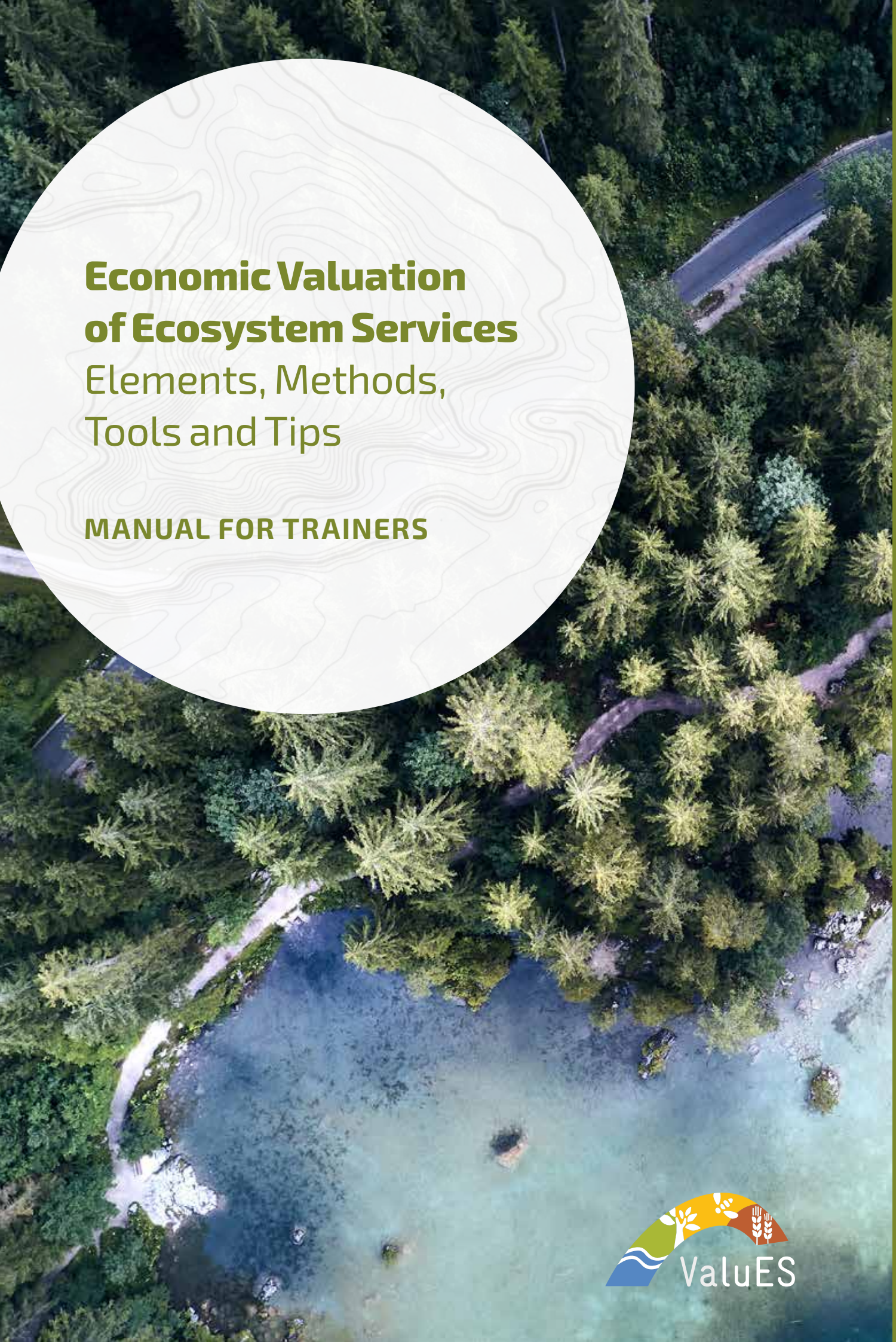

Economic Valuation of Ecosystem Services

Elements, Methods, Tools and Tips

MANUAL FOR TRAINERS

ValuES

EVT ECONOMIC VALUATION TRAINING

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On behalf of the BMU and as part of IKI, the project "ValuES: Integrating ecosystem services into policy, planning and practice" is implemented by the *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) in close collaboration with the *Helmholtz Centre for Environmental Research* (UFZ) and the *Conservation Strategy Fund* (CSF).

Since 2012 the project provides practitioners and decision makers in partner countries with the skills to select and effectively use methods and instruments to identify, prioritize, assess, value and integrate ecosystem services into national and local policies and strategies. Additionally, since 2015 ValuES has been supporting the *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (IPBES) on its concept of multiple values of nature and benefits, on the catalogue of policy support tools and methodologies, and on its capacity building programme.

www.aboutvalues.net

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Technical inputs on how to implement an interactive training are based on:
- Principles of Ecosystem Services Assessments for Policy Impacts: Elements, Methods, Tools and Tips. Manual for Trainers. GIZ 2018.
- Integrating Ecosystem Services into Development Planning. Manual for Trainers. GIZ 2018.
- Integrating Climate Change Adaptation into Development Cooperation – A Practice. Oriented Training Based on the OECD Policy Guidance. Trainer Handbook. GIZ 2011.
- Climate change adaptation in coastal and marine areas (Blue CCA). Manual for Trainers. GIZ 2016.

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ValuES

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INTRODUCTION

BACKGROUND

The Millennium Ecosystem Assessment (MA, 2005) and the study on *The Economics of Ecosystems and Biodiversity* (TEEB, 2008) highlighted the immense value of nature to the economy. They made the case that conserving biodiversity and ecosystems is not only an ecological or biological concern, but is also crucial for human wellbeing and development. The links between biodiversity and the economy were further prioritised when the Strategic Plan for Biodiversity 2011 – 2020 was adopted by the *Conference of the Parties to the Convention on Biological Diversity* (CBD), with a vision that "biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people". The Aichi Biodiversity Targets associated with this plan explicitly flag the need to increase awareness of biodiversity values as well as to develop measures to integrate such values into national and local development and poverty reduction strategies, planning processes, national accounting and reporting systems. Most countries have ratified the CBD and committed to reach the Aichi Targets, and have over recent years updated their National Biodiversity Strategies and Action Plans to meet these goals.

Since the communication of the Aichi Biodiversity Targets, practitioners working in the fields of biodiversity and environmental management, as well as policy-makers, are frequently confronted with a set of multi-faceted challenges related to the identification, assessment, valuation, integration and reporting of *ecosystem services* (ES) within different management contexts and sectoral strategies. By recognizing the links between ES and human well-being, development and economic activities can become more environmentally sustainable.

Ecosystem service assessment and valuation (ESAV) can be defined as "the process of describing, measuring and analyzing how ecosystem services are generated, managed, used and perceived". There are many different types and categories of ESAV (for example biophysical, social, institutional, economic and so on). By a similar token, ESAV may be used in many different situations and for many different purposes. The primary goal of a valuation is to understand the relationship between ecosystem services and the economy, and to communicate their importance to relevant stakeholders. The results can help decision-makers to better understand how their actions depend and impact on the natural environment and provide the necessary information to consider potential trade-offs between different options. Ultimately, economic valuation seeks to provide information to guide decision-makers towards policies that contribute to the maintenance, restoration and sustainable use of ecosystems. At the same time, socioeconomic development goals are tried to be achieved.

The *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH developed a guide for development planners and policymakers on the topic of integrating ecosystem services into development planning. This guide advocates a stepwise approach ('Six-Step Approach', *http://www.aboutvalues.net/six_steps/*) through which it is possible to recognize, demonstrate and capture the value of biodiversity and ecosystem services for development planning. Based on this approach, the GIZ developed a training course that is titled 'Integrating Ecosystem Services into Development Planning' (IES Training), which aims at building capacities for the application of the Six-Step Approach in development planning. As more and more countries implement the Six-Step Approach, demand is rising for a better understanding of basic concepts, methods and tools — specifically for conducting ESAVs and integrating their results into decision-making.

The training course "Economic Valuation of Ecosystem Services", covered in this manual, builds on concepts that were introduced in the IES Training, and specifically, on the way in which economic valuations can be tailored to achieve greater policy impacts.

RATIONALE

Measuring economic linkages and values is often seen as a key argument to make the case for biodiversity and ecosystem services. But in reality, economic valuation studies often do not reach decision-makers or influence on-the-ground policy, planning and practice. At the same time, conservation and development planners and managers often lack the capacity and know-how to identify how, and in which ways, ecosystem valuation can best be used to assist them in their work or to further strengthen their mandate. This training is driven by the need to ensure that ecosystem valuation approaches and tools are technically credible and based on a sound understanding of economic principles, at the same time as being clearly targeted towards influencing decision-making in the real world.

OBJECTIVES

The course seeks to equip participants with knowledge and understanding to think through how to design, manage and apply processes to assess the economic value of ecosystem services, and to use the results effectively and convincingly to strengthen conservation and development decision-making. It is important to emphasise that it does not intend to provide in-depth technical training on "how to" apply specific valuation methods – the focus is on designing and delivering credible, relevant and practical ecosystem valuation studies. The key learning goals are for participants to:

1. Understand basic economic concepts, principles and terminology that underlie ecosystem valuation;

2. Identify why, when and how ecosystem valuation studies can be useful for particular policy purposes and decision-making contexts;

3. Be informed about (but not necessarily be able to apply) commonly-used economic methods for valuing ecosystem services;

4. Share experiences, lessons learned and best-practices of applying ecosystem valuation within real-world decision-making processes; and

5. Be able to oversee processes to design, commission, manage and use the results of ecosystem valuation studies in the course of their work.

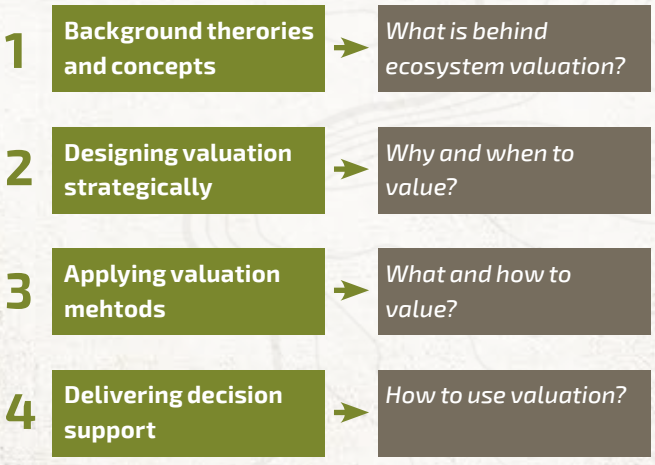
CONTENT

The training offers a general introduction to basic economic concepts and principles and gives an overview of commonly used approaches and applications of ecosystem valuation. It is organised around four modules:

1. Background theories, concepts and paradigms: Describes the basic economic and ecological thinking that underlies ecosystem valuation. It is important to understand what these theories and paradigms are, and how they fit together, because they provide the logical basis (and focus) upon which ecosystem valuation is founded.

2. Designing valuation strategically: Is targeted towards ensuring that valuation studies are not seen as an end in themselves or driven solely by the wish to conduct academically interesting exercises or to generate "big numbers". It underlines the need to think through the reason for carrying out a valuation exercise in the first place and reinforces the message that valuation is a means to an end – better informed, more inclusive, equitable and sustainable decision-making.

3. Selecting and applying valuation methods: Explains how to apply the most commonly used methods in the "ecosystem valuation toolbox". Although the focus is on economic valuation methods, the module also considers the other types of (biophysical and social) data and methods that may be involved in a valuation study or are required as inputs for economic valuation. The module has a very practical slant and includes a number of worked examples of how to apply key valuation methods.



4. Delivering decision support: Looks at the ways in which the results of valuation studies can be practically integrated into decision-making and effectively communicated to decision-makers. It reinforces the messages given in module 2, that valuation should always be targeted to a strategic purpose and tailored to the decision-making context (and decision-makers) that it seeks to influence.

METHODOLOGY

The training course utilises a mixture of interactive lectures, open discussions, groupwork, case studies and real-world examples. During the group discussions, participants can share their knowledge and learn from each other's experience. Most of the exercises are based on the Harvard Case Methodology, which conveys teaching messages through interactive practical work by participants. Most of the training exercises are based in the fictitious country of Bakul, which is designed to mirror conditions and challenges that can be found in many real scenarios. The Bakul case study is also used in other ValuES training courses (including the main "*Integrating Ecosystem Services into Development Planning* (IES)" course. The intention is that the economic valuation course will fit easily in with these other courses.

All modules follow a similar sequence, including the following crucial elements:

1. The introduction to the module, given by the trainer with the help of a power-point presentation or other visual aids, covers the theoretical background of the module and introduces participants to the casework and the exercises. For this training, the module introductory slides (PowerPoint) align with the training manual and handouts. Their basic message should not be changed, but it can be extended with, for instance, regional case examples that fit better to participants experience and understanding.
2. The exercises based on casework, give participants the opportunity to work through different aspects highlighted in the theoretical background. During the exercises, participants typically work in groups and adopt the role of 'casework experts' or involved stakeholders in charge of a specific task.
3. In the presentation of results, work groups present their findings to the plenary. The presentation should highlight major findings and/or questions from the casework. It is important that this step is introduced as a chance to share experiences and for mutual learning instead of a 'test'. Trainers ask probing questions and can offer alternatives and corrections when necessary.
4. During the reflection, participants reassume their own real-life position. They reflect on their experiences during the exercise and link them to their own work and context.
5. Recap of the key messages of the previous presentations and link it to the next module/presentation.

