



# **Prospects for the future?**

Practical teaching suggestions for education for sustainable development



THE TURQUOISE CHANGE

Islands – Prospects for the future?4
Island worlds – Unusual places, fabulous places
What is an island and how many are there?7
Island worlds and their special features
Islands of sustainability – Didactic-methodical basics
Islands of sustainability – Didactic-methodical basics
The mystery-method
Learning to understand complex systems
Do islands show a glimpse of the future? – A mystery
Mystery-story "Islands"
Do islands show a glimpse of the future?
Understanding the Canary Island of El Hierroal's System
Work unit 1: Recognising the Canary Island of El Hierro as a complex system
Work unit 2: El Hierro as a model of sustainability?
Work unit 3: A sustainable future for islands – Work assignments
Final activity: SDG 18
Literature
Literature on: Islands – Prospects for the future
Literature on: Islands of sustainability – didactic-methodical basics

#### Imprint

Publisher: The Turquoise Change e.V. Immanuelkirchstr. 6 10405 Berlin info@turquoisechange.org www.turquoisechange.org

Project-team: Dr. Andreas Eberth, Dr. Thomas Hoffmann, Katarina Rončević

Design: Christian Bauer, Studio für Gestaltung, Mönchengladbach

2023



The teaching materials marked in this way can be downloaded free of charge here: www.turquoisechange.org

Note: With regard to links to external websites, liability for the content of these the contents of these pages is excluded. The content of these pages is the sole responsibility responsible for the content of these pages. Image and text rights have been carefully checked. However, if copyrights have not been taken into account, please the publishers so that appropriate licence agreements can be made subsequently. The Turquoise Change e.V. is solely responsible for the content of this publication;

The positions expressed in this publication do not reflect the views of Engagement Global Engagement Global and the Federal Ministry for Economic Cooperation and and Development.

Supported by Engagement Global with funds from the Federal Ministry for Economic Cooperation and Development.

Supported by





Federal Ministry for Economic Cooperation and Development

## Foreword

Dear educators,

What can we learn from islands in dealing with global and complex challenges also for life on land? What scenarios for the future can point the way forward for action today? These and other questions are addressed in this handout "Islands – Prospects for the future?" and offer teachers a concrete tool for implementing education for sustainable development (ESD) in the classroom.

In addition, the special developmental significance of islands in global contexts is highlighted. The innovative approach of the material becomes clear by considering the spatial type of islands as such. It should be emphasised that this handout presents a new, didactic approach by linking the mystery method with the solution-oriented approach using the example of concrete islands. With a further, special didactic approach, islands as a phenomenon are presented as a complex system.

With these innovative approaches we would like to inspire teachers, but especially students, on the importance of islands in their complexity in a global context and for acting in favor of sustainable development.

We invite you to dive into the island worlds with your students (age 15-18) and wish you a lot of fun!

Andreas Eberth Katarina Rončević Thomas Hoffmann



## Islands – Prospects for the future? Thomas Hoffmann

Within a few years, mobility on the Greek island of Astypalea will be emission-free. This is the goal of the project that has been running for two years between the government in Athens and the Volkswagen Group. To achieve this, approximately 1,500 cars, buses and two-wheelers powered by combustion engines will be completely replaced by electric vehicles, which will be powered by a photovoltaic system newly installed on the island. The first steps have already been taken. This includes, for example, the possibility of ordering a ride on an e-bus for the remote locations of the island via app, in order to be mobile island-wide.

At the same time, the Danish island of Bornholm is pursuing its goal of becoming the world's first waste-free island within a decade, i.e. by 2032. At the heart of the implementation strategy is a consistent circular economy and sophisticated recycling processes.

And a look at the Pacific island of Fiji shows a completely new approach to reducing people's vulnerability exposure to hurricanes, which are increasing in frequency and intensity, with the help of a parametric insurance service supported by the United Nations. This is because the insurance does not only kick in in the event of damage, but also when predefined climatic parameters such as wind speeds or precipitation amounts are reached. This means that not only can help be provided more quickly, because it requires less effort to implement, but

there are also more financial options for preventing the threat of natural hazards.

All these developments, which are currently being observed on small islands in many parts of the world, should be seen as laboratories for sustainable development.

Bartolome Island Galapagos CC BY 3.0 Unported, by: Bhasker Thodla

During their implementation, not only technical and procedural processes are tested and optimized, but experience is also gathered on how people deal with these changes, to what extent they reject them or under which framework conditions they accept and embrace them.

Obviously, small islands are suitable real laboratories for testing intended future developments and studying their effects due to their spatial limitations and smallness, their numerically manageable population, limited external influences and, of course, the comparatively low investments required, among many other specific factors. In the process, blueprints emerge on how developments in emission-free energy supply and mobility, waste-free living or the strengthening of resilience to natural hazards can be successfully transferred to continental areas. Against this background, the thesis arose that some developments on islands would, as it were, provide a glimpse into the global future.

While a look at Astypalea, Bornholm and Fiji reveals an interesting and exciting view into a sustainable future development, the thesis "Islands could anticipate global development in their development!" is based on the so-called Easter Island Syndrome. This describes the view that the indigenous population of Rapa Nui and its neighboring islands in the South Pacific had dealt with the given limited resources of the Easter Islands in such a way that, as a result of deforestation, the resulting intensified erosion and the associated loss of agricultural land, they had massively damaged their own livelihood after about 500 years towards the end of the 17th to the beginning of the 18th century. Which additional part then the rats introduced by European seafarers and at the same time as well as the enslavement of a part of the population had in the final decline of the Easter Island culture, is interpreted differently. In any case, the monumental stone sculptures on Rapa Nui became a symbol for an impressive culture, but also for its decline due to unsustainable use of resources. This development can also open a view into the possible future of the planet, if a more sustainable use of resources will not be realized on the global level. Following these considerations, islands can be interpreted as an early warning system of global developments. At the same time, however, they obviously have the potential to be harbingers of possible solution strategies that not only act in the interest of the respective island populations, but also document far-reaching knowledge of sustainable development strategies. Against this background, it is worthwhile to examine the phenomenon of islands, their special characteristics, potentials, opportunities, but also vulnerabilities and threats, as a possible view into the future of the 21st century.

## Island worlds – Unusual places, fabulous places

Like mountains, plains or cities, islands are specific geographical spaces. They are a very special part of our global reality. Islands are special because they are real and yet at the same time seem unreal and, as it were, remote. They are hotspots of biodiversity and at the same time extremely vulnerable in their existence. They are places of refuge, but also of banishment, and they were and are at all times projection surfaces for longings, utopias and the so overused supposed paradise on earth. In any case, however, islands are extraordinary places. In cultural history, their symbolic power as places of solitude is expressed in Daniel Defoe's "Robinson Crusoe" as well as in Napoleon's banishment to St. Helena. The latter in particular makes it clear that islands have always been used to isolate disagreeable contemporaries – for whatever reason – be they people fighting for their rights as on Robben Island, criminals as on Alcatraz or people suffering from the plague as on Poveglia in the Venetian lagoon. The distance thus guaranteed between islands and the mainland is at the same time the prerequisite for directing all conceivable projections onto it.

It was not by chance that the Maharajas of Udaipur built their palace on an island in Lake Pichola.Udaipur built their palace on an island in Lake Pichola, Thomas More moved his vision of the state of Utopia to an island, and seafarers have fabled for centuries about the of the "islands of women" in the southern hemisphere, where the moral laws of the north would have no validity. <image>

Las Grietas, Isla Santa Cruz CC BY-SA by: Diego Delso In contrast, Louis Antoine de Bougainville, James Cook and George Foster described the lush and often endemic vegetation of tropical islands in the 18th century. Tropical islands and thus contributed their part to the later emerging idea of paradise, as did Paul Gauguin with his paintings of Tahiti or Max Pechstein with his views of Palau in the early 20th century.

In view of this plethora of changing real and fictitious, objective and subjective images of islands, the multifaceted and at least ambivalent reality of islands is not (always) clearly discernible. Against this background, islands move into the focus of geographic interest. For a long time, they have been the subject of geographic studies, whereby the majority of treatises have focused on individual islands, either as isolated natural spaces or or as a state unit, has been the focus of attention. There are monographs on a large number of islands or island states around the world.

In addition, many publications deal with islands as the epitome of seclusion, of the supposed paradise and of mystification. Books such as "Island Worlds – Adventures between Jungle, Fire and Sea" signal this as much. This is also indicated by the recent increase in the number of special atlases containing Islands as their themes, such as "Unusual Places", "Lost Islands of the Atlantic," "Lost Paradises," or "Remote Islands".

In the recent past, with regard to research interest, it has been noted that it is changing in favor of a geographical examination of islands as a specific space. Beginning with Clarke's depiction of the island as a "world unto itself," in this context the work of especially Mieth and Bork on the "Islands of the Earth – Landscapes and Cultures", Stephen Royle's work "Islands: Nature and Culture", Beate Ratter's fundamental study "Geography of Small Islands – Outposts of Globalisation" and Elaine Stratford's book "Island Geographies" should be highlighted. In these works, the special commonalities and peculiarities of islands are the focus of attention, and peculiarities of islands, sometimes focusing on landscape development and ecology in their uniqueness, changeability and vulnerability, sometimes the cultural and social specifics of island societies and cultures together with the significance and impact of globalization on them. This thematic perspec-

tive can be extended around Hans-Dieter Striening's book "The Easter Island Syndrome", which was published in 2001. The self-destructive development of the Easter Island culture through overexploitation and the continuous overexploitation of the ecological conditions as a blueprint for a conceivable global development into which we could run through our lifestyles and behaviors. The example of Easter Island also substantiates the quite controversial thesis that today's observable socio-ecological, but also economic changes that can be observed on islands today are, as it were, are able to be interpreted as harbingers of later global developments. The approach to the geographic spatial category of island requires first of all the clarification of fundamental questions such as: What is an island? How many islands are there worldwide? How are islands created?

