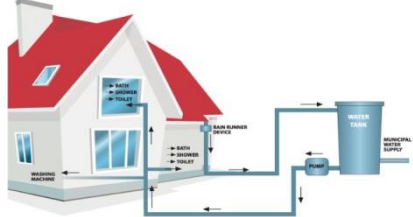





## Soft

- **the least preferred higher charges** for large water extraction and **council tax** in flood-prone areas in all countries

## II. What Adaptation Plan Do People Prefer?

- plans that include **specific measures**
- People are willing to bear some of the costs of the plans to limit droughts and floods
- willingness to pay about 500-600 CZK monthly per a household in case of general description of size of impacts and reduction of number of people at risk
- willingness to pay much larger, when plans include specific measures: 1000-1800 CZK monthly.

# CONCLUSIONS

	structural		soft
	technical	natural	
droughts	 <p>Rainwater harvesting (CZ, IT, UK) Dams (UK)</p>	 <p>Creating wetlands (CZ, UK)</p>	 <p>Tax relief on water efficient technologies (IT)</p>
floods	 <p>Maintenance of river beds (IT)</p>	 <p>Creating wetlands (CZ, UK)</p>	 <p>Control on construction in vulnerable areas (IT, UK)</p>

**Thank you  
for your attention**



August 13<sup>th</sup>, 2012

Oskar Exner

<http://www.praha.eu>



August 21<sup>st</sup>, 2015

<http://www.ceskatelevize.cz/>

Iva Zvěřinová,  
[iva.zverinova@czp.cuni.cz](mailto:iva.zverinova@czp.cuni.cz)