TARGET AUDIENCE

The training is targeted at those responsible for commissioning, designing and supervising economic valuation studies, as well as for those using the results of valuation to inform and influence conservation and development decision-making. It is intended for practitioners from the field of environment and development with at least a rudimentary knowledge of economics and a familiarity with ecosystem services concepts and applications. It can also serve as a refresher or skills-extender for economists who are engaged in carrying out ecosystem valuation studies (particularly those with a more academic or research orientation), but lack experience or knowledge in strategic planning and policy applications.

It is important to emphasise that the course does not seek to equip participants with the technical training to apply ecosystem valuation methods, carry out ecosystem valuation studies or become ecosystem valuation "experts" or practitioners. This requires in-depth, specific skills and training which cannot be provided by this kind of general, policy-oriented short course.

A maximum of 20 participants is recommended for each training course.

DURATION

The course can be adjusted to the individual needs of participants and lasts between 1 to 5 days. The longer the training course, the more of the above-mentioned topics can be covered.

WORKING MATERIAL

The complete working material for the application of the course includes the following:

- Course description
- Agenda
- Annotated agenda of the course
- 11 PPT presentations, corresponding to each one of the theoretical modules
- 3 different workbooks for the participants (one for each of the three Bakul case studies), which include the exercises and background information
- 2 excel files (exercises 5 and 7)
- This manual

All of these materials can be found in the electronic supplement to this guide. It is crucial to have them at hand when revising this manual.

WORKBOOKS FOR PARTICIPANTS

Participants will work most of the exercises in three different groups. Each group will work with a different case study of Bakul, focusing on a distinct sector and/or issue. The three working groups will be the following:

- Group A: Integrating forest conservation measures into the Milaku hydropower scheme public investment plan.
- Group B: Comparing grey and green adaptation options to strengthen coastal protection in Indare Province.
- Group C: Assessing the impacts of coral reef degradation from the development of Moneila Deep Water harbour.

Each participant of the three groups will receive the corresponding workbook that contains an introduction to Bakul (including baseline situation, context, challenges, etc.), exercises' instructions, description of policy cases, information on institutional set-up and other relevant background information. The workbooks can be distributed once the three groups are formed, before starting exercise number 1.

Exercises 5 and 7 are practical applications of economic valuation methods and a cost-benefit analysis, and therefore, will require the participants to work with excel files. It is ideal to ask the organisers for each one of the groups to have at least one laptop to work with.

TRAINERS

Number of trainers

The amount of work necessary for designing, preparing and implementing the EVT requires to have at a minimum two experienced trainers. Trainers have different characteristics, which are perceived, accepted and appreciated differently by participants. Being a trainer is very demanding and intensive. It requires phases of rest and reflection. While one trainer guides the group process, the other may reflect on the program details or the group dynamics and prepare the next steps. Often, new materials are needed, cards have to be distributed or collected, discussion items need to be written down or several working groups be supervised. If there is not a possibility to have a co-trainer, it is important to insist on having at least an event assistant who supports on all the logistic aspects throughout the entire training.

Qualifications of the trainers

The trainers need to have substantial knowledge about ESAV, about political decision- and advisory processes, as well as good understanding of economics principles and economic valuation foundations. Moreover, at least one of them should have studies in economics with direct practical experience in ecosystem valuation. Trainers must be able to perfectly understand and relate to the whole content and perspective of the training, so that they can accurately guide the learning process of participants.

Moreover, trainers should be able to design and implement an interactive training. The training should not be perceived from participants as a series of lectures and presentations. The training should be acknowledged as a learning process, based on practical exercises, real-case examples, experience sharing, discussions and reflection. For this, the trainers should also be able to facilitate and moderate the learning process, be able to communicate concepts in the most practical and less complicated manner and guide participants to achieve the objectives of the training. For more on the roles and skills of the trainer, go to the module "Implementing an interactive training" *below*. Fulfilling the required qualifications of the trainers is crucial, since without it, there is a risk of providing participants with incorrect information on the whole background, principles and applications to ecosystem valuation.

TRAINING STRUCTURE

The Economic Valuation of Ecosystem Services training course consists of four modules and nine exercises. In addition to the lecture presentations and the exercises, there are some other elements to be included in the agenda:

Welcome and introduction of trainees and trainers
The individuals, institution or project organizing the workshop should introduce the training, welcome the participants and explain its purpose. This is important, as it vests the ownership of the training in the host. It also helps to clarify the workshop goals and describe its relationship to the participant's current work.

Afterwards, the organizers should introduce you as the facilitators. Once you give a short welcome, ask the participants to introduce themselves. There are several ways of doing this. The easiest way is just to request participants to introduce themselves one by one and state what are their interests and/or expectations for the workshop

Recommendations on how to introduce participants

A more vivid way of doing it is to ask the group to stand in a circle. Then take a ball (or something similar), introduce yourself and throw it to a participant. Ask this participant to introduce him or herself (name, institution/ background and what their interest in the training is) and then to throw the ball to the next one. Continue doing this until everyone has introduced himself/herself to the group.

Another interesting and time-effective way for introductions is to ask the group to stand up and cluster around different topics. You can ask them to form groups according to educational background (typically social and natural sciences, engineering and law). After this, you can ask them to imagine that the room is a country or world map and ask them to stand on the country, city or region where they come from or where they work. You can also ask them to form a line according to their experience with ecosystem services, with "no experience" on one end and the "experts" on another end. Be sure to walk around and ask some of the participants why they are standing where they are. By using this method, you also get a good idea of the group composition in terms of technical background and expertise.

Introduction to the course
After the welcome and introduction, present an overview of the training. This includes the background, rationale, objectives, methodology, target audience, duration and agenda *(see previous sections of this manual).*

You may visualize the information about the course in an abbreviated form on a flipchart or PPT.

Working rules
When introducing the training, elaborate with the participants the working rules to follow during the training. Write them on a flipchart as they come up during the discussion. Some examples of working rules can be:

- Listen and learn from each other (horizontal learning).
- Participate in an active way.
- Ask whenever something is not understood.
- Don't use laptops or mobile phones during the sessions.
- Start on time and end on time.
- Have fun.

It is important to note that as a trainer, you should also commit to certain working rules – and be subject to those agreed for the participants. Not only should the rules extend to the trainers, but it is also a way of showing equality and good will - that the trainers do not somehow consider themselves superior to the participants or 'above' the rules.

Expectations of participants
Asking the participants about their expectations is a good way to make them know whether the training will fulfil their prospects. In addition, when possible, knowing participants' expectations before the training can help to adapt the content to their needs. Reacting to expectations increases the training's value.

Expectations can be collected before or at the beginning of the training. When collected before the training, you should read all the expectations, write them down in cards, classify and place them on a pin board. In case the expectations are not collected before the training, ask participants to write their expectations at the beginning of the training (in one or two cards). As the participants finish, classify the cards and place them on the pin board.

When presenting the expectations, explain which expectations can be fulfilled and to what extent. Also, clarify which expectations cannot be fulfilled and why.

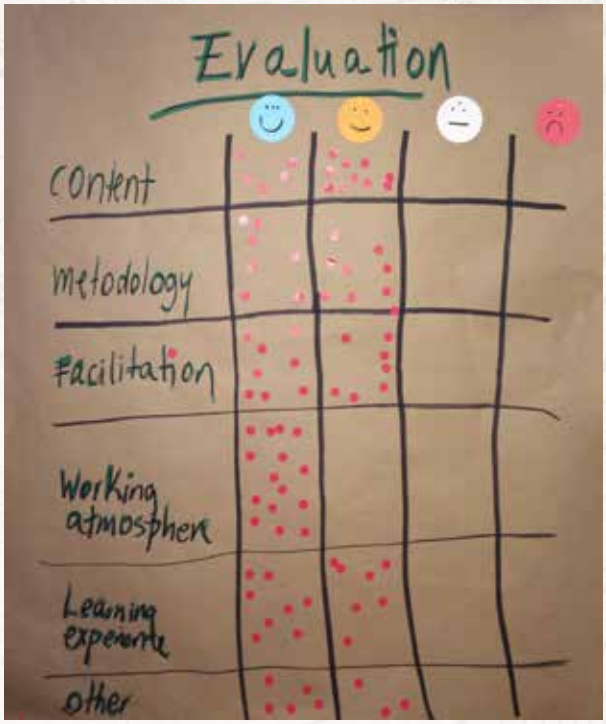
Recap of the previous day
At the start of each training day (except the first day), it is useful to have a session where participants are asked to recall the most important aspects and lessons learned of the previous day. This is a way of reinforcing and internalising the learning. Ask them, for example, "What was good and important for you yesterday?" and "Which questions are still unanswered and should be considered?". Another way of doing this would be to assign two participants each day to present the recap of the previous day to the entire group. It is left to the creativity of participants on how they will structure this recap. For example, they can use the flipcharts to visually summarize some of the key concepts of the previous day, or they could hold a quiz where they ask the other participants about some of the most important aspects of the previous day. Essentially, the participants can come up with their own creative way of presenting a recap.

Conclusions and closing remarks at the end of the day
At the end of each training day (except the last day), it is useful to give some time to wrap up all the key messages of the day. This also helps reinforcing the learning process and introducing participants for the topics to come the next day.

Course evaluation

At the end of the training, you may want (or be required to) conduct a course evaluation. This is always good practice, because it gives the participants a chance to feedback their views and feelings and is also a way for the trainers and organizers to learn how to conduct their courses better in the future. There are different ways of doing this. You can do a verbal evaluation in the plenary, where you ask the participants what they learned and liked or what they missed and disliked. You can refer back to the participants' expectations collected on a board during the training and discuss whether they have been fulfilled. Also, you can ask them to write what they liked and what they disliked in cards of different colours.

Additionally, or instead of the verbal feedback, you can conduct a simple query using a smiley-face matrix, where the trainees can evaluate different components of the training. Prepare a blank matrix, with the components to be evaluated, and the various levels of satisfaction. The components can include: presentations/theoretical inputs, casework, facilitation, time management, location, logistics, atmosphere, etc. Use 3 to 5 smiley faces for the evaluation. The components can be evaluated by the trainees according to whether they were very happy, happy, satisfied, unhappy, very unhappy.



Explain the meaning of the smiley faces to the trainees. Then turn the matrix away from the group so that participants can vote privately. Give each participant one voting dot per component to be evaluated or give them a marker. Ask participants to vote one by one. In case the evaluation is written, it is important to show it to the participants. In case it is necessary, some clarifications can be discussed.

Where do we go from here?

This session can be held on the last day of the training, after finishing with all the exercises on the IES approach. The objective is for participants to foresee where they can apply the IES approach in their own work context. This can be facilitated in a plenary discussion or in working groups. Also, you can give some time for participants to present their own cases, in which they see potential to apply the approach, and get peer advice from the rest of the group. In this case, some participants could shortly present their cases to the rest of the group and then, create teams in which other participants could give advice on specific questions. To get more information on the format in which peer advice can be implemented, revise *Annex II*.

When the course is a training of the trainers

Include time for presentations and exercises on adult learning, methods for interactive participatory trainings, facilitation of learning, group processes and training design (for a more detailed description, *see Part II: Implementing an Interactive Training*).

Agenda

The general time frame depends on the number of working groups, the time spent on the lecture slides and the presentation and discussion of exercises' results. The training will probably have to be adapted to the general framework, the audience and the time available for the course. The overall time required for the whole course can vary between 2 and 4 days. It is important to notice that some content and exercises may have to be omitted if the training is to be delivered in less than four days.

Below, find some suggestions on how to adapt the agenda for fewer training days. Agree with the organizers which are the most important modules for participants to achieve the learning objectives.

It is strongly suggested to write the agenda in a pin board with cards and place it in a visible place in the training room. This allows discussing changes with the trainees and adjusting the content accordingly.