## What is an island and how many are there?

As diverse as the individual conceptions and collective projections of and onto islands are, the answers to the supposedly simple question of what an island is are just as varied. Depending on time, region and point of view, the definitions offered differ considerably from each other. With joy readable between the lines, Andreas Mieth and Hans-Rudolf Bork (Mieth/Bork 2009, p. 14) have compiled some examples: The Scottish survey of the 19th century spoke of an island when the land mass lying in the water could feed at least one sheep. And according to the Canadian conception, at least one tree had to grow on such a land mass had in order to be settled and called an island. These regionally specific and recognizably economically oriented definitions of islands are contrasted by the United Nations' definition, which is based on the law of the sea, according to which an island is a piece of land that is smaller than a continent and is is permanently surrounded by water, beyond which it continuously projects.

The very permanence of the conditions described, which is required by the definition, already points to the factual permanent change. For islands can arise just as quickly - one only has to think of the island of Surtsey, which appeared on November 14, 1963, south of Iceland, out of nothing – as the small and uninhabited northern Japanese island of Esanbe Hanakita Kojima, which disappeared overnight in November 2018. There are numerous examples of both phenomena, although the events do not always occur so abruptly, but rather take place over many years, as in the case of Holland Island off the coast of Maine on the Atlantic coast of the United States. Of the 60 houses that stood here at the beginning of the 20th century, despite intensive efforts, only the ruins of one house were saved from complete destruction by sea erosion (Elborough/Horsfield 2016, pp. 140-143). On this, but even better, the example of the Hawaiian island chain, the principle can be seen: the older, the flatter and smaller islands become, provided they do not experience material accretion. "Since the beginning of the world" says Gilles Lapouge, "islands move. They come to the surface of the sea and pass away again. One fine day, they emerge from a sun or a fog and then sink back into their night. This erratic behavior can be explained. The seafarers of antiquity were able to determine their latitude, but not their longitude. That's why they never knew where they were. They navigated blindly, and when they came across an island, they marked it somewhere on their map of the world. so that a reef could be marked four or five times could be discovered." (Lapouge 2017, p. 68).

Although technical possibilities have progressed enormously over the centuries, and satellite technology of the 20th century has made it possible for an unprecedented inventory of the earth's surface and thus of the islands. Against this background it can be guessed that also the question about the number of islands on the surface of the earth cannot really be answered. On the one hand for biological, volcanic or tectonic processes, while elsewhere they disappear again for the same reasons. And on the other hand, the answer to the question is complicated by the fact that no minimum or maximum size was included in the UN definition. The size of the land mass is not the decisive factor in distinguishing an island from a continent. For this difference is justi-



CDiagramme after Depraetere & Dahi 2007)

fied geologically. According to this definition, an island is an integral of a continental plate, independent of its size, while the continent represents the continental plate itself although the two do not necessarily have to be identical (Ratter 2018, p. 7). If one does not specify a minimum size for islands, then their worldwide number is estimated at about 700 million. If, however, only those islands are considered that have a minimum size of of 0.1 km2, this enormous number shrinks to 85,358 according to Mieth and Bork and to 86,732 according to Ratter. The real number of islands existing worldwide therefore cannot be determined exactly, but only approximately quantified or estimated. The islands are not evenly distributed over the earth, but it shows up in the Mieth and Bork's graph shows that the islands are spread over a wide area. Particularly striking is the large number of nearly 2500 islands in the area of the 61st northern latitude, which must be associated with the archipelago as relics of the ice age.

Basically they distinguish four different island types with respect to primary island genesis (Ratter 2018, S. 27-28):

- 1. volcanic islands and island arcs formed by subduction, convergence, or divergence, such as the Lesser Antilles, Aleutian Islands, Mascarenes, or the Japanese islands, as well as those formed by volcanism, the best known of which is the Hawaiian island chain.
- 2. islands formed by tectonic mountain-building processes, such as the Balearic Islands, Hispaniola or New Zealand.
- 3. islands formed by sedimentation processes, including the West, East and North Frisian Islands, but also the islands Halligen.
- 4. coral islands, which are mainly found in tropical latitudes, such as the Maldives, along the Great Barrier Reef, or Henderson Island in the middle of the Pacific Ocean.

In addition, there are islands that were formed as a result of secondary processes. According to Ratter (2018), these include. six other island types:

- 1. islands formed by isostatically induced subsidence, such as Zanzibar or neighboring Pemba
- 2. islands formed by ingression, that is, the advance of the sea. Examples are Gotland or Djerba.
- 3. islands formed by isostatic uplift, such as the Cape Verde island of Sao Nicolao.
- 4. islands formed by erosion, such as Pellworm or the Channel Islands Guernsey and Jersey.
- 5. islands caused by plate tectonic drift movements, such as Madagascar or the Seychelles as well as Corsica and Sardinia.
- 6. islands formed by salt tectonics, such as Heligoland.

Mieth/Bork 2009, p.23: The distribution of islands worldwide along the latitudes

The added total area of the islands is estimated at 9.8 million km2 (Mieth/Bork 2009, p. 20), which is approximately the area of Europe (10,180,000 km2), the USA (9,834,000 km2), China (9,597,000 km2) or the the Sahara (9,200,000 km2) and is significantly larger than Australia (7,692,000 km2). Thus, islands occupy about 6% of the earth's surface. Worldwide, about 800 million people live on islands, or about ten percent of the world's population. This means, in turn, that islands have a population density that is far above the global scale. Nearly 75 percent – or about 650 million – of these people live in one of the world's 47 island states, i.e. states whose territory consists exclusively of islands and therefore do not have a continent.

## Island worlds and their special features

I slands as a spatial category allow from the most different perspectives ecologically, economically, political or cultural perspectives.

### Ecologically diverse and fragile

The extraordinary biodiversity of many islands should be emphasized. Detached and at least isolated from mainland masses for long periods of time, often leads to a very specific ecology, often endemic of flora and fauna, which is greater than the biodiversity found on the continents. Examples include Madagascar and the islands in the Arctic Ocean to the northeast of Siberia, where a large group of wooly rhinoceroses lived at the end of the last ice age. With the melting of the ice, this population became isolated and survived here about 6000 years longer than in the distribution areas on the northern continents. (Elborough/Horsfield 2016/148-151). At the same time, however, these specific ecological systems are incomparably more vulnerable and thus particularly threat-ened in their continued existence. This is directly related to the scarcity of resources on islands, which, in the face of increasing demand due to population growth and/or changing degradation phenomena, as impressively shown for the development on the Easter Islands. (Striening 2001, Diamond 2011). The described parameters do not necessarily have to lead to overexploitation and the destruction of one's own livelihood, but can also be the starting point for a symbiotic way of life between man and nature.

Even detached from the direct influence of humans, even very remote islands show show a massive threat and destruction of the local ecosystem. As probably the most extreme example of this fact is Henderson Island. The island, which measures only five by ten kilometers is part of the Pitcairn Islands in the middle of the southern Pacific Ocean, about 5000 km from New Zealand and 5400 km from South America. Due to its supposed virginity, the island was included in UNESCO's World Heritage List as early as 1988. The illusion of the untouched tropical paradise was shattered in 2017 at the latest, when New Zealand scientists discovered the island along the beaches an estimated 37.7 million pieces of all kinds of plastic trash from fishing nets to toothbrushes to plastic bags with a total weight of totaling more than 17 tons in weight. Henderson-Island has since been seen as a symbol of a destructive modernity that has affected event the most peripheral ecosystems.

Mohamed Nasheed, the president of the Maldives, together with his ministers, staged a cabinet meeting at the sea off the coast of Males, drawing attention to the the concern of the small island states, which fear the loss of their homeland as a result of climate change. In order to speak with one voice, a total of 39 island states joined forces as early as 1990 to form the Alliance of Small Island States (AOSIS). Their central message addresses all those whose emission-intensive lifestyles ultimately threaten the fragile existence of small island states. The United Nations took up this concern in 2014 with the proclamation of the "International Year of Small Island Developing States." Global comparative studies have shown that islands are special in terms of economic parameters such as income, jobs and economic development. The number of islands are in deficit. However, this statistical statement is contrasted by striking counterexamples Jersey, Bermuda, Cayman, Nukubati- Island, Fiji CC BY-SA 3.0 Unported, by: catlin.wolfard the British Virgin Islands and Singapore, which – whether due to their tax advantages or a far-sighted and successful development policy – have developed into economically prosperous places. This does not mean, however, that in all cases this was accompanied by a positive change in society as a whole.

In the context of the expanding world economy since the 19th century, resource-rich islands were often turned over to overexploitation. The mining of guano deposits on Nauru, which Beate Ratter has impressively portrayed as an example of "islands as outposts of globalization", the mining of tin soaps on the Thai island of Phuket and the Indonesian islands of Belitung and Bangka. The mining of the sandy beaches on the Cape Verde island of of Sal, but also the plantation cultivation of sugar cane on Cuba and other Caribbean islands are of particular importance in the context of the rapid increase in worldwide (mass) tourism. In particular, the Mediterranean and tropical islands of the Caribbean and Southeast Asia fulfill the often cliché-like expectations of Europeans, Americans and Japanese regarding natural scenery and cultural performance. As the artificially created palm and themed islands off the coast of Dubai, where they do not exist per se, can also be elaborately staged. The extent of the discrepancy in perceived reality between tourists and locals has become clear in recent years, especially in Mallorca.

