Galloway and Southern Ayrshire Biosphere

Research Priorities

2014-2018

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With:

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Table of Contents

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Acronyms

CVCWT – Cree Valley Community Woodland Trust

EAFS – Environmental Art Festival Scotland

EERC – European Ethnological Research Centre

FCS – Forestry Commission Scotland

MAP – Madrid Action Plan

SAC – Special Area of Conservation

SEPA – Scottish Environmental Protection Agency

SNH – Scottish Natural Heritage

UNESCO – United Nations Educational, Scientific and Cultural Organization

WNBR – World Network of Biosphere Reserves

1. Introduction

The Galloway and Southern Ayrshire Biosphere (the Biosphere) is located in southwest Scotland within the council areas of South Ayrshire, East Ayrshire and Dumfries &Galloway. It has been recognised by UNESCOas one of the World Network of Biosphere Reserves (WNBRs) because of its unique combination of wildlife habitats, characteristic landscapes, rich cultural heritage and communities. Biosphere status recognises a commitment not only to care for our natural heritage but also to sustainable development and to research which takes these agendas forward. In the following pages, in the context of further information about the Biosphere and guidance on research provided by UNESCO, we identify some key research priorities for the period 2014-2018. The list of priorities has been compiled with the help of members of the Biosphere Partnership Board, particularly those active in the area of research, and staff in the School of Interdisciplinary Studies at the University of Glasgow.

2. The Galloway and Southern Ayrshire Biosphere[1]

Cairnsmore of Fleet, Silver Flowe and Merrick Kells were first designated as Biosphere Reserves in 1976. However, in the 1990s UNESCO broadened the Biosphere Reserve concept and invited existing members to re-apply (or withdraw) under the new criteria. Following extensive consultation a Biosphere Partnership applied for Biosphere status over a much larger area of Galloway and Southern Ayrshire (5,269 square kilometres). This was awarded in 2012.

As with all UNESCO Biosphere Reserves, the Galloway and Southern Ayrshire Biospherehasa core surrounded by buffer and transition areas. The core is focused on Cairnsmore of Fleet, Silver Flowe and Merrick Kells which include a diverse range of upland habitats including nationally and internationally important areas blanket bog, heather moorland, and montane and boreal grasslands. These uplands are protected in different ways asSites of Special Scientific Interest, Special Areas of Conservation, National Nature Reserves and Ramsar Sites.Many assemblages also have specific UK Habitat Action Plans for their management, restoration and protection.

Wetlands within the corefeed many of the water catchments in southwest Scotland. In the case of the Galloway and Southern Ayrshire Biosphere, with the exception of the southern end of the Nith, most people live in areas drained by the river catchments of the Cree, Fleet, Ken-Dee, Nith, Doon, Water of Girvan and Stincha, which all have their sources in the Biosphere. The area is largely rural with approximately 94,000 people at an overall population density of 0.34 persons per hectare. It is characterised by a large number of small towns and villages all of which have fewer than 10,000 residents. The list includes Castle Douglas, Gatehouse of Fleet, New Galloway, Newton Stewart, Wigtown, Girvan, Maybole, Dalmellington, New Cumnock, Cumnock, Sanqhuar andThornhill. Whilst lying outside the Biosphere's boundaries, the three larger urban areas of Ayr, Dumfries and Stranraer are important because of their proximity.

[1] For more information see http://www.gallowayandsouthernayrshirebiosphere.org.uk/

The Galloway and Southern Ayrshire Biosphere Charter sets out the principles which underpin the Biosphere Reserve. All of theserelate to research in some way but the most important include 'develop knowledge and understanding', 'educate and raise awareness' and 'monitor progress'. Beyond the Charter principles the Biosphere has five key themes and ambitions: (i) underpinning and developing the economy; (ii) enhancing the quality of life andcommunity revitalisation; (iii) responding to climate change; (iv) enriching the environment; developing awareness, (v) understanding and knowledge.

