RESPONSIBLE RESEARCH AND INNOVATION FOR JOBS & GROWTH

IMPACT THROUGH PARTICIPATION:

Create real-world labs: Innovation City Bottrop
Develop ownership: CuveWaters
Promote citizen science: Roadkill
Involve local stakeholders & investors: Green-Win

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NEW HORRIZON

Impressum

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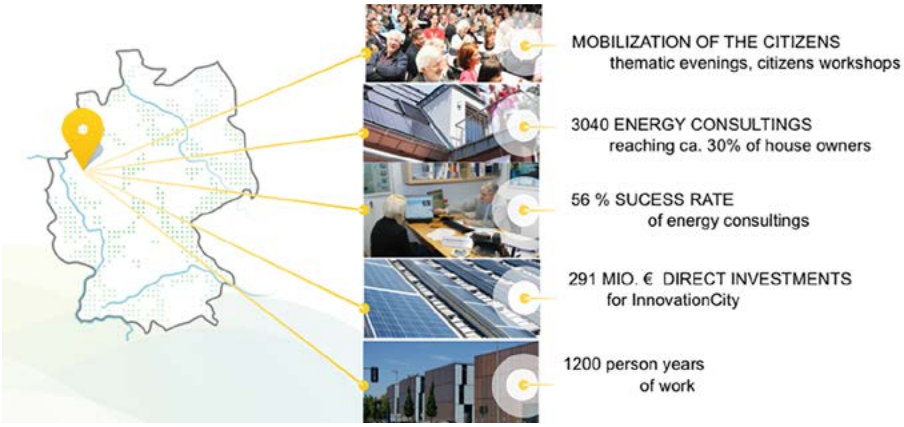
A NEW TYPE OF RESPONSIBLE RESEARCH AND INNOVATION IS REQUIRED

The resource requirements of a growing world population with an expanding per capita consumption accelerate the global degradation of ecosystems. This endangers or even irreversibly destroys many life-supporting functions on which humans depend. Human development beyond the limited resources of our planet has already led to a measurable increase of natural disasters, geo-strategic tensions, migration and wars. In response to such ecological challenges, the careful and systematic transformation of global production and consumption patterns could offer a new historical opportunity. Such a great transformation also has consequences on how we organize science and innovation. A new type of research is required, which is able to integrate multiple disciplines as well as the expertise of partners from business, policy-making and civil society. New coalitions between science and society are able to assess problems from many angles and come up with sustainable social and technological innovations. In the following, NewHoRRizon presents some examples of high-impact Responsible Research and Innovation (RRI) projects that have successfully involved societal actors in creating multiple social, economic and ecological benefits.

INVESTMENTS AND JOBS IN A REAL-LIFE EXPERIMENT

Participation in a Real-world Lab: Innovation City aims to promote low-carbon transition in urban districts.* It is an important real-life experiment for governance of the German energy system transition. In 2010, a regional body consisting of public and private stakeholders launched the Innovation City Ruhr competition.



*Bottrop has a population of 117,000 inhabitants. It belongs to the core of the Ruhr district, and is a typical representative of an old industrial town. The population and structure of the city has been shaped by coal mining. It had the only remaining hard coal mine of the Ruhr district, in operation until 2018.

Sixteen municipalities participated. The city of Bottrop won the competition with a participatory blueprint for the governance of an ambitious low-carbon transition. Innovation City Bottrop aimed at halving CO_2 emissions by 2020 (compared to 2010 levels) in an area of 25 square kilometers with 14,500 buildings and 70,000 inhabitants. The transition aims at neighborhoods, which represent, in many ways, the cultural and socioeconomic diversity of the Ruhr district. By 2020, the city plans an exemplary demonstration of innovations in energy efficiency, renewable energy, decentralized power generation, and electric transport.

Bottrop develops its solutions bottom-up, through collaboration between academia, business, municipal and state administrations, civil society, as well as the general public. Target groups are institutions on the one hand and consumers on the other. Together all government and non-government stakeholders have invested €183 million in low-carbon transition. Until 2020, more than €290 million will be spent. About €110 million have been invested in the private sector, while €26 million have been invested in services and consumption. During the total transition, employment will increase by 1,200 person-years.

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IMPROVING LIVING CONDITIONS IN AFRICA

Participation to develop ownership: The effects of climate change, a rapidly growing population and the rural exodus are increasing water scarcity. The goal of a German-Namibian joint project was a long-term improvement of living conditions through integrated water resource management.

Pilot plants for harvesting rain- and floodwater, water reuse and groundwater desalination were established in the Cuvelai-Etosha-Basin. The development and implementation of infrastructure was carried out by involving stakeholders, such as the residents and Namibian Ministries, to develop ownership and shared objectives for improving living conditions (demand-response approach).