AGENDA: VALUES TRAINING COURSE ON ECONOMIC VALUATION OF ECOSYSTEM SERVICES IN 1 DAY

TIME	DAY 1
09:00	Welcome, introductions, expectations P1: About the course D1: Participants' views & expectations P2: Ecosystem services: features & approaches P3: What is the point of valuation? Valuation scope & purpose
10:30	Introduction to Bakul & the case studies C1: Defining the scope & purpose P4: Economic valuation methods (remarks on other types of valuation)
12:45	C2: Choosing & applying economic valuation methods to calculate the baseline P5: Dealing with change
15:30	C3: Developing scenarios & assumptions of change P6: Influencing decision-making, economic analysis frameworks & instruments for capturing value D2: Formulating messages & communicating value information D3: Where do we go from here?
18:30	Thanks and close

Discussions in plenary Interactive presentations Case studies (Bakul-based)

AGENDA: VALUES TRAINING COURSE ON ECONOMIC VALUATION OF ECOSYSTEM SERVICES IN 2 DAYS

TIME	DAY 1	DAY 2
09:00	Welcome, introductions, expectations P1: About the course D1: Participants' views & expectations	Previous day summary & reflection P5: Economic valuation methods C3: Choosing & applying economic valuation methods to calculate the baseline
10:30	P2: How economists talk & think #1 D2: Ecosystem services: features & approaches	P6: Dealing with change C4: Developing scenarios & assumptions of change
12:45	P3: What's the point of valuation? Valuation scope & purpose Introduction to Bakul & the case studies C1: Defining the scope & purpose	C5: Incentives, finance & measures
15:30	C2: Understanding ES-economic links & stake-holder, prioritising ES	D3: Formulating messages & communicating value information D4: Where do we go from here?
17:30	P4: When & how to value?	Evaluation Thanks and close

Discussions in plenary Interactive presentations Case studies (Bakul-based)

AGENDA: VALUES TRAINING COURSE ON ECONOMIC VALUATION OF ECOSYSTEM SERVICES IN 3 DAYS

TIME		DAY 1		DAY 2		DAY 3
09:00	Opening	Welcome, introductions, expectations P1: About the course D1: Participants' views & expectations		Previous day summary & reflection C3: Worked examples of social & participatory valuation methods P6: Economic valuation methods		Previous day summary & reflection P8: Influencing decision-making #1: economic analysis frameworks C7: Worked examples of scenarios, economic analysis & discounting
10:30		P2: How economists talk & think #1 P3: Ecosystem services: features & approaches	B. Designing valuation strategically	C4: Choosing & applying economic valuation methods to calculate the baseline C5: Worked examples of valuation methods	C. Selecting & applying valuation methods (contd.)	C7: Worked examples of scenarios, economic analysis & discounting P9: Instruments for capturing & distributing values
12:45	A. Background theories, concepts & paradigms	P4: What's the point of valuation? Valuation scope & purpose Introduction to Bakul & the case studies C1: Defining the scope & purpose		C5: Worked examples of commonly-used economic valuation methods		P10: Instruments for capturing & distributing values C8:Incentives, finance & measures
15:30 17:30		C2: understanding ES-economic links & stakeholder, prior-itising ES P5: when & how to value?	C. Valuation methods	P7: Dealing with change C6: Developing scenarios & assumptions of change		D3: Formulating messages & communicating value information D4: Where do we go from here? Evaluation Thanks and close

Discussions in plenary Interactive presentations Case studies (Bakul-based)

AGENDA: VALUES TRAINING COURSE ON ECONOMIC VALUATION OF ECOSYSTEM SERVICES IN 5 DAYS

TIME		DAY 1		DAY 2
09:00	Opening	Welcome, introductions, expectations P1: About the course D1: Participants' views & expectations		Previous day summary & reflection P5: what's the point of valuation? D3: how can valuation be used?
10:30	A. Background theories, concepts & paradigms	P2: How economists talk & think #1 E1: harvest game	B. Designing valuation strategically	P6: valuation scope & purpose Introduction to Bakul & the case studies C1: defining the scope & purpose
12:45		E1: harvest game P3: ecosystem services: features & approaches		C2: understanding ES-economic links & stakeholder, prioritising ES
15:30 17:30		P4: how economists talk & think #2 D2: relating ecosystem and economics basics	C. Valuation methods	P7: when & how to value? C3: worked examples of social & participatory valuation methods

	DAY 3		DAY 4		DAY 5
	Previous day summary & reflection P8: economic valuation methods		Previous day summary & reflection P10: influencing decision-making #1: economic analysis frameworks	D. Decision…	Previous day summary & reflection C9: incentives, finance & measures
C. Selecting & applying valuation methods (contd.)	C4: choosing & applying economic valuation methods to calculate the baseline C5: worked examples of valuation methods	D. Delivering decision support	C7: worked examples of scenarios, economic analysis & discounting	Closing	D4: where do we go from here? Evaluation Thanks and close
	C5: worked examples of commonly-used economic valuation methods		P11: influencing decision-making #2: communicating evidence C8: formulating messages & communicating		
	P9: dealing with change C6: developing scenarios & assumptions of change		C8: formulating messages & communicating P12: instruments for capturing & distributing values		

Discussions in plenary Interactive presentations Case studies (Bakul-based)

ADAPTING THE TRAINING TO A PARTICULAR CONTEXT

It is not only possible, but actually suggested, to tailor the agenda, presentations and exercises to the specific needs and interests of the participants. We recommend, before making any modification, to agree with the course organisers on which are the main objectives and key messages that participants should take for their everyday work. Based on that, you can modify the agenda, presentations and exercises as it fits best. For example, you might want to focus on a particular sector or development challenge (e.g. infrastructure planning, hydropower or protected areas). You might also want to tailor the course and examples to a particular country, or site.

Presentations

When it comes to changes in the presentations, make sure that the information that remains from the original presentation is always cited (the reference should state the presentation is modified from the original, and must include the complete citation of the original presentation). This should include all the examples used, where the full reference to the publication upon which the case study is based should always be given. Also, specify when modifications were made on the original slides.

Remember that the idea of the training is to present economic and theoretical concepts in the easiest language as possible. If you add or modify something, make sure that it will help the participants to achieve their ultimate goal, and that it will give aggregated value to their learning process. Also, remember that you should avoid making very long and heavy presentations, with technical language, as this could be counterproductive in terms of attention and learning. The original presentations already have some examples, but it is ideal to, and we actually encourage you, to CHANGE them according to the participants' interests and needs. To do so, make sure that the example you are giving is relevant for the topic and that it is rightfully cited. All of the examples should refer to economic valuation studies designed to have impacts in policy and decision-making. If you use the original examples in the presentations, read the complete case study to explain it appropriately and cite it accordingly.

Change to exercises and case studies

It may also be necessary to change the case studies and the exercises. Before doing so, agree with the organisers of the training on the main changes to be made, based on the learning objectives you want the participants to achieve. When changing/adapting the case studies, make sure to include the elements for participants to learn the key messages.

Changes can be made in certain aspects of the economic, political and environmental context of the case study to fit a specific learning objective. Just take into account that the background information throughout all the exercises is associated, therefore, if you want to make changes to, for example, the Bakul context, modifications will need to be made in the additional information sections of the following exercises. Watch out, since changes made in the context may also require changes in the Bakul map!

It is also possible to use real-case studies relevant to the organisers or the participants and apply the exercises to these specific contexts. In this case, we suggest the cases to be organised in a similar way as the original ones, so that participants can count on the background information they need for solving the exercises. You can also divide the group into three or four working teams, who can work in different or similar cases, but remember that it is not recommendable to have groups with more than 7 people, since it would be counterproductive for the learning process of the participants. It is highly recommended to have a map on the area of the case study and print it in a size and resolution that allows showing it in the plenary. You might even want to have one printed map for each one of the working groups.

When changing the exercises and the questions, be careful to formulate or modify them in such a way that the key messages and learning objectives are adequately transmitted. If you want to include some changes to the worked examples in the excel files (exercises 5, "worked example of economic valuation" and 7 "worked example of cost-benefit analysis and discounting"), consider that many cells have predetermined formulas and references. Before doing the changes, revise the formulas in the file. Also, remem-

ber that exercise 5 is linked with the other exercises. Therefore, make sure that the ecosystem services and the valuation methods are relevant for the exercise and the case study itself. Exercise 7 is also linked to exercise 5, consequently, any changes made need to be reflected in both exercises.

Also, many times the participants already have some real-life case studies which enclose key messages of the training. In such case, we recommend giving some time to participants to present them in the plenary, so the rest of the group can learn from these experiences. In such cases, try to highlight the key messages in the framework of the training, so that participants can take it as a lesson learned that they can apply to their own work/cases.

In case participants are working in ongoing real case studies, and they would like to obtain some feedback, you can plan a session for peer reviewing in the last day of the training. These participants can present their case studies in plenary and divide in groups to receive feedback and recommendations, based on what the group learned throughout the training. A recommendation of the format of a peer-review session can be found in the *Annex II.*

Whichever change done to the case studies or/and exercises should be cited and clarified accordingly (the reference should state the exercise is modified from the original, and must include the complete citation of the original exercise).

ABOUT THIS MANUAL

This manual is a quick guide for trainers on how to implement the training. It is important to mention that it does not provide theoretical information in detail, since it is expected that the trainers already have relevant experience in economic valuation and policy advising. Instead, it clarifies the GIZ perspective on economic valuation and the key messages to consider for increasing its influence on decision-making. Nevertheless, if needed, it provides some references and sources for consultations.

In the first section, the manual includes some basics on how to "be a trainer" and how to implement an interactive training. It also gives tips and recommendations on the application of the training exercises and each one of them comes with examples of the answers. Remember that these examples represent one of many possible outcomes: they are not the only possible answers.

2

IMPLEMENTING AN INTERACTIVE TRAINING

The responsibility to deliver a successful training course falls in large-part on the trainer. Being a trainer implies to be a facilitator of learning and create all the necessary conditions for participants to make the most out of the training. In order to do so, trainers require taking into account different aspects that can increase the quality of participants' learning process: adult learning, methods for an interactive participatory training, roles and functions of a trainer, management of group processes and training design. In this section, there is a brief description of each one of these aspects as well as some recommendations for increasing the trainings' learning experience.

HOW DO ADULTS LEARN?

Part of being an effective trainer involves understanding how adults learn best. Compared to children and teenagers, adults have special needs and requirements as learners.
Principles of adult learning

- **Adults already know a lot.** Adults have accumulated life experiences and knowledge. In order to ensure that they retain and use the new information, they need to be able to integrate new ideas with what they already know. The trainer's job is to mobilize the participant's knowledge first, before adding new information, and subsequently to provide opportunities to discuss and reflect on new knowledge and insights, and to adapt it to individual circumstances.

- As with all learners, **adults need to be shown respect**. Trainers must acknowledge the wealth of experiences that adult participants bring to the training. These adults should be treated as equals in experience and knowledge, and should be allowed to voice their opinions freely in the group.

- **Adults are autonomous and self-directed.** They need to be free to direct themselves. Trainers have to act as facilitators, guiding participants to explore their own knowledge rather than supplying them with ready-made facts. They must facilitate the participants' own learning process and actively integrate the interests of the participants in the design of the training. They should allow participants to assume responsibility for presentations and group leadership.

- **Adults are goal-oriented.** Upon enrolling in a training course, adults usually know what goal they want to attain. Therefore, they appreciate a learning programme that is well organised and has clearly defined objectives and elements. Trainers must show participants how the training will help them to attain their goals.

- **Adults are relevancy-oriented.** They must see a reason for learning something. For learning to be valuable for them, it has to be applicable to their work or other responsibilities. They may not be interested in knowledge for its own sake. Therefore, trainers need a sound understanding of the participants' motivations and must continuously try to harmonize training content and design with the life and work context of the participants. They should make participants think about the practical application of the newly acquired knowledge at their work place.

What do adults remember?
In general, adults remember only about 10% of what they read (e.g. in newspapers, in power point slides - if information is not presented in a spoken manner as well). They remember twice as much of what they hear, and 50% of what they hear and see. Adults also remember 70% of what they say themselves, but they remember best what they say and do!

Moreover, when it comes to information assimilation, some adults prefer visual methods, while others remember better with auditory or kinesthetic methods.

Consequently, it is important to make use of methods that address different ways of learning. Therefore, instead of just giving a lecture about methods for ecosystem service economic valuation, it is recommended to facilitate the learning process with reading materials, good visualization aids, encouraging group work and discussions, and most important, letting participants work with and plan their own cases and projects. For example, ask participants to turn to their neighbour after a lecture and let them talk about what they remember. This will allow them to absorb a much higher percentage of the new information.

METHOD	KEY CHARACTERISTICS AND USE
Group work	• Consists of small groups receiving a specific task or problem that they need to solve or accomplish. • Highly participatory; all group members share knowledge and delve into the subject matter in greater depth. Advisable to let group members assume different roles during group work (moderator, time-keeper and presenter) to ensure a smooth process.
Expert lecture	• Consists of a traditional classroom-type lecture where audience assumes a passive role and listens to presenter. • Top-down technique, useful for leveling the knowledge base among participants and delivering information that may not be well-known among participants. • Can be arranged in an interactive way by asking questions or inviting participants to make questions.
Guided discussion	• Consists of a debate or dialogue guided by questions from the facilitator that are answered by the audience. • Typically, at least one question is developed for each specific learning objective.
Role play	• Consists of single participants or small groups assuming a given role and then interacting with other "actors" in a given, pre-defined fictitious setting. • Enables participants to become aware/be sensitized of actorś different positions and interests in discussions or negotiations.
Brainstorming	• Consists of a relatively unstructured collection of ideas and insights on given topics. • A facilitator moderates the discussion and writes down participants' inputs. • Useful for gaining new insights and viewpoints that can further be used to deepen discussions/reflections.
Case study	• Consists of participants applying learned content and insights to solve problems based on a specific situation, which can be real or fictitious. • Enables participants to understand and apply knowledge in a dynamic setting. • Useful to draw attention to and analyze specific topics. • Fictitious cases aid in generating non-emotional engagement with real life-like situations.
Games and dynamics	• Consists of a wide array of group and individual tasks in a relaxed and potentially highly active atmosphere. Usually, groups or individuals get a task that they need to solve or represent. • Useful as ice breakers or energizers when interest or energy is dwindling, or to gain insights and lessons learned on specific issues. • Should be used appropriately and at the right times (when, for instance, energy is low after the lunch break): too many games can cause the event to lose seriousness and credibility, while not enough games may result in distraction and boredom.
Case study	• Consists of participants applying learned content and insights to solve problems based on a specific situation, which can be real or fictitious. • Enables participants to understand and apply knowledge in a dynamic setting. • Useful to draw attention to and analyze specific topics. • Fictitious cases aid in generating non-emotional engagement with real life-like situations.