3.Research in Biospheres

In 1995 an international conference in Seville, Spain, launched a new era for the World Network of Biosphere Reserves. The actions agreed at that meeting were incorporated in the Seville Strategy and the Statutory Framework of the WNBRs (known as the Seville Strategy). In relation to research the Seville Strategy notes:

> *… thebiosphere reserves constitute ideal sites for research, long-term monitoring, training, education and the promotion of public awareness while enabling local communities to become fully involved in the conservation and sustainable use of resources…*

It also identifies the following as one of 10 key directions for the Biosphere programme:

> *Reinforce scientific research, monitoring, training and education in biosphere reserves since conservation and rational use of resources in these areas require a sound base in the natural and social sciences as well as the humanities.*

In relation to research, the Seville Strategy also identifiesa number of more specific objectives and indicators of success relevant at reserve level (Appendix A).

Five years later, the Seville+5 international meeting also took up the issue of research in the WNBRs. The proceedings of the meeting record the key conclusions particularly of Working Group 1 which dealt with'Biosphere reserves as sites to contribute to international research and monitoring programmes'. Amongst other things this group recommended:

> *That co-operation will be increased between biosphere reserve managers, researchers and local communities to jointly define research needs, monitoring needs, and the utilization of monitoring and research data and results.*
>
> *That simple, but standardized, monitoring is applied to ensure comparable quality data.*
>
> *Implementation of the BRIM [Biosphere Reserve Integrated Monitoring] program should be accelerated, including explicit recognition of the need to integrate the social sciences in its activities.*
>
> *Biosphere reserve co-ordinators should use volunteer monitoring activities both to generate data and for environmental education purposes.*

For more on Seville+5 see Appendix B.

In 2008, the Madrid Action Plan (MAP) was adopted by the 3rd World Congress of Biosphere Reserves. It builtparticularly on the Seville Strategy and aims to raise Biosphere Reserves to be the principal internationally-designated areas dedicated to sustainable development in the 21st century. The MAP deals with research primarily under the title 'science and capacity enhancement'and identifies a large number of actions and success indicators including:

> *15.2 Promote the MAB Programme's global network function through the systematic recording of policy relevant case studies and ensuring their availability and dissemination – Document on case studies*
>
> *16.3 Strengthen the role of science in decision-making through problem oriented, applied research in order to increase the availability of funding for both science and management, and ensure good science-informed participatory and collaborative management – Research projects established in all BRs*
>
> *19.1 Mobilize scientific and non-scientific actors combining all knowledge systems in order to strengthen the scientific functions of BRs – Number of BRs having research programmes*
>
> *20.1 Ensure stakeholder involvement in the production of a research agenda to be incorporated in the management plan for the whole BR – Number of BRs with defined and operational research programmes*
>
> *20.2 Use BRs as sites for applied, problem oriented research for sustainable development linked to the zoning and management plan. Incorporate the results of applied ecological and socio-economic research into ecosystem management of all areas and link educational activities to the different functions in all zones of BRs – Number of BRs with research agendas related to sustainable development*
>
> *24.1 Use mountain BRs as field observatories of global change impacts on the environment, economy and human well-being, based on the GLOCHAMORE Research Strategy – Number of mountain BRs with active research and capacity enhancement programmes*

For more on MAP see Appendix C.

4. Research Priorities

In this section we list the research priorities of the Galloway and Southern Ayrshire Biosphere for the period 2014-18. Rather than describing specific projects it indicates broad areas where we hope to make progress and welcome contributions from others. Some of these are more relevant to the core, transition and buffer areas specifically whereas others apply across the Biosphere. The section begins by considering generic and institutional developments in the area of research before moving on to research in specific areas and interdisciplinary scholarship.

4.1 Generic/Institutional

Priorities:

- Develop a system, process, database or repositoryto linkdata and research activities across the Biosphere making the whole more accessible.
- Identify/establish key indicators/baselines for research and monitoring in areas relevant to sustainable development of the Biosphere – making use of existing work of FCS, SEPA, SNH, RSPB and others where possible.
- Mobilise local communities and volunteers as contributors to processes of research and monitoring in the Biosphere.
- Promote use of the Biosphere for research, training and education by identifying and publicising relevant contacts and facilities. Also explore opportunities for a research/education centre.
- Publish a collection of case studies from the Biosphere linking research and policy and ensure widespread dissemination.
- Incorporate this list of research priorities into a management plan for the Biosphere.
- Establish the Biosphere as an area where methods and approaches which might be relevant elsewhere are developed and where those developed elsewhere are applied.
- Network with other Biospheres, particularly those with similar characteristics, and begin to share results/approaches.