BENEFITS

FOOD SECURITY Storage of rain- and floodwater and the reuse of water allow the cultivation of fields even during the dry season. Irrigation increases the variety of the produced vegetables. This improves the diet of the villagers and also generates income. In particular, children benefit from a more balanced diet and clean drinking water.

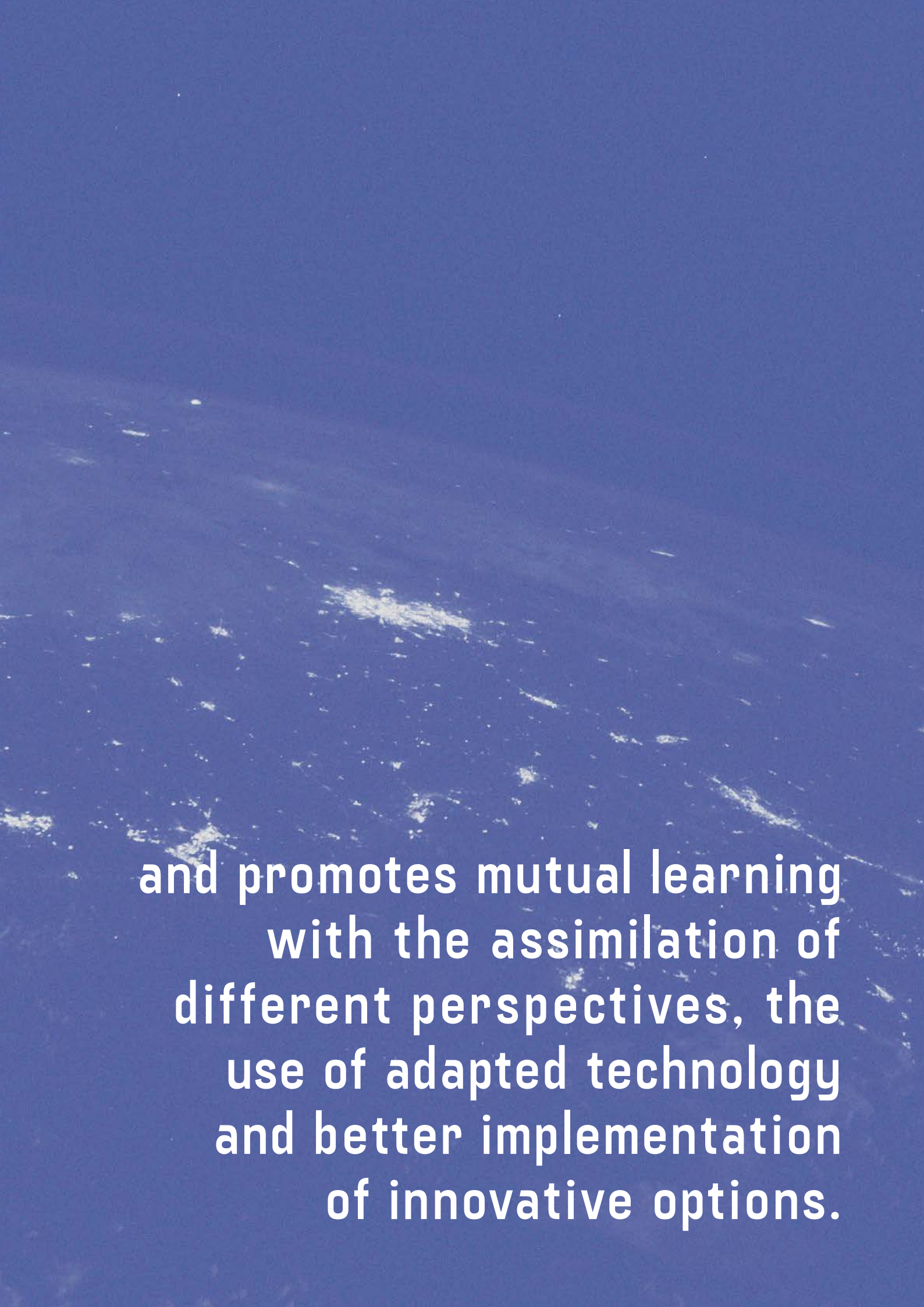
PUBLIC HEALTH The CuveWaters plants help to improve public health by providing safe drinking water in remote areas. Without these systems, people often depend on unpurified water from hand-dug wells.

ECONOMIC INDEPENDENCE As part of the capacity building, the project provided training enabling the local population to build, operate and maintain the facilities. People now are able to cultivate and manage gardens and can make profits from the yield. Some of the involved workers are employed as local caretakers. They earn a wage and can support their families.

Local caretakers are in charge of everyday operations.
© CuveWaters

"The CuveWaters project is, beyond doubt, a huge success, because it brings more to the region than water: It creates jobs and vocational training and it improves the health situation and food security. Thus, the pilot project is a blueprint for a better Namibian future."
- Abraham Nehemia, Namibian Secretary of Agriculture, Water and Forestry

Participation facilitates a better understanding of societal challenges, gives access to data and information gathered on location,



and promotes mutual learning with the assimilation of different perspectives, the use of adapted technology and better implementation of innovative options.