METHODS FOR AN INTERACTIVE PARTICIPATORY TRAINING

Many different methods can be chosen to maximize the learning processes during a training. *Below* is a list of some of the most common methods and tools. Successful participatory training courses typically draw upon a combination of various methods

Harvard Case Method[1]

One main method used in the EVT is the Harvard Case Method. This is a tested approach for practice-oriented, interactive learning. Its application includes the combination of different methods, such as group work, case study, role play and guided discussion. It was developed in the context of university teaching, where it is largely based on the intensive exploration and discussion of a particular case relevant to the teaching objectives. This method stimulates the trainee's active exploration and conclusion development, rather than providing ready-made teaching messages. It also conveys teaching messages through **interactive practical work by participants.**

The Case Method has been adapted to the particular requirements of this training programme, which means that compared to the university teaching context, trainees play an even more active role, while the role of trainers is less dominant. For example, trainers explore the case study in a group work format while trainers assist, as needed, with guiding questions – in the university context, the teacher guides his/her students through the case with the help of questions.

Materials, preparation and other prerequisites

The Case Method requires intensive preparation prior to the course/training workshop. The exercises of the EVT are based in a case of a fictitious country, Bakul. The materials and exercises are already developed and included in the corresponding modules of this manual, as well as in workbooks that must be delivered to the participants.

The five golden rules for a Harvard Case teacher

Rule 1: Do not 'explain' the message of the case directly. Let the trainees find the conclusions themselves. Guide them through the questions.

Rule 2: Provide enough time for the wrap-up phase, where the participants intensively discuss the messages and conclusions.

Rule 3: Be precise with your instructions for the casework. The trainees should start the casework with a clear vision of what they have to do.

Rule 4: Limit presentations. Do not talk for more than 15 minutes (except the introductory lecture). If necessary, split lectures into several shorter inputs.

Rule 5: Always invite the trainees to reflect on how the lessons learnt relate to their day-to-day work or to what extent the training approaches need to be adjusted.

Fictitious or real case?

The particular value of having a fictitious case study is that everybody can relate easily, and everybody has the same knowledge. Bakul has most of the relevant features needed in order to simulate the whole process of an economic valuation of ecosystem services and its integration into policy and planning.

One could argue that real-world cases would be better, as they are real challenges that training participants could realistically face. The tricky thing, however, is that there are no 'neutral cases' and participants may be biased or hampered in one way or another by learning in this manner. Real cases may also provoke unproductive discussions about the reliability of data being used.

Furthermore, it is important to make clear that even in a real case, we would never have all the information we would like to have and dealing with logically drawn assumptions is part of planning for change.

1 Adapted from: Integrating Climate Change Adaptation into Development Cooperation - A Practice-Oriented Training Based on the OECD Policy Guidance. Trainer Handbook. GIZ 2011.

ROLES AND SKILLS OF A TRAINER

Apart from their knowledge, trainers need specific facilitation skills. The success of a training course greatly depends on skillful and creative facilitation. Good facilitators bring a group together by developing and balancing the group's potential without dominating the discussion, and they are knowledgeable about the issues being discussed but do not force this knowledge on participants.

Trainers should master a variety of techniques to enhance group dynamics and facilitate the learning process of participants. Some of the most important trainer skills are summarized *below.*

Active listening
There are five key elements to active listening.

1. Pay attention. It means to recognize that non-verbal communication also "speaks" loudly.
   - Look at the speaker directly.
   - Avoid being distracted by environmental factors, such as background noises or people moving.
   - Pay attention to the speaker's body language.
   - Refrain from side conversations when listening; give the speaker your undivided attention.

2. Show that you are listening
   - Use your own body language and gestures to convey your attention.
   - Nod occasionally.
   - Encourage the speaker to continue with small verbal comments like “yes” and “uh huh”.

3. Provide feedback. Personal filters, assumptions, judgments, and beliefs can distort what is heard. As a listener and facilitator, the trainer needs to understand what is being said and reflect on it. This may require asking certain questions for clarification.
   - Reflect what has been said by paraphrasing. "What I'm hearing is ..." and "Sounds like you are saying ..." are great ways to reflect back.
   - Ask questions to clarify certain points. "What do you mean when you say ..." "Is this what you mean?"
   - Summarize the speaker's comments periodically.

4. Defer judgment. Interrupting is a waste of time. It frustrates the speaker and limits full understanding of the message. Therefore, allow the speaker to finish and do not interrupt with counter arguments.
5. Respond appropriately
   - Be candid, open, and honest in your response.
   - Assert your opinions respectfully.
   - Treat the other person as you would want to be treated.

Asking good, precise and intelligent questions
Experience and knowledge are made explicit through questions. During training courses, the group learning process should be encouraged by asking carefully formulated questions. It is advisable to test the questions and potential answers amongst the trainer team beforehand.

Basically, there are two types of questions: closed-ended and open-ended questions.

- Closed-ended questions are designed to recall factual information. These questions are usually answered with short sentences, or a yes or no. Closed-ended questions usually start with *Is*, *Are*, *Can*, *Do*, *Does*, and modal verbs such as *Would*, *Could*, and *Should*.
- Open-ended questions are designed to elicit more ideas and more elaboration from the person responding. It may seek to reflect or draw a conclusion. This is a preferred type of question to be asked when initiating a discussion or for promoting team spirit. Open-ended questions allow for a deeper understanding of the group's objectives and draw out a person's knowledge level. They usually start with *What*, *Why* and *How*.

An effective facilitator does not just stop to ask effective questions. Proper timing and accurate delivery are also important. For good and effective question asking, the APPLE technique might be useful. APPLE is the acronym for:

- **A** sking the question,
- **P** ausing to allow the participants to comprehend the question and think of an answer,
- **P** icking a member to provide an answer,
- **L** istening to the answer provided, and
- **E** xpanding or elaborating on the answers provided.

Examples of types of questions[2]

TYPE OF QUESTION	USE	EXAMPLE
Question about the context	• Give information on facts and figures regarding a particular situation.	• How many people work in your department? • How often do you facilitate training workshops?
Differentiating questions	• To clarify a vague response. • To clearly state differences.	• For whom is the problem greater? • On a scale of 0 – 100, how big is XXX?
Questions for probing reasons and evidence	• Test the validity of a reason. • Put evidence on solid ground.	• Why is that happening? • Are these reasons good enough? • What do you thing causes XXX? • What evidence is there to support what you are saying?
Questions for probing implications and consequences	• To discover unexpected effects. • To discover alternatives that were possibly overlooked.	• What are the consequences of that assumption? • What are the implications for XXX? • How does XXX fit with what we have learned before?
Hypothetical questions	• To think about given boundaries. • To think outside of the box. • To explore possible consequences.	• If we speculate: If you were to do XXX, what would be the effects? • If you wanted to change the training approach in your organization, how could this be possible?
Questions about the future	• Open the mind to look beyond what the situation is like today.	• What are your intentions once this difficult situation is over? • Where would you like to be two years from now?
Circular questions	• Change the perspective. • Introduce other perspectives.	• If I asked your colleagues about what made the situation so difficult, what would they say? • What are some alternative ways of looking at this? • If you had invited a representative from civil society to your meeting, what would have been different?
Questions about behaviour	• Help to understand what is happening without passing judgment. • Gain a more detailed perception about the behaviour of others and reframe. • Clarify your own contributions to a situation.	• What exactly happens, when nobody takes responsibility for XXX? • How exactly do you react when the team XXX?
Assessment questions	• To step back and use hindsight. • To draw lessons from a particular experience.	• What have you learnt from XXX? • What was encouraging for you? • If you started again, what would you do differently?

2 Adapted from: Integrating Climate Change Adaptation into Development Cooperation - A Practice-Oriented Training Based on the OECD Policy Guidance. Trainer Handbook. GIZ 2011.

Visualization skills

Trainers should possess drawing and good handwriting skills, as well as a sense for arranging space, structure, colors and other moderation or presentation elements to create an attractive learning environment. To make better use of visual written aids, it is important to consider the following rules:

- Use key words and phrases – visualization supplements an explanation but does not replace it.
- Structure and message must be clear and understandable.
- When using moderation cards, observe writing rules:
  - print words; do not use cursive
  - write big enough so that the content can be read from a distance
  - be creative in using colors, sizes and shapes of cards
  - one idea per card jotted down in no more than three lines
  - use the thick end of the marker

Participation skills

Trainers should attempt to bring out the best in a group by means of cumulative learning, which is generated through the contribution of all the participants. Good trainers make participants feel that "nobody knows everything, but everybody knows something". They set the tone of the event, trust in other people's intellectual and creative potential, avoid a sense of winners and losers in a group, and respect the ideas and opinions of others.

Flexibility and dramaturgic skills

Trainers arrange an event to alternate between suspense and thrill, group and plenary sessions, experience-sharing and reflection. Trainers need to be able to adapt and modify sequences of steps, moderation and visualization methods according to the group's dynamics and needs, time, space, and other conditions that influence the training design.

Trainers should be seen less as a teacher or expert and more as a facilitator of a learning process. This fits very well with the trainer sharing his/her knowledge and experiences (e.g. through presentations and insights) as part of an interactive learning design and not in a way that places the trainer's knowledge and experience in the spotlight.

Making the training come alive!

As mentioned before, it is crucial that the training is not perceived as a lecture or a conference. Participants should not think of the trainers as teachers and the sessions should not be perceived as a one-sided task. The trainer's energy and attitude can set the tone for the whole group. Remember: the whole idea of the training is not to give people a training in economics, but to facilitate the learning on how economic theory influences ecosystem valuation and how to use this to influence decision-making.

For encouraging an active training, it is crucial to:

- Make theoretical presentations as short and concise as possible, avoiding the use of jargon and complex academic concepts.
- When presenting economic concepts, always explain in the simplest way and make sure to relate such concepts to ecosystem valuation.
- During presentations, try to involve participants as much as possible. Start a conversation with the group based on the presentations: ask questions, ask for participant's experience in the topic being presented, etc.
- Mix methods and create a good workshop flow through proper sequencing. It also means mixing intellectual (cognitive), emotional and physical impulses. A day full of lectures and "always-the-same-style-working-groups" can be painful for both sides. Mix input/lecture, group work, discussion, brain-storming, mind-maps, buzz groups, games, role plays, among other techniques. But keep in mind: form follows function, which means that you should first think about the learning objectives and adapt appropriate methods to reach them.
- Never use time from the coffee breaks for making presentations or group work longer.
- Always allocate precise and sufficient time frames for group work or other tasks.
- Use real life examples, which are relevant to the participants in terms of their background, application context, region, challenges and interests.
- When participants present their work-group, encourage them to do it in the most creative and concise way as possible. Give them feedback when necessary.
- From time to time, certainly every morning, provide an overview on where you are in the training programme. Recall the last topics or last steps in the learning process and provide a look ahead to the daý s programme.

DESIGNING A TRAINING

This section provides an overview of what needs to be taken into consideration when designing an EVT training programme.

Clarify objectives and major themes and topics
The first question the trainers must raise to the organizers of the training is regarding the objectives that they want to achieve. Discussing the objectives should also include a clarification on the expected outcomes and the desired impact of the training programme. In order to define learning objectives, it is helpful to go to the very end of the learning process by answering the following question: **"What should participants be able to do differently/better after the training course?"**

The trainers and the client-institution also need to agree on the approach and discuss how the training programme should be structured. The following questions are helpful in this respect:

- Will the training consist of a single event or are follow-up modules necessary?
- Based on the agreement on the participatory orientation of the training programme, what approach will be taken for the training, e.g. case method, real-case studies?
- On which levels should the training workshops take place, e.g. country, regional, sub- regional, supra-regional?

By clarifying the points *above*, the trainers should ensure that a training programme is the right way to achieve the client's objectives. Eventually, the trainers may suggest other capacity-building measures going beyond the trainers' mandate, such as peer-to-peer coaching, network creation or technical advice.

Learn about participants and their needs
The organizers should also provide information regarding who will participate in the training. In case guidance is required, you can discuss with them regarding the criteria to make a proper selection of participants. Some questions that have to be taken into consideration when defining the participants group for a training are:

- How many participants should be in the training? What is the maximum and minimum number?
- What mix of participants is optimal in terms of experience, professional backgrounds and institutional affiliations?
- How can a gender-balanced group be achieved?
- What are the assumptions about the participants' openness towards a participatory training approach?
- What is the time availability of potential participants?

Once the participants are selected, they need to be asked what they expect from the training programme. As a trainer, you will certainly have assumptions about the participants' needs and expectations, and these need to be cross-checked with their actual expectations. This feedback is valuable for helping in the design of the training programme.

Clarify logistics (venue and materials)
This is a decisive milestone in the design process because it entails negotiations with the organizers about what is needed to reach the training programme's objectives. In most cases, this is a difficult balancing act. The organizers might push for increasing the number of participants per training workshop while trainers need to explain that learning objectives cannot be reached in a group of 30 instead of 20 participants.

Another critical parameter is 'duration'. The normal reaction of the organizers with a tight budget is to cut down on the days for a training event and to increase the number of participants. It is crucial for trainers at this stage not to accept responsibility for achieving certain learning objectives if the duration and number of trainees are not adjusted in such a way that these learning objectives can be achieved.