Mallorca, where the local population has taken to the streets to protest mass tourism and demanded its regulation and limitation. While the economically successful islands attract people from other parts of the world, the vast majority of the economically weak islands are experiencing outward migration. In many cases further weakening the economic base of the islands. At the same time, however, as Mieth and Bork point out, the interplay of low incomes, high transport costs and limited imports of goods and commodities leads to lower consumption patterns, which in turn provides impetus to strengthen the local economy. This, according to the further logic, results in a greater degree of economic independence, social stability and a lower level of environmental pollution. The synopsis of these effects suggests a positive potential in favor of sustainable lifestyles and economies.



## Islands as politically strategic places

Throughout history, islands have always been of great political importance, often in the context of economic interests. For example, Cidade Velha on Santiago, the main island of Cape Verde, was established as one of the most important slave transshipments. Mauritius gained great importance as a supply island for the Dutch, and later the French and finally British merchant ships on their way to South and Southeast Asia. And today enable Guam and Diego Garcia to provide the United States to conduct strategic military surveillance of the littoral states of the Indian and Western Pacific Oceans. The strategic importance of islands has more than once been the reason for military conflicts up to the present day, for example with regard to the Falklands/Malvinas, which are disputed between Argentina and the UK in the South Atlantic, leading to war in the 1980s. In addition resources are the main reason why even inconspicuous, uninhabited rocky islands are the focus of territorial even inconspicuous, uninhabited rocky islands into the focus of territorial claims. The Paracel and Spratley Islands are a striking example of this. Both groups of islands are located in the southern part of the South China Sea, which has proven to be rich in oil. According to international maritime law, access to these expected resources by international law of the sea, the state in whose 200-nautical-mile zone the deposit lies is entitled to access these expected resources. Due to the manageable dimensions of the South China Sea on the one hand and of the multitude neighboring residents on the other hand, the boundary lines overlap and form the starting point for intensive disputes. The most rigorous approach is taken by the People's Republic of China: Beijing has built a military base on the Spratley Islands, underscoring its non-negotiable territorial claim. While Malaysia, Indonesia and the Philippines are more reserved in their reaction, Vietnam, in particular, is opposing these claims and emphasizing its own.



## Islands as centers of cultural heritage

More than 13 percent of all UNESCO-listed World Heritage sites are located on islands. This is about twice as much as would be expected in view of the proportionality of the area. It can therefore be concluded that islands prove to be distinct cultural centers. Cultural life and traditions are lived more intensively on many islands than on the continents. This may also be due to their partial and/ or temporary remoteness, but it may also be due to the fact that island cultures have suffered far less destruction in the course of history and, as mentioned above, are less affected by the effects of globalization. At the same time, however, the cultural uniqueness of islands can also be affected by negative population trends. A very striking example in this context is the Japanese island of Tsushima, located between South Korea and Kyushu.

In the course of demographic change, no child was born or enrolled in school here for more than twenty years and no wedding was celebrated. Only recently succeeded in persuading some younger people to move to the island, thus restoring a thread of tradition that was thought to have been lost. Not only Tsushima, but the majority of the world's islands are challenged to merge its lines of tradition with innovations that are in order to be able to survive in the long term.

### Islands: Early warning systems or models of the future?

The special characteristics of islands, in particular their ecological vulnerability, are repeatedly interpreted as a glimpse into the continental future. In a negative sense, this is mostly the example of the Easter Islands and their cultural decline as a result of the relentless overexploitation of their limited resources. At the same time, however, islands can also have a positive sense, if they are understood as a kind of laboratory for the future. Strictly aligned with the principle of sustainability and the 17 Sustainable Development Goals of the "Agenda 2030", especially in the field of energy supply, on the Danish islands of Bornholm and Somsö, the British Orkney Islands, and on the Solomon Islands of Ta'ui, document this potential just as impressively as the the efforts of the association "The Turquoise Change", which is working on educational projects on the Andaman Islands and Zanzibar to create a sustainable impetus for development. Islands, it becomes clear, can also be a model for the future.



The culturally and historically developed abilities to cope with limited resources, resources, avoid waste, recycle resources or treat drinking water can prove to be a particular advantage.

After all, according to Australian anthropologist Grant McCall, "The 21st century is the century of the islands."

Developments on Astypalea, Bornholm and Fiji are already providing first glimpses of this.

## Islands of sustainability – Didactic-methodical basics

Andreas Eberth

**E**ducation for sustainable development (ESD) is a recognized educational concept, which has an overriding educational goal. It addresses all educational areas from early childhood and primary school to adult education, both in and out of school.

In the central framework documents of UNESCO, ESD is considered an important instrument for shaping a sustainable future. In the sense of the United Nations' Agenda 2030 and thus for the implementation and achievement of the Sustainable Development Goals (SDGs; UN 2015) (UNESCO 2017; 2020). The implementation of ESD in the field of school education requires, in the sense of the so-called Whole Institution Approach, a (re)orientation of the school as an institution in a variety of areas (Eberth and Meyer 2021; 2020). In this respect, teaching is only one area that is embedded in an institutional environment.

The teaching sequences presented in this handout do not claim to be complete therefore do not claim to implement ESD in schools per se. Nevertheless, they contribute to orienting lessons in the sense of ESD and thereby also provide decisive impulses that promote the Whole School Approach accordingly. Didactically, it is of particular relevance to replace the problem orientation that has been established in the last decades either by a strictly solution-oriented approach (Hoffmann, T. 2021) or at least to complement it in the sense of a problem-solving approach (Hoffmann, K. W. 2021).

Based on the central challenges of the 21st century, which is characterized by global change, the focus is not only on understanding the problems (such as climate crisis, biodiversity loss, etc.). Rather, more class time is devoted to possible solutions for these problems are given more teaching time. As a result, transformation paths, i.e. different variants of a concrete implementation of the socio-ecological transformation for a sustainable future become more central to the lesson.

Islands as a spatial entity are particularly suitable in this sense, since they can be understood as real laboratories of sustainable development, as is made clear in the introduction to this handout. In this respect, the two teaching suggestions presented here follow a solution-orientation in that positive examples of sustainable transformation processes on islands.

In the conception, particular importance is attached to the fact that these teaching sequences contribute to the promotion of system competence. In teaching example I, this is achieved through the use of the mystery method, while teaching example II focuses on various aspects of systems and emergence.

## The Mystery Method

I he mystery teaching method is suitable for the development of complex topics and for promoting networked, systemic thinking (Schuler et al. 2017, p. 125; see Infobox 1). A corresponding effectiveness of the method has meanwhile been proven in various empirical studies (among others, Karkdijk et al. 2013; Applis 2014; Benninghaus et al. 2019a;b).

"In a mystery, the task is to answer a puzzling guiding question [...] For this purpose, students are given 20-30 unordered information cards on which individual facts, dates, information about characters and plotlines as well as general technical basics about the case. The cases are written down. In order to solve the case, the students have to develop their own strategy for organizing, weighting, and combining the information in a meaningful way. Islands of Sustainability – Didactic and Methodological Principles link the information with each other. In small groups, the case is thus reconstructed and the guiding question is answered" (Schuler et al. 2017, p. 125). Working with a mystery in class is usually done in four phases. The beginning is formed by a methodical introduction by the teacher, the formulation of a puzzling question and handing out the mystery cards in a sealed envelope to the working groups (I). This is followed by the group work phase, during which the working groups reconstruct the case and answer the leading question (II).

The presentation and discussion of the group results in the plenum in phase 3. In it, the learners deal with their strategies and procedures (IV) (after Schuler 2012, p. 6).

Weighing information, distinguishing relevant from irrelevant

Organize and structure information: Forming categories and grouping related information

Relating information to one another, examining connections between individual pieces of information and the categories, develop cause-and-effect relationships

Change perspectives and look at issues from different factual perspectives as well as the perspectives of different actors

Infobox: Requirements for students when solving a mystery (after Schuler et al. 2017, p. 126).

A special feature of this method is that there is not just one single, unambiguous model solution existing. Rather, the intention is that students' proposed solutions may differ, but are therefore not necessarily wrong. "This openness in the solution results in interesting discussions in the small group and also later when the group results are discussed and reflected on in plenary. At the end, there is a metacognitive reflection phase with the entire class, in which different solution paths and solution strategies are discussed and compared. This reflection is very important because it is the only way effective promotion of thinking skills can be achieved" (Schuler 2012, p. 4f.).

## Learning to understand complex systems

l o understand an island as a complex system, different system components should first be identified. In this example, this is done in a learner-oriented manner in a small group work using the Placemat method (Brüning and Saum 2009, p. 25f.).

Here, too, it is assumed that the respective group members will sometimes identify differentsystem components and then compile them. After the students have defined the island of El Hierro as a system, the focus is directed to the changeability of systems in the sense of emergence. This is done by applying the scenario technique as a method for reflecting on potential influencing factors and corresponding possible future changes to the system (Hoffmann 2015). In a further step, the Sustainable Development Goals (SDGs) are contextualized and used as an analytical framework to examine whether and to what extent current and possible future developments can be assessed as sustainable. In order to do this in a structured way, the method of SWOT analysis is applied here (see also Berger 2020 on SWOT analysis).

The phased structure of the article enables the promotion of the system understanding of the students' understanding of the system. In the sense of differentiation, only individual phases can be selected here. At the same time, the demand can also be increased by having the teaching example in the sense of the "Ten Steps to Systemic Thinking" (Hoffmann et al. 2022) is extended. In this way, not only can the understanding of complex systems be promoted, but students learn to think systemically, as they are able to reflect even more on their own thinking and actions.

