Integrating Activities for Advanced Communities

D2.12 - Pocket guide on how to handle effects of tourism at research stations and in adjacent local communities

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Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
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CO	Confidential, only for members of the Consortium (including the Commission Services)	

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Publishable Executive Summary

Across all INTERACT stations there is a wide range of desired and actual interactions between the research and tourism communities. These interactions are not static but change depending on the socio-economic situation of the research station and the local community over time.

This guide is a tool seeking ways to enhance the positive interactions with tourists and prevent negative ones. The guide, created in consultation with station managers, proposes a set of mechanisms to enhance the positive interactions and negate any harmful interactions for the benefit of the station's operations, the science community, the local community, and the natural environment. These mechanisms are illustrated with practical examples from INTERACT stations.

1. The tourism dilemma

INTERACT – International Network for Terrestrial Research and Monitoring in the Arctic is a network of more than 85 research stations located in the Arctic and adjacent boreal and alpine areas. Collectively they cover a range of desires and possibilities to interact with tourists (Fig 1).

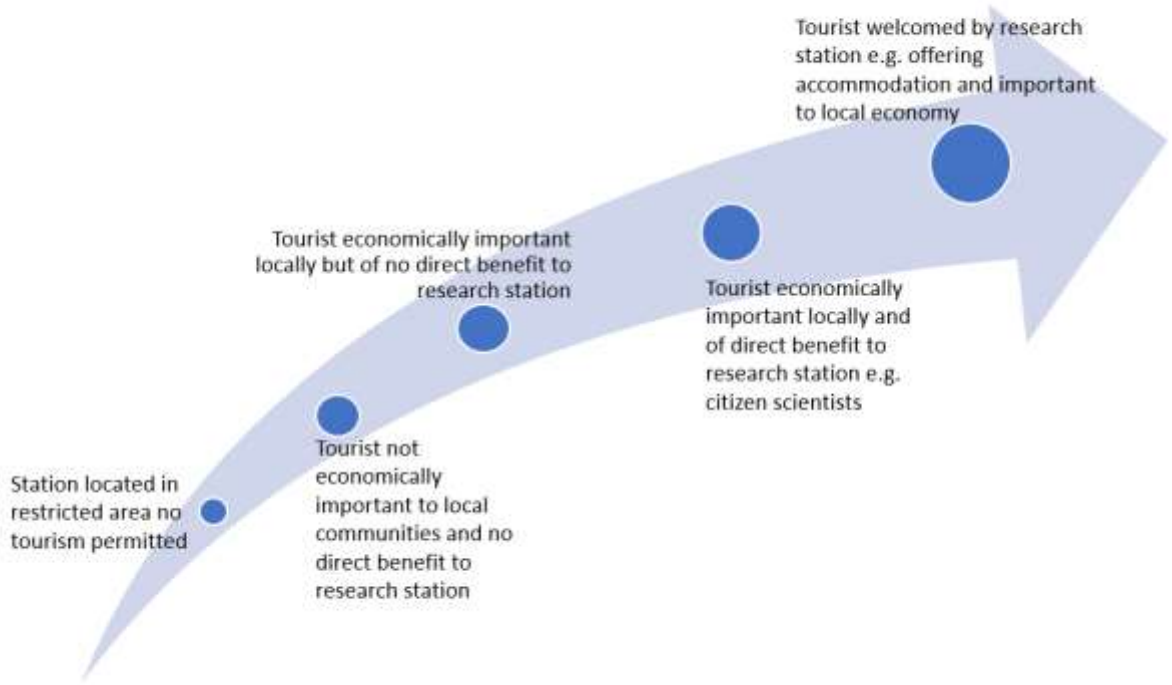

Figure 1. Range of desires and possibilities reported by INTERACT station managers to interact with tourists.

For many research station managers, it is a well-known dilemma that the local community desires a research station to contribute, in one way or the other, to the development of the local region into a tourist attraction. However, the scientists working at and visiting the research stations are often busiest at peak tourist season and find tourists disturbing so prefer to avoid interactions. For tourist operators, the stories told, and the knowledge provided by scientists are often crucial to determine how interesting an area will seem to tourists. Further, the research station itself can be considered as an attraction especially in these times of heightened awareness of environmental dilemmas such as climate change and biodiversity loss.

It is important for the scientists to know that tourism may be important for the local community, and it is important for the tourists to know that the scientists are busy and that their activities can impact the research.