4.2 Applied Science

Priorities:

- Compile an inventory of biodiversity and ecosystem services to inform decisions about restoration/enhancements.
- Develop models of the distribution of species, habitats and community-types in relation to climatic and edaphic conditions and land-management.
- Analyse the effects of land management practices on ecosystem service delivery.
- Assess the extent to which plantation forestry could contribute to the delivery of ecosystem services.
- Increase understanding of the riparian zone and the effects of land-use on the quality of aquatic and wetland habitats.
- Quantify fluxes and sinks of carbon at multiple spatial and temporal scales to evaluate the effects of management on the region’s carbon balance.
- Evaluate habitat restoration/enhancement measures already undertaken in order to advise on their efficacy and value for money.
- Determine the resilience of ecosystem service delivery to disturbances (e.g. wildfire, grazing) and drivers of environmental change (e.g. climate change).
- Establish a network of long-term monitoring plots to track changes in ecosystem structure and function.

In all of these areas a priority is to draw together or build on work already being done. LenkaSukenikova, for example, has already done valuable work in relation to ecology and natural heritage of the Biosphere (see below).

4.3 Social Science

Priorities:

- Explore links between tourism and benefits to communities and the region focusing on specific projects/initiatives such as theme towns, Dark SkyPark, Red Kite Trail, 7stanes (mountain biking).
- Analyse land-use and resource controversies (e.g. wind farms, open-cast mining and clear-felling) to understand causes and solutions.
- Explore markets for locally produced (including “Biosphere”) products (food, timber) including, for example,labels and technical requirements of customers.
- Explore opportunities for community empowerment in the Biosphere including management or (co)ownership of assets.
- Analyse the strengths and weaknesses of the Biosphere as a new and alternative form of environmental/sustainability governance.
- Analyse how different types of knowledge and ways of understanding (e.g. lay and expert, different disciplines) are mobilised in the Biosphere, particularly the relationship between scientific, economic and other perspectives
- Explore opportunities for the Biosphere to play a more central role in enhanced health and wellbeing of residents.

4.4 Arts & Humanities

Priorities:

- Gather the life experiences (perhaps through oral histories) of people and explore the meanings of the Biosphere in this context. This could focus on people who have lived in the region for different lengths of time or other criteria such as age or gender.
- Analyse the meanings of the Biosphere in relation to space, including howmeanings of spaces differ and residents living in one place relate to other places.
- Through a combination of research and practice, explore the link between art in the landscape (music, poetry, visual arts, drama) and community revitalisation.
- Study how visitors perceive and value the area particularly in the context of proposals for changes in use of natural resources e.g. wind farms.
- Examine thecontent and dynamics of the imaginary geographies which are implied and brought into existence by the Biosphere e.g. maps and signs.
- Uncover and explore links between thevarious ideas and assumptions which underpin the Biosphere such as essentialism and sustainability.

4.5 Interdisciplinary

Priorities:

- Understand the relationship between the Biosphere and strategies for resilience and adaptation to climate change in local communities.
- Explore opportunities for the Biosphere to benefit from policy developments includingpayments for ecosystem services.
- Investigate how different types of expertise, particularly on the Biosphere Partnership Board, are combined (or not) in practice.
- Understand relationships between people/communities and ecological change e.g. public perception of signal crayfish.

5. Examples and Projects

In this section we provide some examplesand projects which illustrate how rich the Biosphere is as a place to do research. Those interested in pursuing research in the area could take these as starting points for projects across applied sciences, social sciences, arts and humanities. The list, of course, is not exhaustive; there are many more possibilities than we are able to highlight.[2]

