

# Merging Social-Ecological Research, Development Studies and Citizen Science in Central Asia



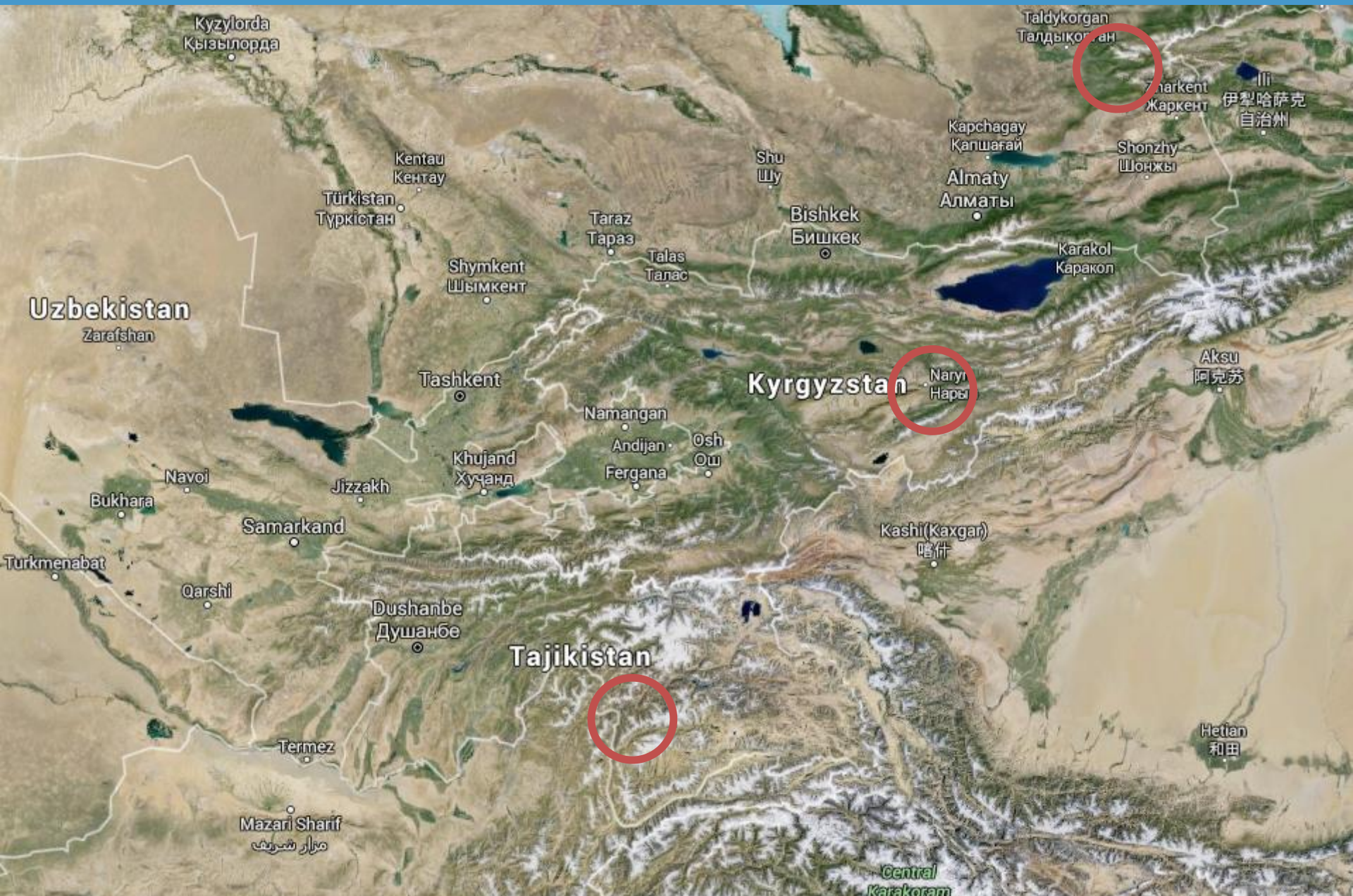
UNIVERSITY OF CENTRAL ASIA  
GRADUATE SCHOOL OF DEVELOPMENT  
Mountain Societies Research Institute

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# Central Asia: at the convergence of mountain ranges