2. Managing impacts of tourism

The first step to managing an issue is to recognise and analyse its form, then find appropriate solutions and monitor if they are successful (Fig 2).

Figure 2. Step to analyse, manage and evaluate measures to enhance the positive and negate the negative aspects of tourism at INTERACT stations.

Internal discussion with staff at the research station and members of the local community is vital to fully understand the issue of tourism at a research station. In this guide, station managers have identified both positive and negative interactions with tourists, these lists can be used as a guide to analyse the situation at your station.

The negative aspects of tourism can be mitigated or negated completely, while the positive aspects can be encouraged by research stations adopting best practices.

Development of best practice is seen as a systematic approach to provide widely applicable mechanisms and tools for influencing human behaviour to minimise environmental impacts and disturbance of science activities at research stations. Here we have recognised three general behavioural change mechanisms, although in reality they represent a spectrum of informing, encouraging or prohibiting sets of behaviours (Fig 3).

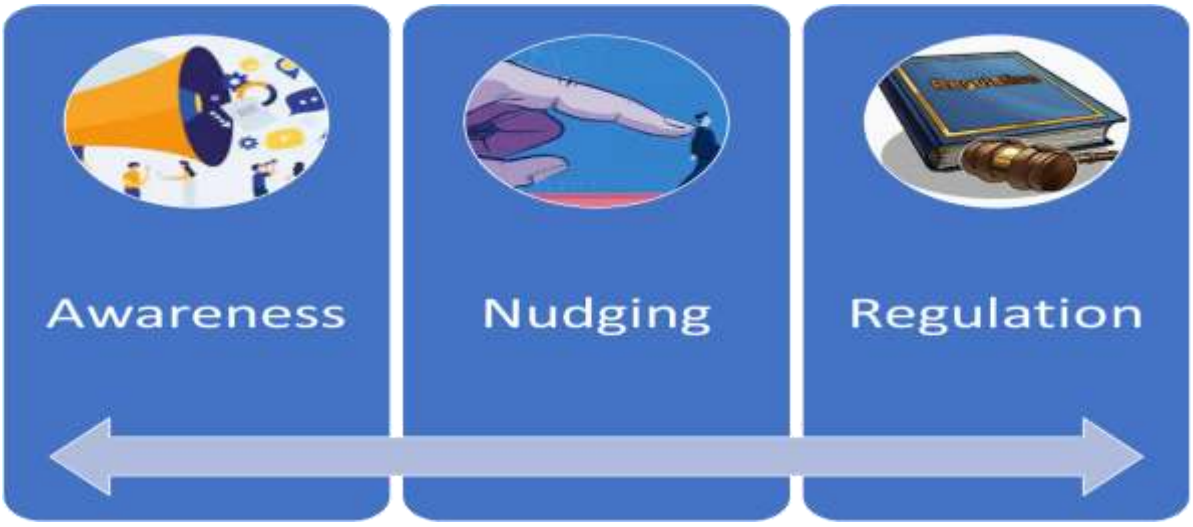

Figure 3. Spectrum of mechanisms and tools to influencing human behaviour.

Principles

1. Awareness – is a mechanism that seeks to enable tourists to make behavioural choices in favour of ecosystems and science by providing them with knowledge about the nature, how they impact it and how they may impact scientific results. Awareness raising can take many forms from a simple sign attached to an instrument explaining its function and how tourists should act, to a booklet given to every visitor (explaining, for example the environmental policy of the station, the purpose of equipment visitors may encounter) or, at stations accommodating scientists or tourists, giving a full mandatory educational lecture the first night guests arrive at a station – this introduction might just be a part of the general introduction given to station visitors. With increased knowledge, most visitors will not interfere with equipment or monitoring plots or disturb vegetation or wildlife.

As signage is the major awareness enhancing tool the international recommendations such as ISO 7010 colour and shapes are useful (and probably already used at most INTERACT stations). ISO 7010 specifies five combinations of shape and colour to distinguish between the type of information presented in terms of hazards – these can be adapted for local use (Table 1).

Table 1. Summary of the International Organization for Standardization technical standard for graphical hazard symbols on hazard and safety signs.