Location is also an important issue. Choosing a location can be tricky. Being in a windowless room in a hotel close to an airport may seem like a good idea with respect to costs and transport, but it may backfire. Therefore, it is important for trainers to lobby for a suitable venue. A good venue provides working rooms with sufficient light and space, away from the daily life of busy organizations, but not too remote. In case of being unfamiliar with the selected venue, trainers should check whether it is suitable for a participatory workshop. Things to consider are:

- A workshop room with space available to seat the 20 participants plus 5 people (trainers and resource personnel) in a "U" shape, and to fit flipcharts and pin boards. In the same room, there should be extra

space for participants to break out in three permanent working groups with a table each. The room should not be cramped: people should be able to move freely. There should not be obstructive pillars.
- The room must have enough natural light and windows, as well as an adequate temperature.
- It should be possible to tape the results of the exercises on walls.
- The location of the venue should allow participants to arrive on time and should be close to places where to have lunch (in case catering is not included).
- It should be possible to leave materials in the room through the night.
- The venue must count on electricity, internet, chairs, tables, screen and binder, extension cables and necessary infrastructure (toilet, parking lots, etc.).

It is a good practice to take a look at the room where the training will take place before it begins. Trainers should aim to arrive at least the day before the start of the training to have enough time to check the venue, make adjustments and prepare the room(s).

It is also necessary to share the venue requirements and a list of the materials required with the organizing team from the beginning (when the organizers contact you for implementing the training).

Develop a script of the training workshop

Based on the workshop structure, the trainers need to get together to work out a detailed day-to-day script of the training. Working on such a script enables the trainers a feeling of what is feasible with a particular group of participants in a limited time. A script may be structured as a table with the following information.

Time	Activity	Methods / Techniques	Materials needed / Observations	Responsible Trainer

Documentation and reporting

In consultation with the organizers of the training, trainers need to decide how the results and the process of the training workshop are to be documented, and when such documentation will be sent to the participants. In case a photo-documentation or report will be handed to participants, let participants know at the beginning of the training so that they can focus on the discussion rather than taking notes. A suggested content of a report would include:

- A short summary of the content of the theoretical inputs and exercises
- A summary of the discussions in the plenary (main statements)
- Photos of the visualized material (definitions, illustrations, exercise results)
- Photos of the participants (including a group photo)
- A list of participants with their contact information
- An agenda of training
- All presentations in pdf-format

In this case, it will be ideal to count in an extra assistant to take pictures of the many flipcharts and boards generated throughout the training, and of the participants while they are working. Pictures are important, since it is the best way for participants to remember their group work and main ideas. This person could also take notes during the plenary discussions.

The trainers also need to decide what they want to offer participants — in addition to the workshop documentation — in order to support their learning transfer. This support might include handouts, technical articles, case studies or a handbook, just to give a few examples.

FURTHER INFORMATION ON HOW TO IMPLEMENT INTERACTIVE TRAININGS

Implementing an interactive training

Higmore, Sims Nikki. 2006. How to Run a Great Workshop: The Complete Guide to Designing and Running Brilliant Workshops and Meetings. Pearson.
Matthew, Alans. 2012. How to Design and Deliver a Great Training. CreateSpace Independent Publishing Platform

Skills Converged. 2016. Train the Trainer. CreateSpace Independent Publishing Platform.
Seeds for Change. ND. Facilitating Workshops. Retrieved from: *https://www.seedsforchange.org.uk/facilwsh.pdf*

Adult learning

Lakey, George. 2010. Facilitating Group Learning: Strategies for Success with Adult Learners. Wiley.

Methods for interactive participatory training

Chamber. Robert. 2002. Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities. Routledge
Hamilton, A. Pamela. 2016. The Workshop Book: How to design and lead successful workshops. Pearson Business
Training for Change. Retrieved from: *https://www.trainingforchange.org/tools/*

Harvard Case Method

Harvard Business School. The HBS Case Method. Retrieved from: *https://www.hbs.edu/mba/academic-experience/Pages/the-hbs-case-method.aspx*

Harvard Business School. Teaching by the Case Method. Case Method in Practice. Retrieved from: *https://www.hbs.edu/teaching/case-method/Pages/default.aspx*

Roles and skills of a trainer

International Institute for Facilitation and Change. Retrieved from: *http://english.iifac.org*

International Institute for Facilitation and Change. What Do Facilitators Do? Retrieved from: *http://english.iifac.org/resources/*

International Institute for Facilitation and Change. Facilitation Techniques. Retrieved from: *http://english.iifac.org/facilitation-techniques/*

3

TRAINING ON ECONOMIC VALUATION OF ECOSYSTEM SERVICES

MODULE 1: BACKGROUND THEORIES, CONCEPTS AND PARADIGMS

This module describes the basic economic and ecological thinking that underlies ecosystem valuation. It introduces participants to the global frameworks and discourse that drive current conservation and development decision-making and shows how they relate to ecosystem valuation. In addition, in this module, participants review the approaches and characteristics of ecosystem services, so they can understand the importance of integrating their value in decision-making.

MODULE 1: BACKGROUND THEORIES, CONCEPTS AND PARADIGMS	
Objectives	· Understand the basic economic and ecological thinking underlying ecosystem valuation. · Identify how ecosystem valuation fits into conservation and development decision-making.
Key messages	· In order to reach economic welfare, economists try to find the best way of allocating resources. · Information on how to allocate resources derives from an analysis of demand and supply, but these assume perfect markets, which is not how reality works. Therefore, economists try to look for new ways of allocating resources more equitably, efficiently and sustainably. · Because of their characteristics and how they are managed, most ES do not have markets and prices, and therefore are commonly not taken into account in decision-making. · This also means that most costs and benefits to ES are accrued as externalities. · Ecosystem valuation represents a possibility to evidence the value of ES and capture such value in measures and instruments for decision-making.
Overview	**Presentation 1.** How economists talk and think I: demand, supply and resource allocation **Game:** Harvest Game **Presentation 2.** Ecosystem services: features and approaches. **Presentation 3.** How economists talk and think II: interventions and instruments **Discussion 1:** Relating ecosystem and economics basics

PRESENTATION 1. HOW ECONOMISTS TALK AND THINK I: DEMAND, SUPPLY AND RESOURCE ALLOCATION

The five golden rules for a Harvard Case teacher

Content covered in Presentation 1

- Scarcity, the classic economic problem
- Production possibility frontier
- Opportunity cost
- Demand curve and diminishing marginal utility
- Supply curve
- Elasticity (elasticity of demand and supply)
- Consumer and producer surplus: economic welfare and economic value
- Difference between value and price
- Market equilibrium and "pareto optimum"
- Invisible hand and market equilibrium
- Assumption of competitive markets and why markets do not behave "perfectly"
- Types of goods (inferior and luxury goods)

This presentation clarifies the basic economic thinking underlying ecosystem valuation. Remember that, as this presentation is quite theoretical, it is strongly recommended that you use as many practical examples as possible. These should be tailored to the course topic, country and context, to make the theory 'come alive' to participants. Do not be too abstract or academic and try to avoid complex economic jargon as far as possible. Also, try to engage participants as much as possible, to avoid the risk of this becoming an academic lecture. The point is for participants to understand simple economic concepts and be able to see how they inform and underpin ecosystem valuation in the real world.

It is recommended to first conduct the explanation of the concepts with every-day, easy examples, and then, move towards its exemplification with ecosystem services. As mentioned *above*, it is also highly recommended to try to avoid complex explanations and terms, if it is not required or will not help participants to reach the learning objectives.

Main presentation points and notes for the presenter

- At the beginning of the presentation, participants should understand that economists look for allocating resources under an assumption of scarcity, aiming to optimise economic welfare. This, it should be emphasised, drives ecosystem valuation, which aims to inform decisions above land, resource and investment choices and trade-offs and to put biodiversity and ecosystem services 'into the equation'. When explaining the analysis of allocation of resources with the production possibility frontier, emphasize how this reflects opportunity costs. Exemplify opportunity costs in the conservation arena: choosing to allocate resources for encouraging development implies that those resources are not conserved and therefore, ecosystem services supply decreases or is non-existent; and vice versa.

- Information on how to allocate resources derive from an analysis of the demand and supply of goods and services, which reflect behaviour of consumers and producers: in the case of consumers, the willingness to pay for a good or service, and in the case of producers, the willingness to accept.

- During the explanation of consumer and producer surplus, accentuate that the surplus indicates the difference between the market price and the highest price consumers are willing to pay (in the case of consumers); and the market price and the lowest price a producer would be willing to accept (in the case of producers). Such differences also reflect how differently consumers and producers value goods and services. This is an important message to communicate, since it also reflects the differences between value and price (specifically, the equilibrium price), and between market value and economic value. These differences are quite important for participants to understand why economic valuation of ecosystem services does not mean "putting a price" to nature: an economic valuation makes explicit the value of ES to a group or groups of stakeholders, further than the market price (equilibrium price). The differences between the market and economic value will continuously be discussed throughout the training, especially when applying the economic valuation methods, the livelihood framework and the economic analysis frameworks.

- Highlight that, even though the models of supply and demand can provide valuable information about

the markets of goods and services, such models are based on an assumption of perfect and competitive markets, which is not how reality works. All the assumptions of perfect, competitive markets are not fulfilled, and consumers are not necessarily "profit-maximisers". Moreover, for the case of economic valuation, it is relevant to note that most ecosystem services do not have a market. In this sense, when undertaking an economic valuation of ES, it is crucial to revise the economic reasoning behind the provision and use of ES.

- Many goods and services do not behave like "normal goods". An example of inferior good is firewood used for fuel, since it decreases its demand when consumers' income increases, because they prefer to switch to electricity. An example of a luxury good is the exclusive eco-resorts, since as increase in consumers' income results in a more than proportional rise in demand.

- As a result, economists try to find alternative ways to analyze how to achieve economic welfare and an efficient allocation of resources. Economic valuation of ecosystem services is one tool that seeks to provide a piece of information that, together with an ecological, socio-economic and political analysis, allows to make better decision-making towards the search of economic welfare. This last message reflects the purpose of ecosystem valuation and will continuously arise throughout the training.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation:

Conservation Strategy Fund. Econ Video Lessons. Retrieved from: *https://www.conservation-strategy.org/en/csf-econ-video-lessons*

Daly, E. Herman and Farey, Joshua. 2010. Ecological Economics. Principles and Applications. Island Press

Hanley, Nick; Shogren, Jason and White, Ben. 2013. Introduction to Environmental Economics. Oxford.

Kahn Academy. Retrieved from: *https://www.khanacademy.org*

Kolstad, Charles D. 2010. Environmental Economics. Oxford University Press

Mankiw, Gregory N. Principles of Microeconomics. 2014. Cengage Learning.

Perman, Roger; Yue, Ma; McGilvray, James; Common, S. Michael and Maddison, David. 2011. Natural Resource and Environmental Economics. Pearson

HARVEST GAME

After the presentation on basic economic concepts, the Harvest game provides a background for exemplifying peoples' economic behavior as they search the maximization of their benefits and, introduces on how such behavior changes under different institutional settings and policies. The game is also an introduction to analyze how different goods and services (and of course, ecosystem services) can be best managed, based on its inherent characteristics and governance context. It is typically something that participants find fun to engage in, and for this reason, it is a good way of promoting learning. In addition, because it comes at the beginning of the course, it serves as something of an icebreaker. By the end of the harvest game, participants have usually established quite an informal relationship with each other and have started to form certain team bonds.

Before running the exercise, carefully read this section and the article: Murphy, J. and J-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47-61, which can be found in the "References" folder, included in the electronic documentation attached to this manual (See PDF Document <<Harvest game - Murphy and Cardenas.pdf >>).

When reading the previous reference, you will note that the authors specify that it is necessary to have 24 participants for the game (teamed in three groups of eight participants each). The reason for this is that the authors have prepared some materials, including some predetermined excel files, which consider this exact number of participants. Therefore, they emphasize that in case the game is applied with less people, some changes need to be made in the excel files. In case you require doing such changes, please refer to the aforementioned publication for more guidance on how to adapt the game.

In addition, it should be noted that the harvest game is not the only option for helping participants to operationalize theories of basic economic behavior and utility maximization. There are many games and options available to communicate economic concepts with dynamic exercises, videos and presentations. Many institutions, such as the Foundation for Teaching Economics *(www.fte.org)* or MobLab *(www.moblab.com)* provide different options. Some examples include:

- Potato game. Useful for understanding how the law of demand and supply works in perfect markets. By assuming the role of buyers and sellers, participants comprehend the demand and supply curve, as well as the buyer and consumer surplus.

- Fishing game. Illustrates the tragedy of the commons in a fishery. By assuming the role of fishermen, participants understand the problem of over-exploitation for common-pool resources and analyze different management solutions.

- Fishermen and Farmers. Illustrates the concept of property rights and incentives. Participants play the role of fishermen and farmers, with a competitive use of water. The idea is to discuss on institutional and property right arrangements that suit both groups.

Any of the exercises can be used and adapted as required. The idea is to find out which are the most important economic concepts that participants should need to understand, given their learning objectives, background, interests and experience. Try to choose the most appropriate game for increasing their learning experience. Many games can take a considerably amount of time to be applied, therefore, we recommend you to plan the time you need and adapt the agenda accordingly.

Introduction

This exercise aims to recreate a context in which a group of families must decide how much fuelwood to extract from a forest. Of course, you can modify this to the context in which you are working (how much fish, timber, fruits, etc., in coral reefs, mangroves, grasslands, etc.). Participants play the role of one of those families and the extraction decision relies on determining how many months they will spend in the forest harvesting fuelwood, with the objective of maximizing their payoff. Participants play for several rounds that

are equivalent, for instance, to months or harvest seasons. Each round, participants may harvest from 0 to 8 months, but maximization of payoff does not necessarily happen by extracting 8 months each round (because payoff also depends on the decision of other participants). Each round takes place under different institutional settings (scenarios), which trainers must specify.