## Do islands show a glimpse of the future? – A mystery

Thomas Hoffmann

The learning method mystery goes back to the British geography didactics school "Thinking through geography", which has developed a variety of competence-oriented methods since the late 1990s under the leadership of David Leat and thus decisively enriched geography didactics. The mystery-method is particularly suitable for training systemic and networked thinking, strengthening communicative and argumentative exchange, and developing critical thinking.

This is done by first emphasizing the beginnings of two, three, in some cases even more story lines (see mystery story) to the students and reading them out loud with short interruptions between the stories. These short stories are obviously completely disconnected from each other and create the very confusion or mystery that gave the method its name. In a final summary, approaches of connecting causality are suggested and with the question "Is that so?" their basic coherence or with the concluding question "Why is that so?" causal connections are given to the students for examination. In order to be able to do this, the students, who are divided into groups of preferably no more than four, are given a set of about 25 to sometimes well over 30 information cards.

These contain the narrative beginnings read out at the beginning as well as further information on various aspects of the overall topic in the form of texts, graphics, diagrams, thematic maps, pictures or other information carriers. The task of the students is now to lay out these cards and ideally to connect them with arrows in such a way that the causal links become clear and ultimately the mystery of seemingly unconnected facts initiated at the beginning can be resolved and logically explained. The presentation of a selection of the group results trains rhetorical skills and logical presentation.

Mysteries are suitable for the beginning of a lesson as well as for the end of a thematic block. They fulfill different functions. A mystery used at the end of a lesson can start at a more complex level and is suitable for bringing together strands and partial developments of a topic that have been addressed in the course of the lesson and for connecting and presenting the existing links in a logical way.

The use of a mystery at the beginning of a lesson, on the other hand, is particularly suitable for an initial overview of the topic, visualizing and recognizing its major lines and causal connections, and above all as a basis for asking further questions. These are first named by the students and then jointly put into a factual logical order, which in turn can be used in the sense of an advanced organizer for the further course of the lesson.

The mystery on islands as prospects for the future presented here offers not only three or four initial stories, but even six possible scenes. This enables a wide range of organisational options in terms of differentiated teaching. Thus, between three and six narrative strands can be used and the complexity can be increased or decreased accordingly. The concentration on certain areas such as Europe or to the so called Global South as well as topics such as energy, waste, environmental protection or traffic can also be decisive for the final selection.

## Mystery-story "Islands"

At first, Mette Andersen had a hard time sorting the garbage, because until a few years ago, all of Bornholm's garbage was simply burned. But by now she is well acquainted with the new system that everyone on the island has now decided on. By 2032, Bornholm is to become a completely waste-free island. Everything that accumulates in the household, offices and factories will be consistently reused in a circular economy. This applies to metals, glass and paper as well as broken fishing nets and insulation materials. And anything that is still good enough is simply exchanged or given away.

Keiko Takahashi has the latest developments shown to her on site and substantiated with data and facts. She conducts research at Rikkyo University in Tokyo on the question of how education and sustainable development can be brought together. A few years ago, while searching for a suitable example, she came across the changes being driven with commitment on Amami Island in the south of the country. What has been started here is extraordinary for Japan and is therefore followed with great interest not only in the country but also internationally.

Just before Alexis Papadopoulos leaves his home on Astypalea, the small Greek island in the middle of the Aegean Sea, to travel to the island's main town of the same name, he quickly books his ride via the Astybus app. From experience, it only takes a few minutes for the electric bus to arrive in front of his house to take him to Astypalea. Since this new mobility concept implemented on the island, many of his neighbors and he himself have got rid of their own car and now only use this environmentally friendly service.

Friends from the mainland have registered to visit Knut Hansen next week. They want to see in detail how and why many of the people living on Föhr, and above all many companies, have joined the "FöhrGreen" project in recent years. This is obviously accompanied by a far-reaching process of change that could possibly set an example for the visitors' home communities. Knut Hansen quickly books accommodation that matches the sightseeing program and makes appointments with the island baker, the brewery and the cheese dairy.

Even after many discussions David Kumar has had with his neighbors from the village, he is still not sure whether or not to accept the offer and sign the natural hazards insurance policy. Although there have been six major cyclone events in Pacific Fiji in the last twenty years and the financial support from the United Nations Fiji to pay for the insurance is also convincing, a lack of knowledge and experience with insurance means that there is still doubt. Other neighbors, however, have already signed up and are sure that they have made the right decision.

Experienced ranger Luis Rodriguez explains the local rules to the tourists who have just arrived on the Galapagos Islands. How far they are allowed to approach the animals, how they have to deal with their garbage and which possibilities there are to observe animals both on land and in the sea despite the strict protection regulations. Luis always emphasizes the importance of intact seas for our own survival. In his experience, only a few people know that half of our oxygen is produced by metabolic processes in the oceans.

Because Bornholm's municipal council has adopted the "Bright Green Island Strategy," Keiko Takahashi is following developments on Amami-Island with interest, Alexis Papadopoulos is booking the Astybus to travel to Astypalea via app, Knut Hansen's friends want to take a close look at current developments on Föhr, David Kumar wants to convince his neighbor to take out parametric insurance, and Luis Rodrigues repeatedly emphasizes the protection of species and the oceans, islands are often seen as real laboratories of the future and therefore as a kind of harbinger of developments on the continents in the 21st century. Is that so?

## Do islands show a glimpse of the future?

### Work assignment

- 1. Arrange the mystery cards logically, so that the causes and consequences of the current developments become clear, which are interconnected between them.
- 2. Present the result of your working group in the plenum.
- 3. Formulate further questions based on the orders created.

The mystery-cards can be downloaded free of charge here: www.turquoisechange.org

On 25 September 2015, the United Nations General Assembly in New York adopted the 2030 Agenda, which sets out 17 Sustainable Development Goals (SDGs) to achieve global change by the end of 2030. These range from overcoming poverty and hunger, to health, education, water and energy supply for all, positive economic development, the reduction of inequalities, the protection of the climate, the oceans and the land ecosystems, to structures of the rule of law and global partnerships. The goal of the 2030 Agenda is to enable all people to live in dignity, to be personally free, existentially secure and to live in an intact environment.



As part of the Regional Amami Oshima Biodiversity Strategy, which was launched in 2015 and will run until 2024, the five municipalities on the island are pursuing the goal of rediscovering the value of nature. On the one hand, this means knowing and protecting the diversity of species. On the other hand, it also means understanding the ecosystem services that nature provides to us humans. Based on this knowledge and experience, a life in harmony with nature is to be developed at Amami-Oshima. According to the project's philosophy, this is beneficial for people and nature. This is the first time in Japan that a development strategy is based on such a concept.



CC BY 2.0 Generic, by: TANAKA Juuyoh

#### Do islands show a glimpse of the future?



Amami Oshima is the largest island of the Amami group. It forms the northernmost part of the Ryukyu island chain, which stretches south of the main Japanese islands for more than one thousand kilometers. 104,000 people currently live on the 1,240 km<sup>2</sup> island.



In mid-2021, UNESCO, the United Nations Educational and Scientific Organization, added the Amami archipelago in southern Japan to its list of UNESCO World Natural Heritage Sites. The subtropical islands of Amami Oshima and Tokunoshima are characterised by lush subtropical forests, extensive beaches and an underwater world rich in species. The rich flora and fauna includes many species that are extinct in other parts of Japan and are only found here. These include the black amami rabbit, the nocturnal Iriomote wildcat and the Okinawa rail, a large, flightless bird. This unique ecosystem is to be given special protection by being included in the UNESCO World Heritage List.





CC BY SA 4.0, by: Simon Speich
CC BY 4.0, by: Aleš Bucek
CC BY SA 2.0 Generic



ine master plan for the further development of tourism in the Amami Islands is action-or ented and comprises several sub-projects, which are summarised in the structural outline: https://kyushu.env.go.jp/okinawa/amami-okinawa/plans/ecotourism/pdf/z-2-e.pdf



Photo: © Keiko Takahashi

Keiko Takahashi has the latest developments shown to her on site and substantiated with facts and figures. She is a researcher at Rikkyo University in Tokyo, where she is investigating how education and sustainable development can be brought together. A few years ago, while searching for a suitable example, she came across the changes being driven forward on Amami Island in the south of the country. What has been started here is extraordinary for Japan and is therefore followed with great interest not only in the country but also internationally.

At the end of 2020, the Greek government decided to start a project on Astypalea together with the VW Group that could anticipate the future of mobility. The entire transport system on the island will be changed. The focus is on e-mobility. In the future, tourists will only be able to rent e-cars. The inhabitants of Astypalea, on the other hand, can choose whether they want to do without their own car and use car-sharing cars or public transport in the future. If they do not want to do this, they can buy their own electric car at very favourable conditions. In any case, cars with combustion engines will be a thing of the past on Astypalea. With this project, the government in Athens wants to be at the forefront of innovation in the fight against climate change and become a role model throughout Europe.





CC BY 2.0, by: flightlog

On Astypalea, we can take a look at the future of mobility. In order to implement e-mobility on the island, the approximately 1500 diesel or petrol-powered vehicles will be completely replaced by 1000 electric cars, minibuses, bicycles and scooters by 2023. The energy supply for the vehicles will be provided by a large solar park, which will supply 3 megawatts and the island-wide charging infrastructure, enough not only to power the vehicles but also 50 per cent of the remaining electricity needs of the households. Energy costs will fall by almost a quarter and  $CO_2$ - emissions by 70 percent by 2026.