Sign type	Meaning	Colour (per ISO 7010)	Shape	Example
Prohibition sign	Prohibition	Red	Circle with diagonal line	 No open flame
Mandatory sign	Must do	Blue	Circle	 Keep dog on a lead
Warning sign	Warn of hazard	Yellow	Equilateral triangle with rounded corners	 Roof avalanche
Safe Condition sign	Safety equipment & exits	Green	Square or rectangular	 Emergency Assembly Point
Fire Safety sign	Fire Protection	Red	Square	 Fire Extinguisher

2. Nudging – is a category of mechanisms aimed at prompting a person to make decisions and behave in a particular way. Nudges are subtle hints intended to direct people towards a desired behaviour, without explicitly explaining how they should behave. Nudging can be categorized into different types based on the main mechanism that they use to influence people (Fig 4).

Figure 4. Types of nudging behaviours to promote positive interactions with tourists and reduce negative interactions.

There is a rich literature on the ethics of nudging behaviours. It is best practice to leave freedom of choice intact, but nudges can still have considerable impact, especially when people lack information and the choice environments they are faced with are confusing or culturally alien.

3. Regulation – or command and control mechanisms can take many forms from station regulations, local licences to national and international laws (Fig 5.). Regulation often involves 'punishment' (typically in the form of a monetary fine or imprisonment), and thus require additional infrastructure to monitor compliance and administrate retribution. Publicizing existing regulations is an important awareness raising mechanism.

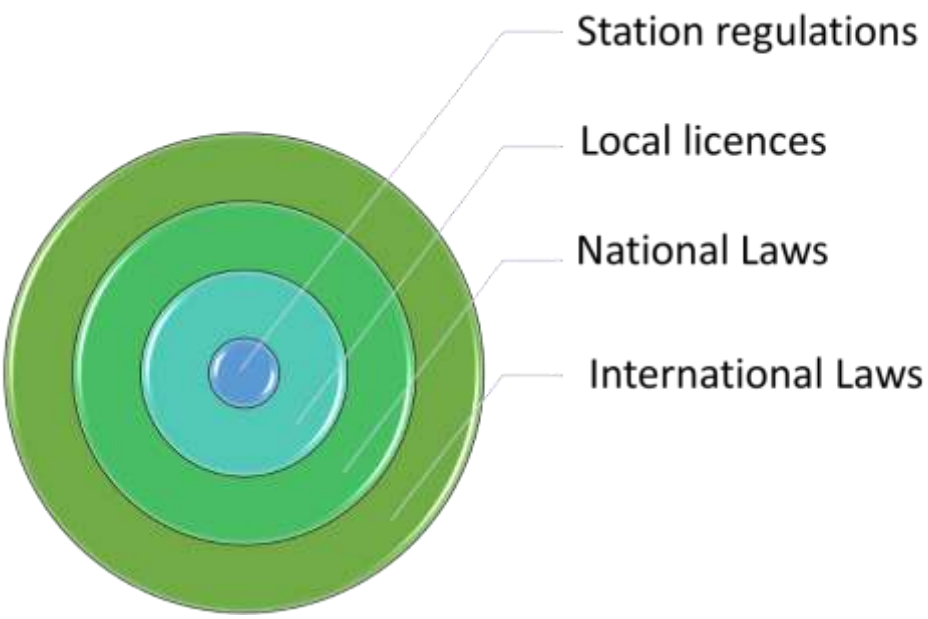

Figure 5. Levels of command and control mechanisms relevant to managing interactions with tourists at INTERACT III stations.

3. Potential benefits from engaging with tourists

Tourists can contribute positively to the operations of research stations. They can bring in money for the research station and the local community, they can be targets of educational and public outreach aims, they can provide high quality citizen science data and be subjects of scientific investigation themselves (Table 2).

Table 2. Categories and examples of positive interactions identified by station managers that can result from research stations interactions with tourists.

Type of benefit	Examples of benefits
Economic benefits	Income through providing accommodation.
	Direct income through some form of paid learning (educational tourism).
	Indirect income through requirement for some form of outreach linked to research funding
	Indirect economic benefit by sharing of transport and accommodation.

Goodwill in local community	Station staff training people from the local communities to guide tourists around the station and/or its research area.
	Indirect goodwill among local stakeholders deriving income by guiding tourists around the station and/or its research area.
Citizen Science	Volunteers contributing with data using standard methods provided by scientists.
Research subjects	Willing to providing knowledge and their time for sociological studies.
Education and public outreach	Tourists can be the target of educational and/or public outreach activities that can be part of a station's operational aims.
	Increased awareness of station science activities can lead to desired behaviour of citizens.