- The Biosphere's Natural Heritage Project – One of the first projects undertaken by the Biosphere was in the area of natural heritage. It was taken forward byNatural Heritage Officer LenkaSukenikova working closely with RSPB Scotland (Crossmichael Office). The aims of the project fell into two main categories: collation of information and formulation of an advisory management plan for enhancement, interpretation and promotion of key natural heritage in the Biosphere.
- Cree Valley Community Woodland Trust (CVCWT) – CVCWTenters into long term management agreements with landowners to enhance biodiversity and provide public access, especially in broadleaf woodlands habitats. It has been very successful in engaging members of the community in improving the woodlands of the Cree Valley.
- Carsphairn Renewable Energy Fund Ltd – This company was set up to administer community benefit funds given annually to Carsphairn by the owners of Windy Standard and Wetherhillwindfarms. The money is distributed in the form of grants to help finance projects which will benefit the community and assist inhabitants of the parish to continue their learning through further education.
- Galloway Oakwoods Special Area of Conservation (SAC) – This complex of oakwoods is the only site within the SAC series representing the Southwest Lowlands of Scotland Atlantic Bryophyte zone. The individual sites are small and dispersed, but are regionally important due to the highly fragmented nature of remnant semi-natural woodland in southwest Scotland.
- Energy related projects – The region hosts a fascinating range of energy projects. Some of these are historical and others more recent. Examples include the water-powered

[2] This section has been compiled from suggestions and secondary sources. Being named does not indicate that those involved have agreed to participate in research.

KirkdaleSawmill, the Galloway hydro-electric power scheme built 1930-36, and the LandEnergy wood pellet manufacturing plant in Girvan.

- Galloway Kite Trail – The Galloway Red Kite Trail is a route around Loch Ken which gives people the opportunity to view red kites. It promotes the population of kites, recently re-established in the region, as a source of nature-based tourism to benefit local communities. In so doing it also aims to strengthen the 'ownership' of the kites by local communities and tourist operators.
- Discovering Dumfries and Galloway's Past – This is a community archaeology project using geophysics to explore the region's fascinating history. The project is managed by University of Glasgow (Dr Richard Jones and Dr Valentina Bold) and funded by LEADER, the University of Glasgow's Chancellor's Fund and the Chrichton Foundation.
- Museums – There are numerous museums located across the region which provide a rich resource for research. The list includesSanquharTolbooth Museum,The Stewartry Museum (Kirkcudbright), Dalbeattie Museum and the Doon Valley Museum (Dalmellington). In this context, although more than a museum, it is worth noting the Whithorn Trust (and Visitor Centre), which was set up in 1986 to explore the archaeology and history of Whithorn, and to examine its role in the evolution of Christianity in Scotland.
- European Ethnological Research Centre (EERC)– EERC is an independent research body within Celtic & Scottish Studies at the University of Edinburgh. Their Regional Ethnology of Scotland Projectaims to provide interesting, scholarly, informative and accessible views of life and society in Scotland across time, place and setting. It is divided into a series of regional studies and the project began with a study of the life of the people of Dumfries and Galloway.
- Religious sites – The Biosphere contains many sites with religious and spiritual significance. Some of these are highlighted in a Solway Centre/Whithorn Trust report byCatriona McMillan called 'The Whithorn Pilgrimage'. This explores the history of an ancient pilgrimage route and raises the possibility of a modern route.
- Environmental Art Festival Scotland (EAFS) – EAFS is a biennial arts festival which is held insouthwest Scotland including exhibits and installations across the Biosphere. EAFS is conceived as a 'total artwork', as such its form and structure changes. Each festival is informed by the experience of the previous one and by the evolving debate around creative and multi-disciplinary approaches to sustainable futures.
- Fleet Valley – The Fleet Valley National Scenic Area including Gatehouse of Fleet is somewhere that the Biosphere and other areas might be able to learn from. Many people and organisations, including the Gatehouse Development Initiative, have committed time and energy to a wide range of projects including the Fleet Valley Trails leaflets (in association with Mill on the Fleet, SNH and D&G Council),Cally Story by NicCoombey, The Gatehouse Adventure by David Steel, and the Cally Designed Landscape project. Gatehouse of Fleet was recently part of the Memoria project funded by the European Union to study links between non-material and cultural heritage and sustainability. The Galloway Picts Project is currently examining the history of the Picts in Galloway focusing on Trusty's Hill in the Fleet Valley.

6. Conclusion

In this document we have outlined some of the research priorities of The Galloway and Southern Ayrshire Biosphere in the context of guidance relating to research across the WNBR provided by UNESCO. Rather than being read as something definitive or prescribed, however, it should be read as an invitation to do research in the region. We want to encourage research across the applied science, social sciences, arts and humanities and particularly interdisciplinary projects which take up the challenge of sustainable development.