Just before Alexis Papadopoulos leaves

his house on Astypalea, the small Greek island in the middle of the Aegean Sea, to travel to the island's main town of the same name, he quickly books his ride via the Astybus app. Experience shows that it only takes a few minutes for the electric bus to arrive in front of his house to take him to Astypalea. Since this new mobility concept has been implemented on the island, many of his neighbors and he himself have given up their cars and now only use this environmentally friendly service.

The mobility project on Astypalea not only provides insights into mobility based entirely on e-vehicles and the technical challenges of supplying them with electricity. The Greek government and the VW Group also want to understand which factors are decisive for the acceptance of a mobility change. What makes people accept this change? What makes people reject such changes? These mainly psychological aspects are being investigated through scientific studies on Astypalea and will provide important insights for further mobility projects of this kind. On Astypalea, 65 per cent of the inhabitants have signalled that they are basically willing to switch to e-mobility and 50 per cent, under certain conditions, to give up their own vehicles.



CC BY-SA 3.0 Unported, by: IMFJ at Dutch Wikipedia



Astypalea is centrally located in the Greek archipelago north of Grete and west of Rhodes. About 1300 people live on the 96 km<sup>2</sup> island – which is roughly the same area as the island of Sylt – and lead a very tranquil life away from the main tourist routes. But now Astypalea is preparing to change into a smart and sustainable island.



2

on Bornholm Islar Strategies for policy-makers to enhance gr

The "Bright Green Island Strategy" represents the cooperation between the island municipality of Bornholm, the other state authorities and the island industry. The jointly defined goal is to make Bornholm comprehensively sustainable and environmentally compatible by 2025. Bornholm is to become a model for sustainable living based on intelligent solutions. The aim is to overcome the social and economic problems of recent decades caused by migration and locational disadvantages. Mystery-Cards 17 18

Do islands show a glimpse of the future?



Bornholm is located far to the east of Denmark in the southern Baltic Sea. From here it is 150 km to Copenhagen, about 40 km to Sweden and 100 km to the island of Rügen. With an area of 588 km<sup>2</sup>, Bornholm is Denmark's fifth largest island, but today it is home to fewer than 40,000 people. In addition to the expansion of renewable energies and the promotion of sustainable tourism, Bornholm's Bright GreenIsland strategy also includes a consistent ZeroWaste programme. According to this, the island is to be completely wastefree by 2032. In contrast to the current worldwide practice of throwing away and dumping unused items, their strategy is based on a consistent circular economy. According to this strategy, waste is not treated as waste, but as a resource from which new things can be created, similar to nature, where supposed waste, such as falling leaves, dead plants and animal carcasses, are integrated into new growth processes as the basis for food. Bornholm wants to become the first waste-free municipality in the world. This requires strict waste separation, intelligent recycling systems, the use of modern technologies - but above all waste avoidance! Logically, this also means the end of the waste incineration plant that has been used up to now.





nsulation materials. And everything sland. Everything that accumulates as well as to broken fishing nets or quainted with the new system tha everyone on the island has decided in the household, in the offices and In the factories will be consistently that is still good enough will simply ncinerated. But now she is well ac to adopt. By 2032, Bornholm is to reused in a circular economy. This applies to metals, glass and paper of Bornholm's garbage was simply pecome a completely waste-free oecause until a few years ago, all At first, Mette Andersen had a nard time sorting the garbage oe exchanged or given away.



## Mystery-Cards 21/22

Years of intensive discussions about the right way forward for the Danish island of Bornholm finally came to a common result in 2016: with the adoption of the "Bright Green Island Strategy", Bornholm's municipal council decided to make the island one of the most sustainable places in Europe. The island will then serve as a model to show that the goals for sustainable development laid down in the 2030 Agenda are achievable. With this political decision to tackle global challenges such as climate change, species extinction, water shortages, energy shortages and the general scarcity of resources, a widely respected pilot project has been launched here in the middle of the Baltic Sea. Like in a real laboratory, ideas and sustainability concepts can be tried out and tested for their transferability to other regions. For example, Bornholm is to be CO2-neutral by 2025 and waste-free by 2032. In these two areas in particular, Bornholm wants to become a beacon of sustainable development throughout Europe.







Föhr is protected to the west from the open North Sea by Sylt and Amrum in the middle of the Wadden Sea. Currently, 8321 people live on the 83km<sup>2</sup> island.





© Shutterstock

Friends from the mainland have registered to visit Knut Hansen next week. They want to see in detail how and why many of the people living on Föhr, and especially many companies, have joined the "FöhrGreen" project in recent years. This is obviously accompanied by a far-reaching process of change that could possibly set an example for the visitors' home communities. Knut Hansen quickly books accommodation that matches the sightseeing program and arranges appointments at the island bakery, the brewery and the cheese dairy.

## Mystery-Cards 25/26

Guided by the idea "Today not at the expense of tomorrow and here not at the expense of elsewhere!", the FöhrGreen initiative founded by Föhr Tourismus GmbH pursues the goal of protecting the island's environment and nature, strengthening the regional economy, securing jobs for locals and preserving the island's lively culture. In this way, a sustainable basis for life on the North Sea island is to be secured for the future.







All FöhrGreen partners contribute through their initiatives and products to the advancement of the island in terms of sustainable development. They must in turn and / or in cooperation with business partners at least half of a holistic sustainable approach and prove it by appropriate seals of approval, such as Demeter, organic seal or Green Table. To become a partner in the FöhrGreen network, you must operate a business on the island, sign a commitment to sustainable production or present an existing seal of approval for sustainable production. Do islands show a glimpse of the future?

The FöhrGreen initiative can only be realised through the cooperation of partners from the economic and social life of the island's population.

The circle of these partners has already been greatly expanded and now encompasses many areas of the island's economy. Hotels and guesthouses are now orientating their offers to the ideas of sustainable tourism and the first facilities of a business park, the Greenpark Föhr, which was built using environmentally friendly building materials and and utilises regenerative technologies.

The project partners also include the "Biar-Brauhüs", a small Frisian brewery, the Hinrichsen family farm, which runs a distillery in addition to livestock farming, Föhr wool, a small manufactory that processes the wool of Föhr sheep, or Föhr Island cheese, a farm with a cheese dairy and farm shop, but also the country baker and many more.



🔉 Föhr Tourismus GmbH

one events in the Pacific Fiji in the last wenty years and the financial suppor ven after many discussions with his Other neighbors, however, have alrea neighbors in the village, David Kumar aC cept the offer and sign the insurance nough there have been six major cyc edge and experience with insurance are still doubts due to lack of know up and are sure that they 5 not sure whether he should igainst natural hazards or not. Altrom the United Nations to Fiji or the insurance is convincing, made the right signed t is still Jave









Public domain, by: NASA

Despite very frequent destructive natural events, especially cyclones, extreme rainfall, landslides and floods, which cause massive damage to farmers and destroy crops and infrastructure, only a small proportion of Fijians are insured against such events. The reason for this is that it is not profitable for the insurance companies. This is precisely where a current United Nations project comes in. With the Pacifi clnsurance Adaptation Progamme, the United Nations wants to make it possible for poorer population groups to insure themselves against extreme weather events. It is expected that these will occur more frequently and become more intense as a result of climate change. This increases the risk that the damage could become even greater. A "parametric insurance" should offer protection against this.



CC BY 4.0 International, by: Ed Hawkins, University of Reading

A "parametric insurance" helps the insured when a certain "parameter", i.e. a certain measured value, is reached, regardless of whether there is a loss or not. In Fiji, for example, the insurance pays out when a pre-determined wind speed has been measured in an area or when a certain amount of rainfall has fallen. This arrangement means that money can be paid out more quickly, any damage that has occurred can be repaired more quickly and protective measures against storms can be financed. In contrast, a normal insurance company pays much later after the injured party has submitted a claim to the insurance company and an expert has examined the damage.



#### Do islands show a glimpse of the future?



### Pacific-Insurance-and-Climate-Adaptation-Programme-Pamphlet.pdf

The government of the state of Fiji, in cooperation with two sub-organisations of the United Nations, has decided on a project to parametrically insure Fijian farmers. The aim is to significantly reduce their vulnerability to natural hazards and thus increase their resilience. Against the backdrop of climate change, this project could also be of great importance for other small island states in the Indian and Pacific Oceans.







CC BY-SA 4.0 International, by: Felix Reyes Photography

In January 2022, the Ecuadorian government decided to increase the size of the marine protected area around the Galapagos Islands from 138,000 km<sup>2</sup> by almost 50 percent to 198,000 km<sup>2</sup>. This makes it the second largest marine protected area in the world and is primarily intended to protect the migration routes of endangered marine animals such as various sea turtles, whales and sharks. The inauguration of the new protected area attracted great international interest and was very well received. It is planned to connect the protected area "Hermandad" (Brotherhood) beyond Ecuadorian territorial waters to marine areas around the islands of Coiba (Panama), Malpelo (Colombia) and Coco (Costa Rica) and to expand it into an international biosphere area.

Mystery-Cards

Do islands show a glimpse of the future?



CC BY 2.0 Generic, bu: David Berkowitz, USA

The Galapagos Islands have been famous since Charles Darwin arrived there on his research trip and catalogued the animal kingdom. No other place of comparable size has such a large number of endemic species, i.e. species that only occur here and nowhere else in the world. The most famous are certainly the various iguanas and marine lizards as well as the finches, which Darwin studied in detail. This is why the Galapagos Islands were declared a UNESCO World Heritage Site in 1978 and are under special protection. Nevertheless, environmental influences and intensive tourism are endangering this special biodiversity.