4. Practical recommendations to enhance benefits of interacting with tourists

Across the INTERACT network there are a range of awareness, nudging and regulation mechanisms in place to enhance the five categories of beneficial interactions with tourists identified in the table above.

3.1.Economic benefits

Awareness: The most used mechanisms to maximise the direct economic benefit for stations is to offer services for tourists, e.g. accommodation, guided tours/talks, sale of merchandise, etc. Such services and opportunities should be advertised through relevant communication tools (e.g. websites of stations and tour operators, Facebook groups, poster stands in local communities, signage at the stations).

Nudging: Additional income can be generated by incorporating nudging mechanisms in the communication to tourists. For example, merchandise could be placed and advertised close to the station entrance (or even seen from the outside), statements on websites and signage saying that many/most people book a certain tour or advertising positive references from previous visitors.

Regulation: Entrance fees, enshrined in local law, to nature reserves is a common regulation associated with the economic benefits of tourists.

3.2.Goodwill in local community

Awareness: Promoting local people to guide tourists. Advertising this service in the most appropriate place on the station website can enhance positive collaboration between scientist, tourist and local people.
Nudging: Incorporating a psychological anchor can be a useful mechanism for example a prominently placed counter displaying the number of people who booked a second tour on the website could serve to make people feel this is the 'normal' situation i.e. if people booked tour 1 with a local operator, they also booked tour 2.

3.3.Citizen Scientists

Awareness: Several stations benefit from tourists taking part in citizen science activities. Raising awareness through advertising is commonly used.
Nudging: Less common is the nudging mechanisms of a psychological anchor whereby the station displays the details of previous tours, which provided the maximum verified records into the database and so encouraging the next tour to do better! Alternatively, a timely reminder such as a sign with details on how to contribute at a particular spot on a trail can encourage tourists to take part in Citizen Science activities.

3.4.Research subjects

Many tourists are willing to take part in research activities offering their time and opinions.

Awareness: Such research opportunities should be advertised through relevant communication tools (e.g. websites of stations and tour operators, Facebook groups, poster stands in local communities, signage at the stations).
Nudging: When advertising the possibility to take part in research seek to encourage participation by for example informing them of the importance of the data for science/local community/tourists, and highlight if the opportunity confers some advantage for the individual e.g., some free merchandise, guided walk at and around the station or provide results of previous studies involving tourists to show case the impact of such research.

When tourists are research subjects it is very important that the normal ethical considerations are adhered to e.g. providing a clear participants information and consent sheet. Inform how results will be used and how they are communicated to relevant stakeholders and participants (the tourists).

3.5.Education and public outreach

Many research stations have the operational aim of education and outreach, and tourists can be an important audience in this regard.
Awareness: Stations can reach out to schools and tour operators to schedule regular outreach events (e.g. public talks, Open Station events, etc.). Such arrangements can encourage participants to come to events, while stations may find it more of a challenge to attract an audience themselves. The station and local stakeholders can advertise on relevant platforms (e.g. websites, poster stands, Facebook groups, etc.).
Nudging: If registration for the event is required, sending a timely reminder to all those who register can increase attendance.

4. Managing negative impacts from tourist interactions

Tourists may negatively impact research activities by impacting the natural environment e.g. by trampling vegetation, causing erosion, disturbing wildlife, etc. or destroying or hampering scientific instrumentation either knowingly or unknowingly (Table 3).

Table 3. Categories and examples of negative interactions identified by station managers that can result from research stations interactions with tourists.

Types of potential impacts from tourism	Example of negative behaviour
Physical interference	Camping or trampling on long-term vegetation plots
	Tampering with equipment e.g. camera traps, acoustic recorders, weather station
	Human or vehicle tracks resulting in erosion.
	Presence of humans/vehicles/drones disturbing animal behaviour.
	Extraction of biological resources (berries, mushrooms, fish etc.).
Sources of contamination	Human Waste products carelessly discarded
	Breathing on instruments measuring air quality
	Spread of alien species
	Light or noise pollution disturbing nature
	Vehicle/machinery sources of contamination, e.g. oil, NOx.

Station managers recognised that many negative interactions are caused by misunderstanding and/or thoughtlessness by the tourists thereby subscribing to the thinking of Napoleon Bonaparte who famously declared: *'Never ascribe to malice that which is adequately explained by incompetence*'.