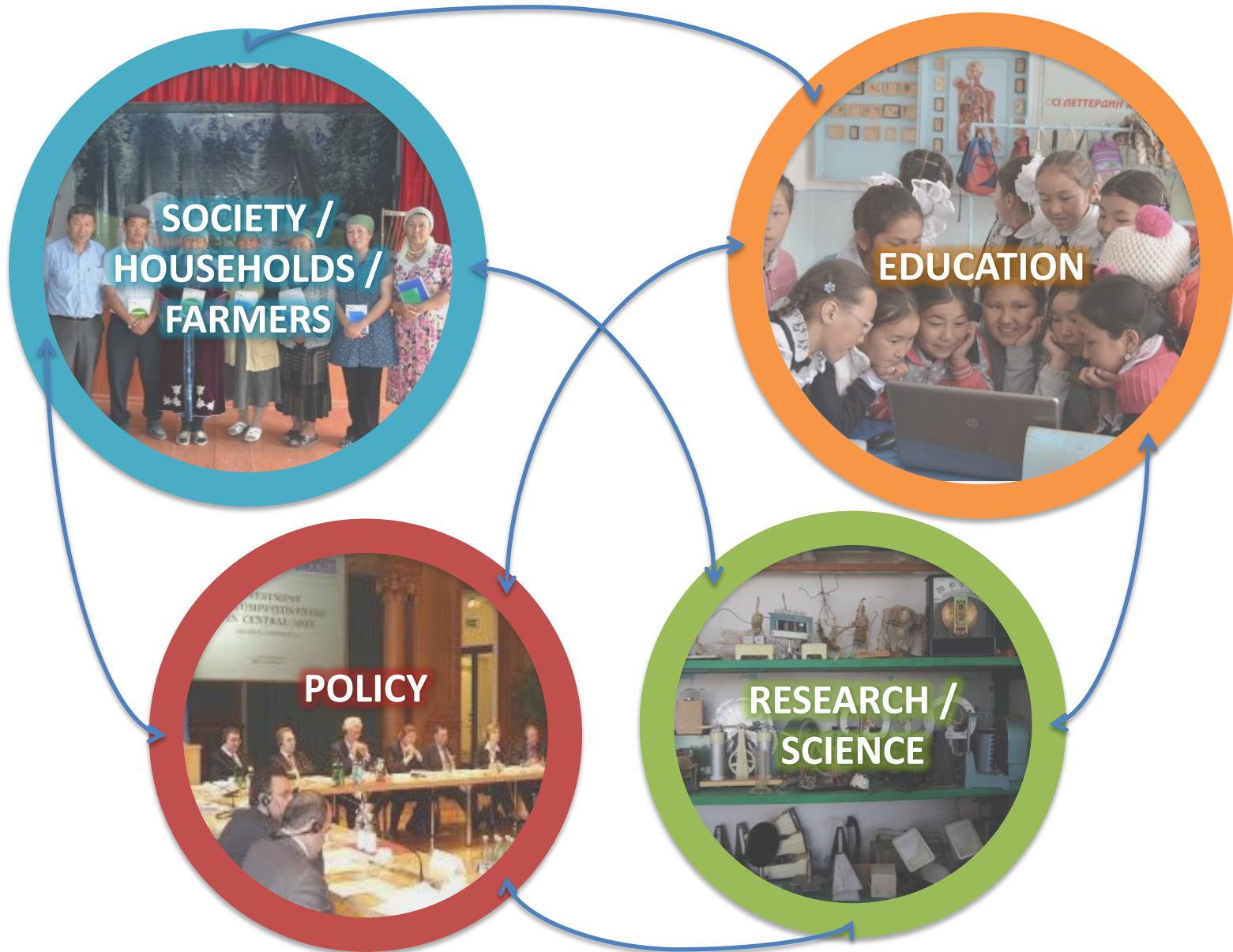


# Globally important mountain ecosystems



*UCA territory overlapping with global biodiversity hotspot*

# Learning Landscapes: Connecting education, science, society and policy



# The SDGs and „wicked problems“



simple

complex

*wicked*

EASY TO SOLVE

RESISTS SOLVING

RESISTS DEFINING

Summary

A clear problem with a clear solution

Summary

The problem and the solution are not clear but can be understood with time

Summary

Problem and solution not understood and keep shifting when we try to define them

Properties

Predictable  
Straightforward  
Obvious

Properties

Many familiar elements  
Hidden root courses  
Non-linear  
Inter-operating parts affect each other

Properties

Ambiguous, chaotic  
Many stakeholders with conflicting perspectives  
Many elements are hidden and unknown  
No right/wrong solution  
Not-quantifiable  
No precedents


- Climate Change
- Loss of Biodiversity
- Food Security
- Emerging diseases
- Population growth
- Poverty & Inequality
- Access to water
- Refugee crisis

...

# To know about these we need to collect data...

- 
- Climate Change
  - Loss of Biodiversity
  - Food Security
  - Emerging diseases
  - Population growth
  - Poverty & Inequality
  - Access to water
  - Refugee crisis

...