Objectives

- Identify and analyze the motivations for people's economic behavior regarding the management of wood (extraction for fuelwood), under different institutional settings.
- Identify and analyze the effectiveness/suitability of different measures for wood management.

Preparation

The trainers require:

- Laptop (for registering each rounds' results and process final results)
- Excel file for registering results. All the participants' decisions will be recorded in this spreadsheet template. It will also enable the facilitator to calculate the total amount of months spent by each of the three groups and show the final results to each group in plenary. (This excel file can be found in the "Exercises" folder, in the "Harvest Game" file, included in the electronic documentation attached to this manual. See Excel Workbook <<Harvest game - results data input.xlsx>>.)
- Flip chart with instructions
- Beamer and screen for projecting final results
- Rules for scenario number 2 (see *below*, this section).
- Coin (for deciding on who will be monitored in scenario number 2)
- Box (to put in participants' numbers and randomly decide who will be monitored in scenario number 2)

Trainers must make sure that each participant have the following documents (all of which are included in the *Annex I*):

- Instructions
- Participant cards
- Record sheet
- Payment table
- Also, each participant must have a participant number (which can be assigned as described in the following section)

Time requirement

- Introduction and instructions (15 minutes)
- Scenario 1. 5-7 rounds (10 minutes)
- Scenario 2. 5-7 rounds (10 minutes)
- Scenario 3. 1-2 rounds with time for communication (10 minutes)
- Analysis results (10 minutes)
- Discussion (20 minutes)

*It is important to notice that the number of rounds should never be announced to the participants.

How to implement the Harvest Game

1. Before starting the game, trainers must prepare the following materials:
   - Flip chart with instructions
   - Laptop with excel file
   - Copies for participants: instructions, participant cards, payment table, record sheet.
   - Copies of instructions for running the rounds with the scenario number 2 (regulation scenario, see *below*)
   - Coin
   - Box with 24 pieces of paper separated in three groups of eight, each group with one different colour (yellow, blue and green).
   - Ask one of the participants or co-moderator to help you distribute the material and process the results.

2. Distribute the following materials to the participants: instructions, participant cards, payoff table, and record sheet. Clarify to participants, that all of them are receiving the exact same information (all tables, record sheets and participant cards are the same).

3. Explain the instructions and solve any questions, but never suggest how to play (which decisions to make). Also, clarify that even though the objective of the game is to maximize the household payoff, this is not necessarily achieved by always extracting 8 months of firewood each round. Participants must know that their payoff also depends on the amount of firewood that other participants extracted.

4. Make three teams of maximum eight persons each.

5. Assign a participant number to each one of the participants (from 1 to 8 in each one of the groups). This number cannot be shared with other participants: only the participant should know it. To provide the

participant number, you can write down the numbers in pieces of paper, put them in a bag and make participants choose randomly.

Notice that all the information provided to the participants during the game will be made through the participant number.

6. For the next 75 minutes, 15-20 rounds will be played. Such rounds will be played in three different institutional scenarios (description included the next section). Trainers must make sure to contextualize the participants with the corresponding scenario before the round starts. The total amount of rounds and the three scenarios should not be mentioned to participants. The three different scenarios are designed as follows. Make sure to follow the order of each scenario.
   a) Open access: Unregulated resource (5-7 rounds)
   b) Regulation: External imposed regulation of the resource with imperfect enforcement (5-7 rounds
   c) Communication: Communication as a tool for management of the resources and self-governance (1-2 rounds)

7. Each round starts when you, the trainer, indicates it. In each round, participants must choose how many months, from 0 to 8, they will spend in extracting fuelwood from the forest. They have to write down their decision and their participant number in the "participant card", being careful not to show it to any other participant. It is very important that participants keep in mind that their decisions are completely private, and they may not show them to the rest of members of the group.

Participant card

Participant number	
Round number	
My months spent in the forest for fuelwood extraction	

8. After a couple of minutes, pick up the participants cards and ask your co-trainer to help you record all the participants decisions in the corresponding row of the Excel sheet (using Excel Workbook <<Harvest game - results data input.xlsx>>). Identify the participant numbers of each group, for each round, and write down their decisions. For example, in the figure *below*, participant 1 is recorded to have decided to harvest for 4 months in the first round, while participant 2 decided to harvest 5 months. In this file, the column "Total" will calculate the total amount of months spent by all the participants in each of the three groups, per round, automatically. Once your co-trainer has introduced all the data for each participant of each group, indicate the total of each group in plenary.

For example, for the yellow group, the total number of months harvested in round 1 of the "open access scenario" are 19.

GROUP 1										
		Player Number - My Months in Forest								
		1	2	3	4	5	6	7	8	Total
A. Open Access										
Round	1-a	4	5	2	1	2	1	2	2	19
	2-a	3	0	4	3	1	3	4	5	23
	3-a	5	0	6	2	0	5	3	7	28
	4-a	6	7	5	4	7	7	1	8	45
	5-a	7	2	7	8	5	2	0	4	35
	6-a									

9. Participants will use the "Record sheet" to write down the individual and group months spent in the forest for each round (column A and B, respectively). Then, by subtracting the individual months of the groups' total months in the forest, they will obtain the total months that the rest of the group decided to spend in the forest (excluding the months they decided themselves) and write it down in the column C "Otheŕ s months in the forest". With this information and the information on their individual decision, the participants will identify their individual earnings in the "payment table" and write it down in the column C "My earnings in this round".

For example, following the case *above*, in the round 1 of open access, the participant number 1 of the yellow team decided to spend 4 months in the forest. Therefore, the participant wrote the number 4 in the column A of the "Record Sheet". Once the trainers indicated the total number of months spent by the yellow team, 19, the participant wrote this number in column B. In column C, "Other's months in the forest", 4 is subtracted from 19, giving a total of 15 months. The participant number 1 searched his/her payoff in the "Payment table" by identifying his/her number of months harvesting (4) and the number of months the rest of the team spent in the forest (15), giving a total payment of 668. This number was written in column D "My earnings in this round (individual income)".

The individual earnings are function of each individual's decision on the number of months they will spend in the forest and the aggregate decision of all participants (sum of all the months all participants spent in the forest extracting fuelwood, minus individual decision). It is assumed, for the sake of this exercise, that the calculation of such income integrates the externalities. It is important to mention to participants, that everybody is receiving the exact same sheet of paper and information.

RECORD SHEET

Name: ..... **Player Number: 1**

	Column A	**Column B**	**Column C**	**Column D**
Round No.	**My month in the forest** (Your decision)	**Total group months in the forest** (Announced by the trainer)	**Others' months in the forest** (Column B minus Column A)	**My earnings in this round (individual income)** (Use your payoff table)
1	4	19	15	
2				

PAYMENT TABLE

	My months harvesting								
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	619	670	719	767	813	856	896	933	967
1	619	669	717	764	809	851	890	926	959
2	617	667	714	760	804	845	883	918	950
3	615	664	711	756	798	838	875	909	940
4	613	660	706	750	792	831	867	900	929
5	609	656	701	744	784	822	857	889	917
6	605	651	695	737	776	813	847	877	905
7	600	645	688	729	767	803	836	865	891
8	595	638	680	720	757	792	824	852	877
9	588	631	672	711	747	780	811	838	862
10	581	623	663	700	735	768	797	823	846
11	573	614	653	689	723	755	783	808	830
12	565	605	642	678	711	741	768	792	813
13	556	594	631	665	697	726	752	775	795
14	546	583	619	652	683	711	736	758	776
15	536	572	606	638	668	695	719	739	757
16	525	560	593	624	655	678	701	721	737
7	513	547	579	609	636	661	683	701	717

10. All the rounds are repeated according to the previously described process. The only thing that changes is the scenario description in different rounds.

Scenario description

The three institutional scenarios are the following:

a) **Open Access. Unregulated resource.** This involves the first 5-7 rounds where there is no regulation for fuelwood extraction, without possibility of communication among participants. In these rounds, participants have no more than 1 minute to make up their mind on their harvest decision.

b) **Regulation. External imposed regulation of the resource with imperfect enforcement.** Once the rounds for the first scenario are finished, the trainers will give the participants the information on the new regulation and read it in plenary. In this scenario, there will be 3-7 rounds where participants, due to a new "regulation", are not supposed to spend more than one month with extracting fuelwood (efficient solution, where group earnings are maximized). The objective is to reach an efficient level of earnings and extraction. There is no possibility of communication among participants. Given that monitoring and enforcement is "quite expensive", the trainers will apply an imperfect monitoring: after each round and after the "participant cards" are collected, there is a possibility that one person of each of the groups is selected for revision. For determining if someone will be monitored, the trainer will flip a coin. In case the revision proceeds, pieces of paper with numbers from 1-8 will be put in a box and one of them will be selected randomly. The trainer will revise if the participant broke the regulation or not: in case that the person decided to spend more than one month to fuelwood extraction, the participant will have to pay $100 per extra month (for example, if the person decided to spend 5 months, the fee will be $400). This should be registered by the participant by subtracting the fee from its total earnings in the "Record Sheet", for the correspondent round. The trainer will indicate in plenary the participant number and how much he/she will have as a fee. The co-trainer also needs to record this in the excel sheet. In these rounds, participants have no more than 1 minute to make up their mind on their harvest decision.

c) **Communication. Communication as a tool for management of the resources and self-governance.** Once the rounds on the second scenario are finished, the trainers will indicate that during the next rounds, imposed regulation will not be enforced anymore and this time participants have the opportunity to communicate between each other. Nevertheless, they cannot reveal their final decision nor show their earnings and "record sheet". In these rounds, participants have no more than 5 minutes to discuss and make up their mind on their harvest decision.

Presentation of results, discussion and reflection

Once the rounds are over, trainers should give the participants a short break (no more than 10 minutes) in which they must make sure that the information in the Excel file has been recorded correctly. Then, they should go to the sheets under the name "Average months_(colour of the team)" and "Average earnings_(colour of the team)" of the Excel file and analyse the results. Some questions to answer when analysing the results of each group are the following:

- How does the average harvesting months change with the change of scenarios and along time?
- How did the participants behave individually in different scenarios?
- How did the self-interested approach of participants change and under which scenario?
- How do the average earnings change with the change of scenarios and along time?
- Which were the differences in average harvesting and average earnings between the groups?
- Which scenario worked the best for the maximization of the earnings of the whole group? Does this change between groups?

Once you have a clear overview of the results, start the discussion with the participants. Before giving your perspective, show them the results and ask them: what do they observe in the results? If it is difficult to encourage the discussion, you can also ask them the questions *above*. Some questions for the participants that could nicely complement the analysis of results are the following:

- How did the group dynamics reflect in the results?
- Why do you think that different scenarios worked better for your team than others? Why do you think these differences exist?
- Do you think that the behavior of participants would have changed if the enforcement of scenario 2 had been implemented? Why? How did the imperfect enforcement affect the participants' behavior in your team?

- Can you think of an example of real life, where certain institutional settings work better than others when searching for maximizing social welfare and sustainable extraction/production?

When discussing in the group, you can have the following messages in mind:

- Payoffs would have been maximized if everyone did 1 month of extraction.
- Some research indicates that in regulation scenarios (with imperfect enforcement), individuals are worse-off when faced with an enforced government-imposed regulation.
  - When facing regulation, individuals tend to behave with a self-interest approach.
  - In the absence of regulation, individuals make decisions with a group-oriented approach.
  - Normally, in the regulation rounds, their compliance is high at the beginning, but it deteriorates to the level of the rounds in open-access scenarios.
  - In general, under these contexts, regulation encourages a self-oriented behavior.
- The same research explains that self-governance can be more effective when looking for maximizing social welfare and generating sustainable extraction/production solutions and strategies.
- As reflected in the rounds when communication was permitted, reaching agreements for sustainable arrangements require time for building trust, collaboration and negotiation.

PRESENTATION 2. ECOSYSTEM SERVICES: FEATURES AND APPROACHES

In presentation 2, introduce the concept of ES, why ecosystem services are important and which are their special characteristics. Additionally, they present how ES have developed under the global policy discourse, and which initiatives have risen from its relevance. Take into account that most participants can have different levels of knowledge in the topic. The idea is to homogenize the knowledge in the group. We suggest making this presentation in such a way that participants can contribute to the explanation of the concepts. Consider that there might be a discussion regarding different approaches. As a trainer, it is important to encourage a productive discussion and to promote a convergence towards an agreement on concepts and definitions that can be used in this training and in economic valuation.

Content covered in Presentation 2

- Definition of ES
- Explanation of why ES are different to other goods and services
- Classification of ES
- Special characteristics of ES:
  - Spatial dynamics
  - Temporal dynamics
  - Connectivity
  - Causality and complexity
    - Attribution, (non)-linearity and thresholds
    - Uncertainty and risks
    - Trade-offs and synergies
- ES valuation in the development discourse
  - Aichi targets
  - Green growth
  - Natural Capital
  - Circular economics
  - Doughnut economics
  - TEEB
  - IPBES

Main presentation points and notes for the presenter

- The presentation starts with a remark of why ES differ from marketed goods and services, and why does this have resulted in the lack of their consideration in planning instruments and policies. A key message is that economic valuation is a tool that provides a piece of information to encourage its integration in such planning instruments and policies.

- Then, go through the concept of ES and the classification suggested by the MEA (2005). Try to encourage participants to contribute in this explanation and provide examples of their own.

- The most important message to deliver to participants when presenting the special characteristics of ES is that their functioning and interaction is quite complex, and therefore, understanding their changes and provision -as well as finding sound scientific knowledge and data on it- can be a challenging task.