Raising awareness, employing nudging mechanisms and employing command and control regulation are recognised as important tools to ensure minimal negative interaction with tourists while enhancing their experience of the area. Below are described actions, which are found by

station managers to work in connection with tourism issues commonly identified at the arctic and alpine research stations.

Physical interference with equipment and monitoring plots

Awareness

The most used mechanism to negate negative behaviour is awareness raising passively through clear signage. Signage explaining the importance of the equipment/research area to scientific research and the unintended consequences the tourist may have on the equipment or monitoring plots possibly using the ISO 7010 is thus recommended.

Nudging

Nudging mechanisms such as signs marking trails/track and boardwalks may be used to divert visitors away from equipment or monitoring plots and present a route easier to walk. This may need to be done in cooperation with the landowner or local community/authority, possibly as part of the co-created tourism strategy for the area.

Another approach is to change the salience of an option. For example, if legally allowed, an inaccessible motion-activated camera can be placed clearly visible for taking pictures of equipment and anyone interfering with the equipment to deter people from interfering. Alternatively, a motion activated loudspeaker, if noise pollution is not an issue (or if also wanting to scare away animals), can be effective.

Regulation

In some cases, it can be necessary to create a (fenced) restricted zone around equipment or monitoring plots, which may be locked and/or requires a permit to enter. The station must make sure it has the right to do so in accordance with legislation and land ownership issues.

4.1.Sources of contamination

Awareness

A recommended awareness mechanism to ensure animals are left in peace, is information boards at strategic locations informing about areas where animals are breeding and hence should not be disturbed, potentially including a stated safety distance and/or dates. Such information can deter people, alternatively encouraging people, to recreate in another part of the area can be effective.

Nudging

If the number of tourists is relatively high it is recommended to place sufficient bins along common hiking routes to avoid garbage left in nature. Further, it is also recommended that toilet facilities are available, and tourists are encouraged to use them. In very nutrient poor ecosystems, the nitrogen load through human waste products may have an impact. This may be explained by signage.

Erosion caused by inappropriate vehicle use or people walking off trail can be significant. Using nudging mechanisms, such as providing maps with robust trails, can be effective and is recommended.

Regulation

If legislation and landownership permit, regulating access to given areas in certain periods can prevent disturbance of animals in for example the breeding season. Similarly, regulations for vehicle access can be used to prevent wear and tear of vegetation and reduce soil erosion.

5. Monitoring effectiveness of interventions

It is important to monitor the interventions to evaluate whether they have had the desired effect of protecting the environment or reducing the disturbance of science. The monitoring may include factors such as effectiveness, costs and unintended consequences of the interventions. This will allow station managers to determine whether the intervention is a good tool to use in that situation, or whether it needs to be adjusted or improved. If necessary, an adjustment of the tourism strategy may be considered as indicated in Figure 1.

6. Further issues to consider

Who are the audience: What are the relevant characteristics of the target audience, for example best practice to discourage soil erosion by mountain bikers will be different from motorised quad bikers and different again for drivers of Sports Utility Vehicles (SUVs).

Effectiveness of the behaviour change mechanism is context specific for example, signage in the national language may not be sufficient if international tourists are common.

Scale of intervention: Small measures can sometimes be more effective than bigger ones. For example, changing the default option by only a little can sometimes be more effective than changing it drastically, since a major change might antagonize people, which could cause them to avoid that default, i.e. opt-out. At the same time, however, it's important not to fall into the trap of making interventions so minor that they are rendered ineffective.

Nudges shouldn't necessarily be hidden: Nudges can often work even when people are aware of them and of their intended goal. Increased transparency can sometimes make nudges even more effective, in addition to having potential ethical benefits. You can decide on how transparent to make your nudging based on relevant factors such as where and why you are using it.

People should perceive the intervention as beneficial for themselves, the environment and/or biodiversity: You should make sure that the people who are affected by a nudge or regulation for example will feel that the nudge benefits them to a substantial degree or a regulation is proportionate to the situation (i.e. 'Keep Out' signs with no reason why they should not enter are less effective than 'Danger Electricity Keep Out' signs for example).

Finally, it is important to remember that behaviour change interventions are often only one part of a larger solution. Even though they may be effective to some degree, they are often unable to entirely

solve the issues that they are meant to address. Station managers may not be able to solve the problem alone but must work in collaboration with tour operators or local authorities to fully achieve the desired outcomes.