### CC BY 2.0 Generic, by: David Berkowitz, USA

The experienced ranger Luis Rodriguez explains the local rules to the tourists who have just arrived on the Galapagos Islands. How far they may approach the animals in groups of 10 to a maximum of 15 people, how they have to deal with their garbage and what opportunities there are to observe animals both on land and in the sea despite the strict protection regulations. Luis always emphasizes the importance of intact seas for our survival. In his experience, only a few people know that half of our oxygen comes from metabolism in the oceans.



CC BY-SA 4.0 International, by: Mandie1578

The Galapagos Islands are an important economic factor for Ecuador's balance sheet. However, this can only be maintained if tourism and nature conservation are coordinated with each other in accordance with the sustainability principle. This applies to air travellers as well as to cruise tourists. Since the latter do not need hotel infrastructure, there is an advantage, but cruising through coastal waters turns this advantage into its opposite. In the 1970s, there were only about 10,000 visitors per year, but today the number has grown to over 200,000.

The mystery-cards can be downloaded free of charge here: www.turquoisechange.org

## Possible Mystery-structure







## Understanding the Canary Island of El Hierroal's System

Andreas Eberth

The teaching proposal presented here is didactically structured in such a way that the learners train their systems competence in so far as they learn to think in contexts and to understand complex systems through this. They acquire the ability to describe a part of a complex reality and to understand this part of reality as a model through a specially created visualisation. This model can be used to explain the behaviour of the depicted system and to predict possible changes, i.e. future developments.

In addition, the model can be examined along selected concepts of sustainability with regard to aspects of sustainable development. Based on this analysis, necessary interventions can be identified and options for action can be developed in order to increase the degree of sustainability. The Canary Island of El Hierro is chosen as a concrete spatial example in this teaching concept. In the second part of the teaching sequence, possibilities of transfer to other spatial examples and a discussion of the possible generalisation of the findings are added.

30

## Work unit 1: Recognising the Canary Island of El Hierro as a complex system

## Work assignments:

- 1. a. Locate the Canary Island of El Hierro in GoogelEarth or a comparable programme.
  - b. Name the geographical coordinates of El Hierro's location.
- 2. a. Draw a fist sketch of the island of El Hierro (M1).
  - b. Complete your fist sketch by adding key characteristics of the natural environment, settlements and important infrastructure. You can also add photos, etc.
- 3. Research online how the island is connected to the mainland or other islands.add this information to M1.
- 4. a. Compare your work results from tasks 1-3 with the results of your classmates. Note down differences and similarities between your representations.
  - b. Using the definition in M2, check whether your sketches can be understood as a model of the island of El Hierro.
- 5. Work in groups of four and use the template M3. Each group member uses one of the outer fields of the placemat.
  - a. First work individually and read M4.
  - b. Write down different system elements, i.e. components of the El Hierro system, in your assigned field of the placemat.
  - c. Present your notes to each other.
  - d. In the middle field of the placemat, jointly create a concept map under the heading "The island of El Hierro as a complex system".



## M 1 - Fist sketch of the Canary Island of El Hierro

## M 2 - What is a model?

A model is "a simplified representation of reality for specific purposes. Models are of central importance in describing and analysing phenomena, they mediate between theory and [...] observation.[...] In its simplification, the model does not include all the attributes of the original, but only those that seem relevant."

Broll, G. et al. (2017): Diercke Wörterbuch Geographie. Raum – Wirtschaft und Gesellschaft – Umwelt. Braunschweig: Westermann, S. 576.

## M 4 – What is a system?

A system is understood as the "connection of things, processes and/or parts as a functional unit, which – following certain rules – form an ordered whole."

Broll, G. et al. (2017): Diercke Wörterbuch Geographie. Raum – Wirtschaft und Gesellschaft – Umwelt. Braunschweig: Westermann, S. 923.

### M 3 – Template placemat



## Work unit 2: El Hierro as a model of sustainability?

## Activity:

- 6. Systems are usually not static, i.e. they are not unchangeable. Characterise possible influences that could change the system of El Hierro and explain their consequences.
- 7. Work with the scenario technique. Create different positive and negative scenarios for the future development of the island of El Hierro (M 5).
- In 2020, El Hierro has been ranked second in the "Responsible Island Price" of the European Commission. Analyse the materials M 6 and M 7 and create a SWOT analysis entitled "El Hierro as a model of sustainability in the field of energy?" (M 8).
- 9. a. Find out about the Sustainable Development Goals (SGDs) on https://sdgs.un.org/goals .
  - b. Formulate aspects for each of the 17 SDGs that would have to be met in order for El Hierro to be considered a comprehensive model of sustainability (M 9).

## M 5 – Possible future scenarios for El Hierro



## M 6 – Advertising text on a tourism website

El Hierro is the first self-sustaining island in the world.An island where the trade winds are used as the main source of energy ... and life. An example of sustainability not only in the Canary archipelago, but worldwide.Declared a Biosphere Reserve and Geopark by UNESCO, El Hierro can proudly claim that the island is 100% sustainable. Since 1996, the island has been following a sustainable development plan that aims to improve the quality of life of the population and preserve the natural environment. El Hierro has a unique natural and geological heritage, characterised by its volcanic origin and volcanic landscapes. A beloved and cherished place that remains unique and clean thanks to its inhabitants. https://elhierro.travel/de/entdecken/die-nachhaltige-insel



ENTDECKEN ) DIE NACHHALTIGE INSEL

El Hierro is the first self-sustaining island in the world. An island where the trade winds are used as the main source of energy ... and life. An example of sustainability not only in the Canary archipelago, but worldwide.

Declared a Biosphere Reserve and Geopark by UNESCO,EI Hierro can proudly claim that the island is 100% sustainable. Since 1996, the island has been following a sustainable development plan that aims to improve the quality of life of the population and preserve the natural environment. El Hierro has a unique natural and geological heritage, characterised by its volcanic origin and volcanic landscapes. A beloved and cherished place that remains unique and clean thanks to its inhabitants.



## M8 - El Hierro as a model of energy sustainability? A SWOT analysis

## Strength

Here you can enter the strengths of the project, i.e. all aspects that make the project stand out from the rest. These can be advantages of the project, such as a contribution to environmental protection or the creation of jobs.



## Weaknesses

Here you can enter the weaknesses of a project, i.e. all negative aspects. These can be disadvantages such as the destruction of the environment by the project, exploitation of labour, displacement of the population, etc.

## **Opportunities**

Here you can enter the opportunities of your project in keywords. This requires you to look into the future. You have to think about how the project might develop in the future and what impact it will have. Opportunities are positive aspects and advantages of the project that can show up in the next few years.



## Threats

Here you can enter the risks of your project in keywords. This requires a look into the future. You have to think about how the project might develop in the future and what impact it will have. Risks are negative aspects and disadvantages of the project that might become apparent in the next few years.





M 9 – The Sustainable Development Goals



↓

## Work unit 3: A sustainable future for islands – Work assignments

## Activity:

- 10. Complete your fist sketch from task 1 with potential measures that would increase the level of sustainability of El Hierro.
- 11. Are islands models of sustainability for the mainland as well? Take a position on this question.



CC BY-NC-SA 2.0, by: World Economic Forum 2014

## Final activity: SDG 18

The discussion of islands as windows to the future, as real laboratories and sustainability hubs has led to a wealth of new knowledge and insights for all participants. Islands have been recognised and evaluated as special spaces with very specific characteristics, opportunities, threats, potentials and challenges that need protection, can be role models and must be preserved. However, islands do not play a role in the "Agenda 2030" and its 17 Sustainable Development Goals. This should be seen as a deficit and a reason to think about a possible expansion of the 17 SDGs. Assuming that in 2030 quite a bit of progress will have been made in terms of the Sustainable Development Goals (SDGs), but that the world as a whole will certainly not look as described in the 17 goal formulations, a third world development programme – perhaps it will be called "Agenda 2050" – is to be expected. This world programme could include an additional goal for the islands of the world.



CC BY-NC 2.0, by: © Universitetet i Bergen

## Work assignment:

For a possible "Agenda 2050"-design a logo for an SDG 18 "Islands ..

- an SDG 18 "Islands ...."
- a concise goal formulation to be read in addition to the logo as well as
- an implementation strategy in favour of sustainable development of islands worldwide.