- This implies that every economic valuation has an uncertainty component and that it is difficult to be as accurate as possible when making assumptions and assessing the attribution, (non)-linearity and thresholds regarding ES and their functioning. These might be quite difficult concepts in terms of language and comprehension. Explain them as key ecological principles and give examples of what they mean in relation to ecosystem services, and how they make it more challenging to value.

- Also introduce the recurrent theme of biophysical information, and how important this is for the economic valuation (and how economic studies which fail to integrate or verify biophysical context and relationships, may end up giving incomplete or even incorrect conclusions to decision-makers).

- Emphasize that uncertainty on ES behaviour and their provision in quality and quantity, rise risks to economic welfare, since after all, ES are vital for well-being and economic activities. By definition, risks imply a probability of occurrence and therefore, can be dealt with in a valuation framework. Nevertheless, uncertainty cannot be foreseen. This is a good foundation to introduce the precautionary approach to participants. Ask them for a good example of the application of the precautionary approach in relation to ES.

- One relevant concept in relation to ES and development is "trade-offs". After this presentation, participants must be clear on what trade-offs mean and more importantly, on the fact that trade-offs have different implications for the related stakeholders (not only from the conservation-, but also from the development perspective): some might receive more benefits than others, and some might have to bear more costs than others. A key message in this respect is that economic valuation makes these trade-offs explicit. By evidencing their equity and distributional implications, economic valuation provides information to manage ES trade-offs. This is a good time to refer back to the concept of opportunity costs, which was introduced in the presentation 1.

- The idea in the last part of the presentation is to communicate how the link between ecosystems and economics has derived in international initiatives and policy processes throughout time; and what are the implications of the commitments of countries to such initiatives in terms of ecosystem valuation. Go through some concepts that have risen as a result of this acknowledgement, such as green economy, natural capital and circular economy. It is strongly recommended to provide a more detailed explanation on TEEB and IPBES, as they emphasize an important message of this training: economic valuation goes beyond generating numbers; it is part of a process in which the value of ES is identified, assessed, estimated, demonstrated and captured in policies that promote sustainable welfare.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation:

Bennett, Elena M.; Peterson, D. Garry and Gordon, J. Line. 2009. Understanding relationships among multiple ecosystem services. Ecology letters 12: 1394-1404.

Boyd, James and Banzhaf, Spencer. 2007. What are ecosystem services? The need for standardized environmental accounting units. Ecological Economics 63: 616-626.

Convention on Biological Diversity. 2010. Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets. Ellen Macarthur Foundation. Retrieved from: *https://www.ellenmacarthurfoundation.org/circular-economy*

Fisher, B., Turner, R.K. and P. Mauling (2009). Defining and classifying ecosystem services for decision making. Ecological Economics 68: 643-653

Haines-Young and Potschin, 2010. The links between biodiversity, ecosystem services and human well-being. Ecosystem Ecology: A New Synthesis, BES Ecological Reviews Series, CUP, Cambridge

Heal, G., G. C. Daily, P. R. Ehrlich, J. Salzman, C. Boggs, J. Hellman, J. Hughes, C. Kremen, and T. Ricketts. 2001. Protecting natural capital through ecosystem service districts. Stanford Environmental Law Journal 20:333–364.

Kosmus, Marina; Renner, Isabel and Ullrich, Sivlia. 2017. *Integrating Ecosystem Services* (IES) into Development Planning Training material. Deutsche Gesellschaft für International Zusammenarbeit.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Retrieved from: *https://www.ipbes.net/*

Kate Raworth. Exploring doughnut economics. Retrieved from: *https://www.kateraworth.com/*

Limburg, E. Karin; Ó Neill, Robert V.; Costanza, Robert and Farber, Stephen. 2002. Complex systems and valuation. Ecological Economics 41: 409-420.

Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington DC.

Rodríguez, J. P., T. D. Beard, Jr., E. M. Bennett, G. S. Cumming, S. Cork, J. Agard, A. P. Dobson, and G. D. Peterson. 2006. Trade-offs across space, time, and ecosystem services. Ecology and Society 11: 28

The Economics of Ecosystems and Biodiversity. Retrieved from: *http://www.teebweb.org/*

United Nations. 2012. The Future We Want. Rio +20 United Nations Conference on Sustainable Development.

Van Beukering, P.J.H., H.S.J. Cesar, M.A. Janssen. 2003. Economic valuation of the Leuser National Park on Sumatra, Indonesia. Ecological Economics 44: 43-62.

PRESENTATION 3. HOW ECONOMISTS TALK AND THINK II: INTERVENTIONS AND INSTRUMENTS

Content covered in Presentation 3

- Categories of goods and property rights
  - Private, common, club and public goods
  - Free rider problem
  - Tragedy of the commons
  - Property rights
- Externalities
- Market, policy and price failures
- Economic causes of ecosystem degradation
- Whether or not to intervene?
- Economic tools and measures for conservation

Before starting with this presentation, make a quick review with participants regarding the main topics that have been learned so far. If you notice that they do not mention the key messages, emphasize them again.

At this point of the training, participants have learned and discussed:

- The basic concept of economics and ES
- Why ES are not like other goods and services in terms of their characteristics and lack of markets that reflect their value
- Why economic valuation can be helpful in the process of making ES values explicit, allowing their better management and an increase of economic welfare.

In this presentation, the idea is that participants understand why policies, institutions and markets fail to manage ES in a more equitably and sustainable way. Moreover, this session accentuates that this failure has also resulted in degradation and loss of ES. Finally, a quick review is made on how economic valuation and instruments can be used to address such problems (intervention).

Main presentation points and notes for the presenter

- The first part of this session starts with an analysis of the types of goods in terms of their exclusion and rivalry characteristics (public goods, club goods, common goods and private goods). Some participants may find the concepts "exclusion" and "rivalry" a little complicated. Therefore, it is suggested to introduce the types of goods with everyday life examples, explaining their main characteristics without mentioning the concepts themselves, and then give ES examples. Also, ask participants to explain or exemplify the "free-rider" concept and the "tragedy of the commons" dilemma.
- Mention that the categories of goods and services mostly refer to how these are managed and to how their property rights are defined. In this sense, many ES have characteristics of public goods: they are non-rival, non-excludable, their property rights are not well defined, they are difficult to price and manage, they are subject of overexploitation and free-riding. Nevertheless, ES can change from being managed as a public good to a common good (for example, Fisheries), club good (for example, National Park) or private good (forest plantation for timber exploitation). Therefore, ES can situate themselves in different categories depending on: their characteristics, how challenging it is to manage them (quantities, costs and benefits of its distribution) and the definition of their property rights.
- Also, ask participants why determining property rights for the management of ES often poses a challenge. Stimulate the discussion around market failure and public good characteristics, but also allow for topics such as equity and rights to be discussed.
- The second part of the presentation focuses in explaining how it is that markets fail, where the concept of "externalities" is introduced. One key message regarding externalities is that, since most ES do not have markets, their costs and benefits are often accrued as externalities: externalities result from "transaction" costs and benefits that are not considered (taken into account) by decision makers. Participants who are aware of the concept of externalities, acknowledge it in form of a negative perspective. It is important to mention that there are also positive externalities. Since the value of losses or gains in ES is not reflected in market prices, people's decisions do not lead to a more equitable and sustainable management of resources.

- Externalities may influence stakeholders in a direct way, or an indirect way. Most of the times, those who accrue the costs of ES degradation are not the groups who cause it, and the groups who benefit from ES conservation, are not the ones who conserve. You can ask participants to give some specific examples.

- The last part of the presentation focuses on how these externalities relate to direct or root causes of degradation. It is crucial for participants to distinguish these two causes, since economic valuation and interventions should be addressed to change the underlying causes of ecosystem degradation, not the direct causes (since the last ones are only manifestations of the root causes): unless there is a change in the conditions and circumstances that drive people to degrade the environment in the first place, not much is going to change. Encourage participants to give some examples in which they differentiate direct causes from root causes (or underlying causes), and for them to compare what would happen if interventions were implemented for each one of the causes: what would change in each case?

- Finally, based on the previous presentations, ask participants to explain, which are the criteria they would consider when deciding whether to intervene in how a market and/or policy works? Some additional questions to guide the discussion are: 1. Are resources efficiently allocated? 2. Are externalities internalized? 3. Does the undertaking of economic activities take into account the ES values and the distribution of costs and benefits between stakeholders? 4. Could these policies or economic activities carry on for the long term without causing more changes to ES provision and costs to stakeholders?

- After the discussion, clarify that most interventions to market and policies would ideally address efficiency in resource allocation, equitable distribution of costs and benefits between stakeholders and sustainability through time.

- The process of an ES assessment and valuation provides the necessary information to decide whether and where to intervene. To reinforce this idea, and prepare participants for the following sessions, go again through the TEEB approach. First it is crucial to identify and assess the ES and stakeholders associated to the policies/economic activities (as will be studied in following chapters, this also includes understanding and assessing the ecological, socio-economic, cultural, political and legal context). An estimation and demonstration of ES value will make the trade-offs, costs and benefits explicit. This piece of information can allow ES value to be captured and integrated in specific solutions (you can give some examples of interventions related to markets and prices).

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation:

Conservation Strategy Fund. Econ Video Lessons: Public Vs Private Goods. Retrieved from: *https://www.conservation-strategy.org/en/csf-econ-video-lessons.*

Daly, E. Herman and Farey, Joshua. 2010. Ecological Economics. Principles and Applications. Island Press

Gwartney, James D.; Stroup, Richard L.; Sobel, Russell S. and Macpherson, David A. 2012. Microeconomics. South-Western College Pub

Hanley, Nick; Shogren, Jason and White, Ben. 2013. Introduction to Environmental Economics. Oxford. Hardin, G. 1968. The Tragedy of the Commons. Science 162 (2859): 1243-1248.

Kolstad, Charles D. 2010. Environmental Economics. Oxford University Press

Lloyd, W. 1833. Two lectures on the checks to population. Collingwood Press, Oxford.

PennState College of Earth and Mineral Science. Introduction to Energy and Earth Science Economics. Lesson 7 Overview: Externalities. Retrieved from: *https://www.e-education.psu.edu/ebf200/node/231*

TEEB. 2010. The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.

DISCUSSION 1: RELATING ECOSYSTEM AND ECONOMICS BASICS

Ask participants to bring together the economic and ecological concepts covered in the earlier presentations to see how they fit with each other, and relate specifically to the challenges of ecosystem valuation, conservation and sustainable development.

First, you can openly ask how presentations relate to their everyday work/research/experience. Some guiding questions to encourage the discussion can be the following:

- Do you have some examples of the trade-offs, externalities and their implications in your work/research/experience? Would an ecosystem valuation be helpful? Why?

- Do you work directly with interventions? How was the decision on whether to intervene?

You can also encourage discussion by sharing some examples of your own experience.

MODULE 2: DESIGNING VALUATION STRATEGICALLY

This module underlines that valuation studies are not an end in themselves, but they should be carried out to inform more inclusive, equitable and sustainable decision-making. For this, the module places emphasis on how to frame the economic valuation according to the policy and management context, identifying the decisions and decision makers it seeks to influence and ensuring that the resulting study is focused, targeted and fit to purpose.

MODULE 2: DESIGNING VALUATION STRATEGICALLY	
Objectives	· Understand that economic valuation is not an end itself: it is a tool that, together with an ecological, socio-economic, cultural, political and legal assessment, should encourage a better informed, more inclusive, equitable and sustainable decision-making. · Learn that an economic valuation needs to be fit to purpose: should be framed according to the policy and management context in which it will be used, identifying the decisions (and decision makers) it seeks to influence.
Key messages	· Ecosystem services are undervalued, which not only leads to misinformed decision-making, but also to their mismanagement, generating distributional issues. · It is important to clarify the purpose and intended outcome of valuation to ensure that it is designed to influence decision-making. · For clarifying the purpose and intended outcome of the valuation, it is crucial to think through the intended decision to influence, the target audience and the focus of the study. · Economic valuation should be guided by a clear policy question, which reflects the decision-making context. Policy and research questions provide a logical storyline to support the valuation purpose. · In a valuation study, ES need to be prioritized because not all of them can be valued. The criteria for prioritization can vary, but it is important to make sure that the ES selected are those more relevant to the decision-making context and the target audience.
Overview	**Presentation 4:** What is the point of ecosystem valuation? **Discussion 2:** How can valuation be used? **Presentation 5:** Scope and purpose of valuation studies **Case study introduction:** Bakul **Exercise 1:** Defining the purpose, target audience and questions **Exercise 2:** Understanding the economic links and stakeholders

PRESENTATION 4. WHAT IS THE POINT OF ECOSYSTEM VALUATION?

Content covered in presentation 4

- The problem of undervaluation
  - Consequences of undervaluation
- Different uses of valuation
- Is valuation enough for encouraging changes?

Before starting this new module, do a quick recap of the previous module and the key messages. This will help participants to follow the connecting thread with this new module:

- Often, markets and policies do not account for the value of ES, which most of the times leads to inefficient management and inequitable distribution of costs and benefits.
- Moreover, this undervaluation leads to ecosystem loss and degradation, which poses a risk to stakeholders that depend on ES, making it even more challenging to reach economic welfare.
- Therefore, economists try to find ways of intervening and make sure that ES values are accounted for. This can facilitate a more efficient, equitable and sustainable way of using resources; hence, of finding a path to economic welfare.