ASeville Strategy

Goal three of the Seville Strategy is to 'Use Biosphere Reserves for research, monitoring and educational training'. In relation to this goal there are a number of objectives and recommended actions at individual reserve level:

Objective III.1: Improve knowledge of the interactions between humans and the biosphere

Use biosphere reserves for basic and applied research, particularly projects with a focus on local issues, interdisciplinary projects incorporating both the natural and the social sciences, and projects involving the rehabilitation of degraded ecosystems, the conservation of soils and water and the sustainable use of natural resources.

Develop a functional system of data management for rational use of research and monitoring results in the management of the biosphere reserve

Objective III.2: Improve monitoring activities.

Use the reserve for making inventories of fauna and flora, collecting ecological and socio-economic data, making meteorological and hydrological observations, studying the effects of pollution, etc., for scientific purposes and as the basis for sound site management.

Use the reserve as an experimental area for the development and testing of methods and approaches for the evaluation and monitoring of biodiversity, sustainability and quality of life of its inhabitants.

Use the reserve for developing indicators of sustainability (in ecological, economic, social and institutional terms) for the different productive activities carried out within the buffer zones and transition areas.

Develop a functional system of data management for rational use of research and monitoring results in the management of the biosphere reserve.

Objective III.3: Improve education, public awareness and involvement

Encourage involvement of local communities, schoolchildren and other stakeholders in education and training programmes and in research and monitoring activities within biosphere reserves.

Produce visitors' information about the reserve, its importance for conservation and sustainable use of biodiversity, its sociocultural aspects, and its recreational and educational programmes and resources.

Promote the development of ecology field educational centres within individual reserves, as facilities for contributing to the education of schoolchildren and other groups.

Objective III.4 Improve training for specialists and managers.

Use the reserve for on-site training and for national, regional and local seminars. Encourage appropriate training and employment of local people and other stakeholders to allow their full participation in inventory, monitoring and research in programmes in biosphere reserves.

Encourage training programmes for local communities and other local agents (such as decision-makers, local leaders and agents working in production, technology transfer, and community development programmes) in order to allow their full participation in the planning, management and monitoring processes of biosphere reserves.

The Objective III reserve level implementation indicators identified by the Seville Strategy are:

- *Co-ordinated research and monitoring plan implemented*
- *Functional data management system implemented*
- *Biosphere reserve is used for developing and testing of monitoring methods*
- *Biosphere reserve is used for developing indicators of sustainability relevant to local populations*
- *Local stakeholders are included in education, training, research and monitoring programmes*
- *Information for visitors to the biosphere reserve developed*
- *Ecology field centre developed at the biosphere reserve*
- *Biosphere reserve is used for on-site training activities*
- *A local educational and training programme is in place*

BSeville+5

The proceedings of the Seville+5 international meeting of experts takes up the issue of research in various places but particularly in the report of *Working Group 1: Biosphere Reserves as Sites to Contribute to International Research and Monitoring Programmes*:

> *The working group recognized biosphere reserves as ideal sites for long-term monitoring and research projects.*
>
> *Recommendations:*
>
> *That the MAB Secretariat elaborate a concise, user-friendly overview of the different conventions, relevant to the MAB program and prepare guidelines for their implementation in the framework of the MAB programme; these should be translated in as many different languages as possible, with assistance from the MAB national committees.*
>
> *That the MAB Secretariat co-ordinates with the secretariats of the relevant multi-lateral environment agreements (e.g. the Convention on Biological Diversity) and develops guidelines toharmonize research initiatives concerning the different conventions.*
>
> *The regional networks, in consultation with the MAB Secretariat, should define and adopt a limited number of research and monitoring projects that are related to conservation and sustainable development, such projects should be promoted in all biosphere reserves.*
>
> *The networks should encourage research especially at landscape level in order to study the interaction between different eco-systems.*
>
> *That the regional networks increase interregional co-operation and exchange research results using appropriate communication technologies, including the Internet.*
>
> *That co-operation will be increased between biosphere reserve managers, researchers and local communities to jointly define research needs, monitoring needs, and the utilization of monitoring and research data and results.*
>
> *That simple, but standardized, monitoring is applied to ensure comparable quality data.*
>
> *That MAB national committees or the equivalent focal points develop a national inventory of all research and monitoring activities in their biosphere reserves, and document the existence of permanent monitoring plots.*
>
> *Implementation of the BRIM program should be accelerated, including explicit recognition of theneed to integrate the social sciences in its activities.In this connection the BRIM meetingforeseen for Kiev (2001) should be used interalia to generate inputs for the conference of theEuropean ministers of environment to be heldin 2002.*
>
> *The MAB secretariat is asked to develop guidelinesfor volunteer biosphere reserve committeeson monitoring and research, recognizing andmobilizing the potential of the local communitiesin and around the biosphere reserves tocontribute to the development of research andmonitoring activities.*