CITIZEN SCIENCE AS INNOVATION ENGINE IN SCIENCE, ECONOMY AND SOCIETY

Participation as Citizen Science: Animals migrating over long distances are particularly vulnerable to roadkill. Humans may also be endangered by animals crossing roads. Project Roadkill has the aim to reduce roadkill. The aim is to investigate, which animals are killed on roads and which factors are influencing roadkills.

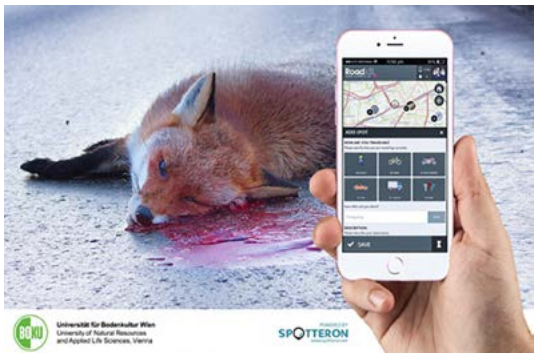
Citizen science enables data collection on a wide geographic range and the collaboration with those affected by roadkill. Data collected by participants allows the project to identify roadkill hotspots. The vision is to mitigate those hotspots in cooperation with local authorities.

BENEFITS

PUBLIC ENGAGEMENT Only citizen science enables us to get an overview of animals killed on our roads. As it is now possible to report roadkills via smartphone apps or our website in German and English, the project gained global attention.

SCIENCE EDUCATION Participants learn why animals cross roads, learn to distinguish species and bring in their expertise to the project. By following the blog on the project website, participants get an insight into the scientific process from collecting data to publishing in peer-reviewed journals.

JOBS & GROWTH Citizen science fosters innovation, especially in communication and information technology. Project Roadkill, for example, was a test run of the concept for the software company SPOTTERON, which has since become one of the main providers of mobile applications and websites for scientific projects engaging with the public.



© Klaus Schindler, adapted by Philipp Hummer (SPOTTERON)

ETHICS The goals of the project are clearly stated and data handling processes are transparent. Participants get all necessary information prior to registration so they can make an informed decision if they want to participate.

OPEN ACCESS So far three peer-reviewed open-access scientific publications stem from Project Roadkill. Data submitted to the project is displayed on a map on the project's website. Data is shared with special interest groups that then can do their own research on certain topics.

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A WIN-WIN STRATEGY FOR GREEN BUSINESS

Participation of local investors: The core question of the project Green Growth and Win-win Strategies for Sustainable Climate Action – Green-Win: Is green growth possible?

Scientists, investors and business representatives at the Green-Win wrap-up workshop in Barcelona. © Anet Duncan

Win-win strategies combine economic and ecological benefits. Their contribution to green growth differs significantly and is largely determined by whether and to what extent they are economically viable and capable of contributing directly or indirectly to the development of so-called green business models.

In a nutshell, **green business models** seek to supply products and services that fulfil three goals:
❶ to run a business and provide owner and employees with a livelihood,
❷ to protect the environment, and
❸ to contribute to the common good.

In the Green-Win project, researchers empirically looked for win-win strategies and green business models during field research in three concrete sectors in both industrialised countries and emerging economies: coastal management, sustainability transformations in cities, and energy poverty in rural areas. In all three sectors, win-win strategies or green business models were developed using a stakeholder-based approach together with local actors.
Bringing together green investors and green entrepreneurs in stakeholder workshops, we found that green matchmakers could significantly improve matchmaking between green investors and green entrepreneurs. Some pioneering green matchmakers already make a difference, but we need many more of them.

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SUMMARY

NEW HORIZONS!

Our examples of Responsible Research and Innovation show that the participation of stakeholders can increase the societal impact and added value of research and innovation. The active involvement of actors outside academia (co-design) is pivotal for sustainable transformations. This kind of transdisciplinary research and innovation requires co-design and co-production of research by scientists and practitioners as well as know-how and financial resources. So far, established research programming, research management and routines of excellence in science leave little room for real participation of stakeholders in the research process. There are administrative hurdles as well as conflicts in allocating time and financial resources which often result in insufficient participatory practice and tokenism. However, there is a growing international consensus about the new horizons of Responsible Research and Innovation. The UN Sustainable Development Goal 17 aims to "strengthen the means of implementation and revitalize the global partnership for sustainable development". In line with international platforms such as the Future Earth Programme, fascinating new concepts of participation such as real-world laboratories or living labs emerge. Excellence in participation is the new horizon for European research and innovation.

RRI can increase jobs and growth by promoting:

1. More real-world labs
2. Ownership among stakeholders
3. Citizen Science
4. Involvement of local investors

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newhorrizon.eu

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