## Literature on: Islands – Prospects for the future

- Bibliographic data for island distribution (after Bork Bork, Hans-Rudolf: Inseln der Erde. Darmstadt: Wissenschaftliche Buchgesellschaft, 2009, S. 23
- Bibliographic information for "Inseln als Außenposten der Globalisierung; Angaben bereits mitgeschickt. auf der Grundlage von Ratter, Beate: Geography of Small Islands, Cham 2018
- Baxter, Sarah: Atlas der spirituellen Orte. Wien 2018 Clarke, Thurston: Die Insel. Eine Welt für sich. Hamburg 2003
- Diamond, Jared: Kollaps: Warum Gesellschaften überleben oder untergehen. Frankfurt/Main 2011
- Elborough, Tavis und Alan Horsfield: Atlas der ungewöhnlichen Orte. Wien 2016
- Fasse, Simon: Die Elektro-Insel. In: VDE-Dialog. Das Technologie-Magazin, Heft 2/2021, S. 32-33
- Fischer, Steven Roger: Islands. From Atlantis to Zanzibar. London 2012
- Gebauer, Matthias und Elisabet Sommerlad: Kleine Inseln, große Themen. In: Geographische Rundschau, Heft 12, 2022, S. 4-7
- Geographische Rundschau, Heft 12/1998 "Inseln Landschaft und Ökologie"; Heft 4/2005 Indischer Ozean; Heft 10/2016 Karibik
- Hamberger, Rainer (Hrsg.): Inselwelten. Abenteuer zwischen Dschungel, Feuer und Meer. Friedrichshafen 1996

- Hoffmann, Thomas: Inselwelten Welt der Inseln. In Praxis Geographie, Heft 1/2020, S. 4-8
- Hofmann, Rebecca und Uwe Lübken: Laboratorien der ökologischen Moderne? In: Aus Politik und Zeitgeschichte (ApuZ): Inseln. Heft 32/33 vom 6.8.2018, S. 4-9
- Johnson, Donald: Fata Morgana der Meere. Die verschwundenen Inseln des Atlantiks. München, Zürich 1994
- Kreisel, Werner: Die pazifische Inselwelt. Eine Länderkunde. Stuttgart 2004
- Lanni, Dominique: Atlas der sagenhaften Orte. München 2017
- Lapouge, Gilles: Atlas der verlorenen Paradiese. München 2017
- Liesemer, Dirk: Lexikon der Phantom-Inseln. Hamburg 2016
- Mieth, Andreas und Hans-Rudolf Bork: Inseln der
- Erde. Landschaften und Kulturen. Darmstadt 2009 Plaß, Julia, Jennifer Philips und Jenbnifer Denno
- Cissé: Fidschi wie perametrische Versicherungen Resilienz stärken. In Geographische Rundschau, Heft 12/2022, S. 34-37
- Ratter, Beate: Geography of Small Islands. Outposts of Globalisation. Cham 2018
- Royle, Stephen A.: Islands: Nature and Culture. London 2014

- Schalansky, Judith: Atlas der abgelegenen Inseln. Hamburg 2009
- Scholliers, Matthias: Die Zukunftsfähigkeit Bornholms. In Praxis Geographie, Heft 1/2020, S. 36-40
- Schopmann, Hendrik: Kampf der Narrative. Inseln im Fokus geopolitischer Konflikte. In: Aus Politik und Zeitgeschichte (ApuZ): Inseln. Heft 32/33 vom 6.8.2018, S. 29-34
- Stratford, Elaine: Island Geographies. London 2018 Striening, Hans-Dieter: Das Osterinsel-Syndrom.
- Bevölkerungswachstum, Armut, Arbeit, Wohlstand. Düsseldorf 2001
- Zollitsch, Jan-Martin: Guam als Archipel? Einführung in die Island Studies. In: Aus Politik und Zeitgeschichte (ApuZ): Inseln. Heft 32/33 vom 6.8.2018, S. 41-46

### Internet

- Insel-Datenbank des Geographischen Instituts der Universität Hamburg
- http://www.island-database.uni-hamburg.de/
- UN: International Year of Small Island Developping States
- https://www.un.org/en/events/islands2014/ index.shtml#&panel1-1

# Literature on: Islands of sustainability – didactic-methodical basics

- Applis, Stefan: Die soziale Dimension des kommunikativen Aushandelns von Gerechtigkeitsfragen. Zur Bedeutung diskursiver unterrichtlicher Auseinandersetzungen in komplexen sozialen Handlungsfeldern. In: Geographie aktuell & Schule Heft, 208/2014, S. 15-23
- Benninghaus, Jens Christian, Mühling, Andreas, Kremer, Kerstin und Sandra Sprenger: The mystery method reconsidered: A tool for assessing systems thinking in education for sustainable development. In: Education Sciences, 9(4)/2019a, S. 1-15. [260].

https://doi.org/10.3390/educsci9040260 Benninghaus, Jens Christian, Mühling, Andreas,

- Kremer, Kerstin und Sandra Sprenger: Complexity in Education for Sustainable Consump-
- tion An Educational Data Mining Approach using Mysteries. In: Sustainability, 11(3)/2019b, https://doi.org/10.3390/su11030722
- Berger, Sören Kristian: Von der Wüste zu den Gletschern. Mit einer SWOT-Analyse Chancen und Risiken des Tourismus in Chile bewerten. In: geographie heute 349/2022
- Brüning, Ludger und Tobias Saum: Erfolgreich unterrichten durch Kooperatives Ler- nen. Strategien zur Schüleraktivierung. Essen 2009
- Eberth, Andreas und Christiane Meyer: SDG Educa-

tion – einleitende Reflexionen. In: Eberth, Andreas und Christiane Meyer (Hrsg.): SDG Education. Didaktische Ansätze und Bildungsangebote zu den Sustainable Development Goals. (Hannoversche Materialien zur Didaktik der Geographie 11). Hannover 2021, S. 5-20.

- Hoffmann, Karl Walter: Vom Paukfach zum Denkfach: Basiskonzepte für einen zukunftsorientierten Geografie-Unterricht, 2022 https:// www.dphv.de/2021/09/09/vom-paukfach-zumdenkfach-basiskonzepte-fuer-einen-zukunftsorientierten-geografie-unterricht/ (06.01.2023)
- Hoffmann, Thomas: Szenariotechnik. In: Reinfried, Sibylle und Hartwig Haubrich (Hrsg.): Geographie unterrichten lernen. Die Didaktik der Geographie, Berlin 2015, S. 172-173
- Hoffmann, Thomas: Globale Herausforderungen und SDGs – ein strikt lösungsorientierter Unterrichtsansatz. In: Eberth, Andreas und Christiane Meyer (Hrsg.): SDG Education. Didaktische Ansätze und Bildungsangebote zu den Sustainable Development Goals. (Hannoversche Materialien zur Didaktik der Geographie 11). Hannover 2021, S. 33-41.
- Hoffmann, Thomas; Menon, Sanskriti; Morel, Wendy; Nkosi, Thamsanqa und Pape, Nicola: Zehn Stufen zum systemischen Denken. Hand-

buch zur Bildung für nachhaltige Entwicklung für Lehrkräfte und Lehrkräftebildende. Bonn 2022, https://esd-expert.net/6f749a86-8b7f-11ed-8526-c86000be3fbf|urlattr (06.01.2023)

- Karkdijk, Jan, van der Schee, Joop und Wilfried Admiraal: Effects of teaching with mysteries on students' geographical thinking skills. In: International Research in Geographical and Environmental Education 22(3)/2013, S. 183-190.
- Schuler, Stephan: Denken lernen mit Mystery-Aufgaben. In: Praxis Geographie extra 2012, S. 4-7. Schuler, Stephan, Vankan, Leon und Gertrude Rohwer, G: Diercke. Denken lernen mit Geographie. Methoden 1. Braunschweig 2017
- UN: Resolution der Generalversammlung, verabschiedet am 25. September 2015. 70/1. Transformation unserer Welt: die Agenda 2030 für nachhaltige Entwicklung. A/RES/70/1. 2015
- UNESCO: Education for Sustainable Development Goals. Learning Objectives. Paris 2017 UNESCO: Education for Sustainable Develop-
- ment. A Roadmap. UNESDOC Digital Library. 2020, https://unesdoc.unesco.org/ark:/48223/ pf0000374802.locale= en (06.01.2023).

#### Islands – Prospects for the future Page 4

 https://commons.wikimedia.org/wiki/ File:Bartolome\_Island\_Galapagos\_Ecuador\_(245374961).jpeg Description: Bartolome Island Galapagos

Ecuador

CC BY 3.0 Unported by: Bhasker Thodla, 2013

Page 6

 https://commons.wikimedia.org/wiki/ File:Las\_Grietas,\_isla\_Santa\_Cruz,\_islas\_ Gal%C3%A1pagos,\_Ecuador,\_2015-07-26,\_ DD\_80.JPG

Description: Las Grietas, Santa Cruz island, Galapagos islands, Ecuador

CC BY-SA by: Diego Delso, 2015

#### Page 8

 Grafik "Die Verteilung der Inseln weltweit entlang der Breitengrade" von Christian Bauer nach: Mieth/Bork 2009, (S. 23)

#### Page 10

 https://commons.wikimedia.org/wiki/ File:Nukubati\_Island,\_Fiji\_-\_panoramio.jpg Description: Nukubati Island, Fiji by: Catlin Wolfard, 2007 CC BY-SA 3.0 Unported

Attribution: catlin.wolfard Page 11

 Grafik von Christian Bauer, nach: Inseln als Außenposten der Globalisierung, Ratter 2008

#### Page 12

 https://commons.wikimedia.org/wiki/ File:Ruins\_at\_Knossos.jpg by: Chris Mitchell CC BY SA 4.0 International

#### Page 13

• https://www.flickr.com/ photos/350org/8520835542/ 8520835542\_e17fcc954a\_o.jpg CC BY-NC-SA 2.0 by: 350.org, 2013

#### Mystery

Page 18 l/u Mystery-card 1 SDG-Circle by United Nations Page 18 r/u Mystery-card 2 https://commons.wikimedia.org/wiki/File: Amami\_beach.jpg CC BY 2.0 Generic

#### by: TANAKA Juuyoh

Page 19 I/o Mystery-card 3 • https://commons.wikimedia.org/wiki/File: by: Andreas Faessler Amami Islands-en.png CC BY SA 3.0 Unported by: Bamse

#### Page 19 r/o Mystery-card 4

 https://commons.wikimedia.org/wiki/File; Okinawa\_rail\_at\_night.jpg by: Simon Speich CC BY SA 4.0 International https://commons.wikimedia.org/wiki/ File:Pentalagus\_furnessi.jpg by: Aleš Buček CC BY 4.0 International • Logo der UNESCO https://commons.wikimedia.org/wiki/ File:Warning\_signs\_for\_Iriomote\_cat.jpg by: sota