Biosphere reserve co-ordinators should use volunteermonitoring activities both to generatedata and for environmental education purposes.

CMadrid Action Plan

The Madrid Action Plan deals explicitly with 'science and capacity enhancement'. In relation to this it states:

> *Ecosystems provide goods and services to all humanity, but the sustainable use of these benefits is challenging in the face of rapid climatic, environmental, social, and political changes. To cope with these changes, biosphere reserves play a crucial role in generating knowledge on how natural systems work and how to maintain ecosystem services and resilient ecosystems while at the same time using these systems to create income, employment and wealth.*
>
> *Wide cooperation from institutions and stakeholders is needed within biosphere reserves to foster communication among scientists, policy makers, private companies and others. In order to achieve this, there is a need for a significant strengthening of both science and capacity in the WNBR also with a view to applying scientific expertise to global biodiversity management and conservation. Both scientific as well as traditional knowledge from local and indigenous people is needed for adaptation to change and building resilience.*

On the same theme – 'science and capacity enhancement' – a number of specific actions and success indicators are identified. The following list includes those where responsibility lies at least in part with individual Biosphere Reserves:

> *15.2 Promote the MAB Programme's global network function through the systematic recording of policy relevant case studies and ensuring their availability and dissemination – Document on casestudies*
>
> *15.3 Develop actions to increase synergies among international, regional and national programmes currently developed and executed in parallel, such as CBD, Agenda 21 and One-UN activities – Number of BRs involved in various international, regional and national programmes*
>
> *16.3 Strengthen the role of science in decision-making through problem oriented, applied research in order to increase the availability of funding for both science and management, and ensure goodscience-informed participatory and collaborative management – Research projects established in all BRs*
>
> *19.1 Mobilize scientific and non-scientific actors combining all knowledge systems in order to strengthen the scientific functions of BRs – Number of BRs having research programmes*
>
> *20.1 Ensure stakeholder involvement in the production of a research agenda to be incorporated in the management plan for the whole BR – Number of BRs with defined and operational research programmes*
>
> *20.2 Use BRs as sites for applied, problem oriented research for sustainable development linked to the zoning and management plan. Incorporate the results of applied ecological and socio-economic research into ecosystem management of all areas and link educational*

activities to the different functions in all zones of BRs – Number of BRs with research agendas related to sustainable development

21.1 Promote the BR as a learning site of excellence for sustainable development, for demonstrating trade-offs and balance amongst ecosystem services, human environment interactions and well-being, in the framework of DESD – Number of schools associated with BRs through joint classes, school camps, curriculum development

22.1 Improve capacity of WNBR with the aim of building strong learning organizations, alliances and empowering all stakeholders at each BR – Number of education programmes; number and range of awareness and educational materials produced

22.2 Provide appropriate staff and funding (a) to enable BR managers/coordinators to actively contribute to the WNBR, i.e. translation of best practices report into local languages, and (b) to feed this information into the Internet website of UNESCO-MAB – Number of best practices reports translated into local languages

23.1 Facilitate the integration of urban areas into BRs – Number of BRs with interactions with urban areas

24.1 Use mountain BRs as field observatories of global change impacts on the environment, economy and human well-being, based on the GLOCHAMORE Research Strategy – Number of mountain BRs with active research and capacity enhancement programmes

24.2 Use of research results to assist countries in developing and implementing policies for sustainable mountain development – Number of countries with policies for sustainable mountain development

24.3 Develop strategies for other ecosystems in collaboration with relevant national and international organizations – Number of strategies applied

24.4 Carry out training courses for different ecosystem types related to climate change, in particular using the ERAIFT regional flagship project for tropical forests and certified forestry as a climate change mitigation approach – Number of training courses carried out