- 
- ...in large quantity
  - ...over long periods of time
  - ...over wide geographic areas and scales
  - ...on a diversity of parameters
  - ...using standardized methods
  - ...allowing transdisciplinary analysis
  - ...with public engagement
  - ...that enables learning
  - ... to be disseminated across broad stakeholder groups

# What is Citizen Science?

*“Scientific work (gathering, processing and distribution of knowledge) undertaken by members of the general public, often in collaboration with scientific institutions”*

- ★ Rapid environmental changes all over the world
- ★ Lack of local environmental information on the local level
- ★ Importance of environmental knowledge of local inhabitants
- ★ Students, farmers, teachers, and local governments get involved in research
- ★ Combining citizen science with education and development projects offers many benefits

# Citizen science projects at MSRI, UCA

- ★ Two research projects undertaken by the Mountain Societies Research Institute, UCA, have been utilizing Citizen Science-based approaches

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## “Mountain EVO” project (ESPA framework):

Environmental data through community-based monitoring with weather stations, camera traps and mobile applications

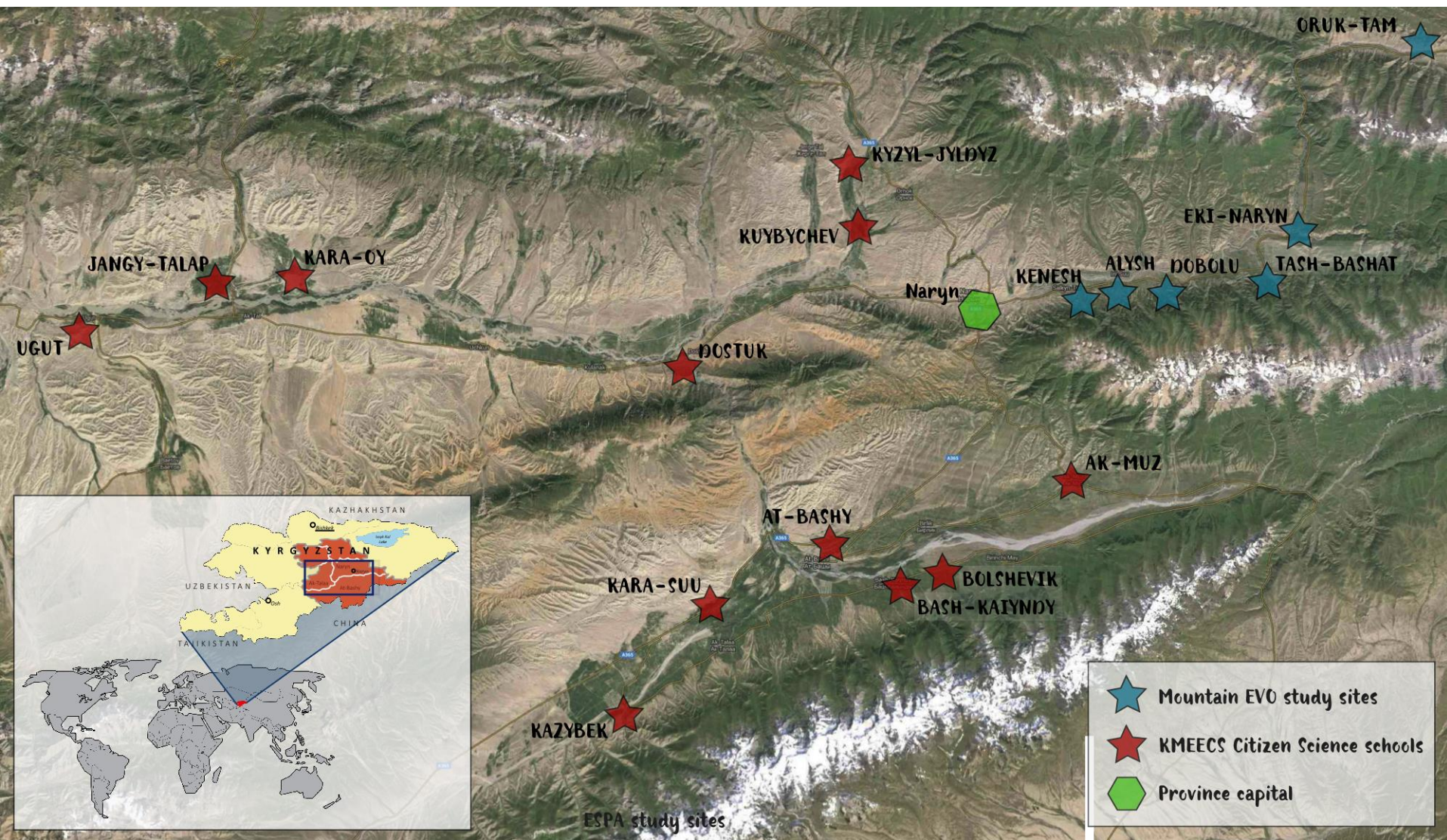
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## “Kyrgyz Mountains Environmental Education and Citizen Science” project (KMEECS)