#### CC BY SA 2.0 Generic

Page 19 l/u Mystery-card 5 Lage der Amami-Inseln, by: Christian Bauer

• Amami Oshima ISS019.jpg Public Domain by: NASA

#### Page 19 r/u Mystery-card 6

 from: https://kyushu.env.go.jp/okinawa/ amami-okinawa/plans/ecotourism/pdf/z-2-e.pdf

#### Page 20 I/o Mystery-card 7

 Privates Bild by: Keiko Takahashi Page 20 r/o Mystery-card 8

 6154719479\_1c9dc414d9\_k.jpg https://wordpress.org/openverse/ image/2780f605-b6a1-4426-8043-eeb2281e0200 "e-mobil" by: flightlog

#### CC BY 2.0

### Page 20 I/u Mystery-card 9

• Flagge Griechenlands Logo VW

### Page 20 r/u Mystery-card 10

 https://de.wikipedia.org/wiki/ Datei:Reliefkarte\_Griechenland.png CC BY-SA 2.5 generisch by: Tschubby

Page 21 I/o Mystery-card 11 shutterstock\_2060992841.jpg ©Shutterstock

#### • Handy, by: Christian Bauer Page 21 r/o Mystery-card 12

• https://commons.wikimedia.org/wiki/File Page 25 l/u Mystery-card 29 :%CE%91%CF%83%CF%84%CF%85%CF%8 0%CE%AC%CE%BB%CE%B1%CE%B9%CE %B1\_-\_Astipalea\_Island\_-\_panoramio.jpg by: INDALOMANIA, 2017 CC BY-SA 3.0 Unported

#### Page 21 I/u Mystery-card 13

 https://commons.wikimedia.org/wiki/ File:IMFJ\_Astypalea\_2006\_1.jpg by: IMFI at Dutch Wikipedia CC BY-SA 3.0 Unported Attribution: IMF

#### Page 21 r/u Mystery-card 14 Bright Green Island Strategy (Buch),

Screenshot from: Amazon

#### Page 22 I/o Mystery-card 15

media/Datei:Bornholm\_Island.png by: Dr. Blofeld CC BY 3.0

#### Page 22 r/o Mystery-card 16 Logo Zero Waste Bornholm

Page 22 I/u Mystery-card 17 shutterstock 1231591531.jpg

#### (© Shutterstock) Page 22 r/u Mystery-card 18

 https://de.wikipedia.org/wiki/Bornholm#/ media/Datei: Bornholm\_luftaufnahme.jpg

#### CC BY-SA 3.0 Page 23 I/o Mystery-card 19 Logo Bright Green Island Strategy

Page 23 r/o Mystery-card 20 https://commons.wikimedia.org/wiki/

File:Nordfriesisches\_Wattenmeer\_D\_JM.png Page 26 I/u Mystery-card 33 by: Begw

#### CC BY-SA 3.0 Unported Page 23 I/u Mystery-card 21

 https://commons.wikimedia.org/wiki/File:Aerial\_ photograph\_400D\_2013\_09\_29\_9546.JPG Description: Luftbild: Wyk auf Föhr by: Walter Rademacher, 2013 CC BY-SA 3.0 Unported Attribution: Walter Rademacher / Wikipedia • https://commons.wikimedia.org/ Page 23 r/u Mystery-card 22 shutterstock\_1923902594.jpg (© Shutterstock)

## Page 24 I/o Mystery-card 23

 FöhrGreen-Logo • © Adam Schnabler, Föhr Tourismus GmbH

#### Page 24 r/o Mystery-card 24

• © Föhr Tourismus GmbH Page 24 I/u Mystery-card 25 © Föhr Tourismus GmbH

### Page 24 r/u Mystery-card 26

 https://commons.wikimedia.org/wiki/ File:A\_farmer\_in\_Fiji,\_May\_2012.\_Photo-\_DFAT\_(12422885383).jpg Description: A farmer in Fiji, May 2012.

by: Department of Foreign Affairs and Trade, 2012

CC BY 2.0 Generic

Attribution: Department of Foreign Affairs and Trade

#### Page 25 I/o Mystery-card 27

 https://commons.wikimedia.org/wiki/File: Page 27 r/o Mystery-card 36 Fiji\_topo.png Description: Topography of Fiji by: Zamonin, 2016 CC BY-SA 4.0 International

#### Page 25 r/o Mystery-card 28

 https://commons.wikimedia.org/wiki/ File:Fiji\_on\_the\_globe\_(small\_islands\_magnified)\_(Polynesia\_centered).svg by: TUBS, 2011 CC BY-SA 3.0 Unported

 https://commons.wikimedia.org/wiki/ File:Gene\_feb\_4\_2008.jpg by: NASA Public domain

#### Page 25 r/u Mystery-card 30

 https://commons.wikimedia.org/wiki/ File:Temperature\_Bar\_Chart\_Pacific-Fiji--1901-2020--2021-07-13.png Description: This bar chart is a visual representation of the change in temperature in the past 100 years. Each stripe represents the temperature averaged over a year. The average temperature in 1971-2000 is set as the boundary between blue and red colors, and the color scale varies from • https://de.wikipedia.org/wiki/Bornholm#/ ±2.6 standard deviations of the annual average temperatures between the years mentioned in the file name. Data source: Berkeley Farth

by: Ed Hawkins, University of Reading, 2021 CC BY 4.0 International

### Page 26 I/o Mystery-card 31

 Pacific-Insurance-and-Climate-Adaptation-Programme-Pamphlet.pdf

#### Page 26 r/o Mystery-card 32

• https://commons.wikimedia.org/wiki/ File:Galapagos\_Islands\_topographic\_mapfi.svg

Description: Topografische and bathymetrische Karte der Galápagos-Inseln, Fcuador

by: Eric Gaba, 2019 CC BY-SA 4.0 International

 https://commons.wikimedia.org/wiki/File: album-72157711064123746/ Galapagos%2Bmap.jpg Description: Map of Galapagos Islands (Ecuador, South America) Source: freeworldmaps.net by: Daniel Feher freeworldmaps.net CC BY-SA 2.5

• Wappen: escudo-de-galapagos from: Wikimedia

wiki/File:Gal%C3%A1pagos\_Islands\_ ESA23188644.tiff Description: The Copernicus Sentinel-2 mission takes us over the Galápagos

Islands. Source: Galápagos Islands, 2021

by: European Space Agency

#### CC BY-SA 3.0 IGO Attribution: ESA

#### Page 26 r/u Mystery-card 34

 https://commons.wikimedia.org/wiki/ File:Giant\_tortoise\_of\_the\_galapagos\_islands.jpg by: Felix Reyes Photography, 2019

CC BY-SA 4.0 Internationa

### Page 27 I/o Mystery-card 35

 https://commons.wikimedia.org/wiki/ File:Espanola\_-\_Hood\_-\_Galapagos\_Islands\_-\_Ecuador\_(4870870271).jpg by: David Berkowitz from New York, NY, USA, 2010 CC BY 2.0 Generic

 https://commons.wikimedia.org/wiki/ File:Floreana\_-\_Cormorant\_Point\_-\_Galapagos\_Islands\_-\_Ecuador\_(4871340658).jpg by: David Berkowitz from New York, NY, USA, 2010

#### CC BY 2.0 Generic Page 27 I/u Mystery-card 37

• https://commons.wikimedia.org/wiki/ File:Bright\_Light\_Volunteers\_on\_the\_Galapagos Islands.jpg Description: Bright Light Volunteers visited the Galapagos Islands and worked with local conservationists to remove invasive plant species. by: Mandie1578, 2017 CC BY-SA 4.0 International

https://commons.wikimedia.org/wiki/

File: El\_Hierro\_(8548720).jpeg

Grafik von Christian Bauer

Darstellung El Hierro,

by: Christian Bauer

by: Christian Bauer

SWOT-Icons

• Screenshot from: https://elhierro.travel/

de/entdecken/die-nachhaltige-insel

SDG-Icons by: United Nations

World Economic Forum 2014

• 48795329568\_8be5e52ee6\_o.jpg

https://www.flickr.com/photos/worl-

deconomicforum/48795329568/in/

Adrian Monck, Kate Behncken, Mark

by: World Economic Forum 2014

95772\_14af185b20\_b.jpg

by: © Universitetet i Bergen

47038895772\_14af185b20\_b.jpg

https://farm8.staticflickr.com/7877/470388

Hawkins, Amina Mohammed, Professor

Klaus Schwab, Punit Renien and Dominic

#### El Hierro Page 28

by: Manolo P

Page 29

Page 30

Page 31

Page 34

Page 35

Page 36

Page 37

Waughray

CC BY-NC-SA 2.0

"SDG Day Zero"

CC BY-NC 2.0

placemat,

CC BY 3.0 Unported

by: Christian Bauer

by: Christian Bauer



**The Turquoise Change e.V. (TTC)** promotes education for sustainable development (ESD) and focuses on islands in the context of sustainability and sustainable development. TTC works nationally and internationally, develops innovative teaching materials such as this present teaching material "Islands – prospects for the Future?" or the innovative learning material including augmented reality developed in cooperation with Nepada Wildlife e.V. "4Wildlife – from the rainforest into the classroom". TTC offers workshops and further training for teachers. At the same time, TTC promotes the transdisciplinary dialogue from science, art or storytelling in the context of ESD and thus contributes to the implementation of Agenda 2030. Against the backdrop of ESD, TTC's heart beats especially for the conservation of fragile island ecosystems.



Supported by



with funding from the



Federal Ministry for Economic Cooperation and Development