Watershed monitoring and mapping in schools, visualization and communication of results



# Study area and context of Citizen Science projects



# Study area and context of Citizen Science projects

- ★ High **economic dependence on agriculture**, particularly on livestock production
- ★ Agro-pastoral practices in late soviet and post-soviet times resulted in **land degradation**
- ★ Deterioration of infrastructure leads to **inefficient management and use of natural resources** (water, land, pastures)
- ★ **Local-level data availability** on social, environmental and economic situation in mountains decreasing and poorly shared
- ★ **Low benefits** from academic research on the local level
- ★ **Access to innovative information and knowledge** restricted
- ★ **Research and monitoring** costly and difficult to conduct due to remoteness
- ★ Valuable **Traditional knowledge** systems in mountains



# “Mountain EVO” project

ESPA framework

Environmental data – weather stations, cameratraps and mobile apps



# Results of Mountain EVO project

- ★ Climatic data used for agricultural decision-making
- ★ Collected data on wildlife, under-utilized non-timber forest products and occurrence of natural hazards are disseminated on information boards for locals to see.
- ★ Several workshops and focus group discussions about 'participatory environmental data collection'
- ★ Participatory research on informal institutions for water resources management
- ★ Salkyntor National Park and Naryn State Nature Reserve and School teachers continue partnering with MSRI in the future

# Results of Mountain EVO project





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## Kyrgyz Mountains Environmental Education and Citizen Science project

Water monitoring and watershed mapping

# KMEECS project

**Goal:** Pilot the introduction of Citizen Science-based Environmental Education activities and experiments in 10 rural schools of Kyrgyzstan's Naryn province.

- ★ Participatory development of resources for teachers (manual, experiments, toolboxes, mob. application) on **water monitoring, trainings of teachers**
- ★ Collect local-level **environmental data** through Citizen Science
- ★ Visualize and disseminate information on local and national level through a **travelling exhibition** and **eBook**
- ★ Cooperation with **local scientists** from within the Kyrgyz Academy of Sciences, universities, and NGOs.
- ★ Analysis of the network of **stakeholders** involved in the project, their roles, resources and how they are impacted by the project activities and outcomes

# Results of KMEECS project

- ★ Teachers and children from 12 rural schools were trained
- ★ Manual and methodology is being disseminated to 800 schools
- ★ Innovative channels for dissemination of results (interactive exhibition in different places, multimedia eBook, blogs)
- ★ New projects combining citizen science and environmental education were started (phenology and climate as well as forest biodiversity)
- ★ Core challenge: credibility of local children as scientists and low-cost equipment
- ★ Main success: high valuation of the educational value of Citizen Science for practice-oriented school activities.





OCSP

МОНАХОВСКИЙ ЦЕНТР НАУКИ И ТЕХНОЛОГИЙ

Ассоциация «Созвездие»

УНИВЕРСИТЕТ НАУКИ И ТЕХНОЛОГИЙ

ПРОЕКТ «Экологическое Образование и Гражданская Наука в Горных Сообществах Кыргызстана»

РУКОВОДСТВО  
ИЗУЧЕНИЕ ВОДЫ  
ЧЕРЕЗ ЭКСПЕРИМЕНТЫ

БИШКЕК 2017

ГРАЖДАНСКИЕ ИССЛЕДОВАНИЯ В НАРЫНСКИХ ШКОЛАХ

# Support for local decision making and income generation

- ★ Decision support for moving to summer pastures based on weather station data
- ★ Demo-plots and trainings for experimenting with new crops
- ★ Localization of wild products and tourism destinations for nature-based income generation
- ★ Bottom-up policy dialogue in the villages on water-related challenges supported by Citizen Science and visualization
- ★ Enhanced capacities of teachers to link theoretical teaching with real-life phenomena in nature and discuss local environmental challenges in school

# Lessons learnt and Conclusions

- ★ All citizens need a 'voice'
- ★ Each stakeholder needs to see his own benefit in the activities
- ★ Acceptance among scientists takes time AND good quality data
- ★ Communication of results to different audiences requires creativity to go beyond standard academic dissemination channels
- ★ Balance of outcomes (science vs. education, community interests vs. academia research interests etc.)
- ★ Complex challenges (e.g., climate change) need to be addressed in a participatory way, e.g. with CS, which engages a wide array of local stakeholders and fosters social learning processes
- ★ Long-term social and ecological monitoring is also critical. Future opportunities: "Learning Landscapes"



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# Thank you for your attention!



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