Main presentation points and notes for the presenter

- After revising the recap, focus on the problem of undervaluation and its implications. The best way of doing so, is going through examples where it is possible to compare the commercial value of an ecosystem (for example, forest, reef, etc.) with the value of all the ES that it provides, beyond provision (for example, carbon sequestration, coastal protection, insect pollination, etc.), and from which many stakeholders benefit. The key idea is for participants to realize that the commercial value of an ecosystem or natural resource is already undervalued. The lack of recognition of the value of the other ES it provides to different stakeholders (and not only those who use it in commercial terms), leads to decisions based on incomplete and flawed information. Moreover, this encourages mismanagement, which leads to degradation of ecosystems, resulting in the decrease of provision in quality and quantity of the ES.
- When explaining the consequences of undervaluation, accentuate the issues related to equity and distributional issues. This is a recurrent theme that you will keep on coming back to – that undervaluation is not just to do with ignoring certain costs and benefits, it is also to do with overlooking (or even marginalizing) the needs and interests of certain groups. By undervaluing a particular ES, we also fail to think of the people who depend on it. These people are often already the poorest and marginalized groups. It is worth knowing that with the omission of ES from decision-making, there are missed opportunities that have high costs in development, which translate in costs, losses and damages to the interests of other stakeholders (most of the times, the most vulnerable).
- The presentation already provides some examples (Myanmar's forest sector, MEA, etc.). Nevertheless, it is strongly recommended to trainers to try to put own examples and case studies, always tailored to participants' needs, interests and mandates.
- In the second part of the presentation, you can give some examples on uses and applications of valuation. As in the case of the first part of the presentation, there are some examples already included, nevertheless, it is recommended to change them to examples relevant for the participants in your training. It is only crucial that every example provided reflects the use of valuation for a very particular objective (and not valuation as an end itself), for example, leveraging public budgets, selecting infrastructure options, calculating degradation/damaging liabilities, pricing entry fees for National Parks, etc. Ask participants if they know similar or additional examples. This is a point at which you might also want to extend the time allocated to this module and bring in some local/national experts (or people from the sector or theme that the course is dealing with) to make more detailed presentations. These would show how valuation has been applied in practice and (hopefully!) served to influence decision-making.
- Finally, stir a discussion on whether making the case for ES is enough to change how policies and economic activities are undertaken. What else would be

needed? Just like the study of Costanza et. al. (1997), knowing how much ES are worth is not enough to make changes. No matter how great the value of ES is, in order to encourage more efficient, equitable and sustainable policies and economic activities, there must be changes in conditions, opportunities and the incentives for causing degradation (in most cases it remains more profitable to degrade ecosystems than to conserve them).

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation. **It is important to mention that even though the references for examples are included, it is highly recommended to use different examples, which are relevant for the participant s interests and experience. In case of using the examples provided in the presentation, read the whole case carefully in order to transmit the information correctly. Also, cite the sources adequately.**

Berghöfer A., A. Wittich, H. Wittmer, J. Rode, L. Emerton, M. Kosmus and H. van Zyl, 2015. Analysis of 19 ecosystem service assessments for different purposes – insights from practical experience. ValuES Project Report. *Helmholtz Zentrum für Umweltforschung* (UFZ) GmbH, Leipzig, and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Eschborn. Germany. 27pp. Retrieved from: *http://aboutvalues.net/*

Desvousges, W.H., Dunford, R.W. and K. E. Mathews. 1992. Natural Resource Damages Valuation: Arthur Kill Oil Spill. Paper presented at Association of Environmental and Resource Economists Workshop on Benefits Transfer: Procedures, Problems, and Research Needs, Utah.

Dubgaard, A., Kallesøe, M.F., Petersen, M.L. and J. Ladenburg. 2002. Cost-Benefit Analysis of the Skjern River Project, Royal Veterinary and Agricultural University, Frederiksberg.

Emerton, L. 1994. An Economic Valuation of the Costs and Benefits in the Lower Tana Catchment Resulting from Dam Construction, Acropolis Kenya Ltd and Nippon Koei for JICA, Nairobi.

Emerton, L., Ha Tran Thi Thu, Hoang Thach Mai, Viet Anh Hoang and E. Ebert. 2014. The economic value of Cat Tien National Park. GIZ/MARD project Conservation of Biodiversity in Forest Ecosystems in Vietnam, Hanoi.

Emerton, L., Kaludjerovic, J. and I. Jovetic. 2011. The Economic Value of Protected Areas in Montenegro. GEF/UNDP PIMS 4279: Catalyzing Financial Sustainability of Protected Areas in Montenegro, Podgorica.

Emerton, L. and N. Furuta. 2015. The economic value of the ecosystem services generated by mangrove planting activities. Report prepared for Tokio Marine & Nichido by Mitsubishi Research Institute, Tokyo

Erdmann, M., Merrill, P., Arsyad, I. and M. Mongdong. 2003. Developing a diversified portfolio of sustainable financing options for Bunaken National Marine Park. Paper presented at World Parks Congress, Durban.

Huhtala, A. 2004. What price recreation in Finland? A contingent valuation study of non-market benefits of public outdoor recreation areas. Journal of Leisure Research

Leon Morales, Fernando. 2007. El Aporte de las Áreas Naturales Protegidas a la Economía Nacional. Ministerio del Ambiente de Perú. Perú: Economía y Diversidad Biológica.

Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington DC.

Pagiola, S., von Ritter, K. and J. Bishop. 2004. How Much is an Ecosystem Worth? Assessing the Economic Value of Conservation. World Bank, Washington, D.C.

Tallis, Heather and Markham, Alex. 2012. Water Funds Business Case: Conservation as a Source of Competitive Advantage.

TEEB. 2011. The Economics of Ecosystems and Biodiversity in National and International Policy Making. Edited by Patrick ten Brink. Earthscan, London and Washington

TEEB. 2012. The Economics of Ecosystems and Biodiversity in Business and Enterprise. Edited by Joshua Bishop. Earthscan, London and New York.

DISCUSSION 2: HOW CAN VALUATION BE USED?

After the presentation, dedicate some time for participants to share their own experiences and thoughts on why they feel that valuation is personally relevant to them and their work.

The aim is to start thinking about valuation as a strategic tool that can be used to resolve real-world decision-making challenges and needs.

Some questions that can encourage the discussion are:

- How can economic valuation be used in your work?
- Which policies/decisions do you think need to change? Why?
- To whom would you address the economic valuation?

PRESENTATION 5. VALUATION SCOPE AND PURPOSE

Once participants have learned about the relevance of undertaking valuations that encourage changes and support better informed decision-making, the next step consists in learning about how to design and frame the valuation in the right context for it to have the desired impact.

Content covered in presentation 5

- The importance of having a purpose
- Valuation in the project cycle
- Practical purposes for conducting ecosystem valuation
- The importance of purpose
- Formulating decision questions
  - Policy question
  - Research questions

It is highly recommended to do a general recap of all the previous presentations. This will allow participants to follow up with the content of the training.

- When starting to design a valuation study, the first step consists in defining a clear purpose, determine the decision process and context (what decision needs to be made/changed?) and clarify who is the target audience (who can change/make the decision?) and what are the information needs.

- One of the key messages of the whole training consist in acknowledging valuation as a means to an end: economic valuation just makes sense if it actually affects how policies, programs and projects are planned and implemented. Economic valuation should contribute to inform a better decision-making towards economic welfare. Implicitly, this is also a critique to the studies that carry out 'valuation for valuation's sake', or simply assume that generating big numbers will be enough to change decisions.

Main presentation points and notes for the presenter

- Describe the phases in which valuation can contribute in the different stages of the project cycle. You can make it as a dynamic and quick exercise in a board and discuss how valuation could be used in different phases of one specific project (could be infrastructure, for example). Another option is to ask participants to indicate where in the project cycle they might use valuation (or have used valuation) in the course of their work.

- Afterwards, exemplify the practical purposes for conducting an ecosystem valuation. There are six generic purposes for valuation, and most ecosystem valuation studies come under one of these categories. Ask participants how these purposes also align with the uses in the project cycle and discuss how the results of valuation could help.

- The next step is to discuss with participants how the purpose of the economic valuation is defined. If the ecosystem valuations' objective is to influence decision-making, then it is important to be clear on which are the main decision questions that the study will address and attempt to answer, and very importantly, who is the target audience. Such questions will frame the whole valuation, so it can actually have an impact. Exemplify the process of framing the scope and purpose of the economic valuation, using the "logic chain" included in the presentation. Then, ask participants to share a real life example.

- Clarify with the participants that, in order to establish the purpose and the decision to be influenced by the economic valuation, it is important to "get inside the decision-maker's head": What is the issue that the decision maker needs to solve (and you want to influence with the economic valuation)? Who is the decision maker? And which are the questions that will allow to give an answer to that issue? These are the policy question and the research questions. Many times, participants might be a little confused regarding the differences between the two of them. To better clarify them, you can go through a complete example: narrate the context, establish the issues and decisions at stake, explain who are the stakeholders involved, determine the purpose and which decision should change, clarify which information can contribute to answer to such purpose, and finally, give specific examples of the policy question and the research questions.

- Even though there is a proposed example in the presentation, it is highly recommended to change it according to the interests and necessities of the trainees.

References and sources

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Berghöfer A., A. Wittich, H. Wittmer, J. Rode, L. Emerton, M. Kosmus and H. van Zyl. 2015. Analysis of 19 ecosystem service assessments for different purposes – insights from practical experience. ValuES Project Report. *Helmholtz Zentrum für Umweltforschung* (UFZ) GmbH, Leipzig, and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Eschborn. Germany. 27pp. Retrieved from: *http://aboutvalues.net/case_studies/*

Berghöfer A, C Brown, A Bruner, L Emerton, E Esen, D Geneletti, M Kosmus, R Kumar, M Lehmann, F Leon Morales, E Nkonya, T Pistorius, J Rode, R Slootweg, U Tröger, H Wittmer, S Wunder and H van Zyl. 2016. Increasing the Policy Impact of Ecosystem Service Assessments and Valuations - Insights from Practice. *Helmholtz-Zentrum für Umweltforschung* (UFZ) GmbH, Leipzig, and *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH, Eschborn, Germany. 31pp. Retrieved from: *www.aboutvalues.net*

Emerton, L., Aryani, R., Cahyana, A. and G. Antou. 2017. Economic Value of Ecosystem Services in Bogani Nani Wartabone and Lore Lindu National Parks & Tangkoko Batuangus Nature Reserve, Sulawesi: making the case for enhanced investments in protected areas. WCS Sulawesi Programme, Manado.

APPLICATION OF EXERCISE 1: DEFINING THE PURPOSE, TARGET AUDIENCE AND QUESTIONS

As mentioned in the first section of this manual, the training's exercises are based on a case study: a country named Bakul. The entire group will divide into three working teams, and each one of them will solve a case that requires a process of designing an economic valuation in Bakul. For this, each one of the teams will receive a workbook containing all the information regarding the context in Bakul, as well as the exercises corresponding to their specific teams. In this part of the training, participants will solve exercise 1 and exercise 2 of the workbook, one after the other. Before that, they need to get contextualized in the Bakul case and their own specific case studies. *Below*, find the step by step for the application of the exercises.

EXERCISE 1 – DEFINING THE PURPOSE, TARGET AUDIENCE AND QUESTIONS	
Preparation	· Write the exercise objectives and questions on a flip chart. · Big map of Bakul and presentation of the main characteristics of the country. · Workbooks for the three different teams. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · It is important for you to know very well the information on Bakul and the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Participants will define the purpose of their valuation study, its target audience and formulate the policy and research questions that it will seek to answer.
Instructions and recommendations	After giving the presentation on "Valuation scope and purpose", give an introduction of the country Bakul, and explain the three case studies. Then, quickly explain the objectives and instructions of exercise 1. After this, divide the group in three teams (remind participants that they will work with this team in the rest of the exercises in the training) and distribute the workbooks with the exercises corresponding to each team. • Group A: integrating forest conservation measures into the Milaku hydropower scheme public investment plan. • Group B: comparing grey and green adaptation options to strengthen coastal protection in Indare Province. • Group C: assessing the impacts of coral reef degradation from the development of Moneila Deep Water harbour. Once the participants are gathered in teams and have their workbooks, allow them to go through the information of Bakul, the background to their specific valuation case study and the instructions and questions of exercise 1. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. Ask participants to choose a person of their team, who will have 5 minutes to present their results in plenary. During the exercise, keep in mind that many participants have probably already worked or dealt with ecosystem services. Be sure to explain any questions that participants may have regarding definitions of ecosystem services.

Hints on carrying out the exercise	This is the first exercise that participants will solve in work groups. Therefore, make sure they have enough time to get to adapt to their teams and to know each other. This exercise is very relevant since it frames the economic valuations of the study cases and is the base for the exercises to follow. In this sense, if there is not enough time, we strongly suggest to better reduce the timing in other exercises. In case this is not possible, we suggest indicating the participants to focus on questions 1 and 2. Make sure that during this exercise, participants pay attention to the political, economic, social and environmental background of the case. They should think thoroughly beyond the obvious and try to think on the issue, decision or policy that the economic valuation tries to influence, and of course, the target audience to which it will be addressed. Remind the participants that in this exercise, they are setting the framework for the valuation study, in other words, its "storyline". This will give them the required guidance to answer the exercises' questions properly. Try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	Give no more than 5 minutes to each group for their presentation. After the presentation, other groups can ask questions and provide feedback.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. · Use the exemplary answers of the exercise to encourage discussion on different results and to ask questions that have not been raised during the reflection. **Possible guiding questions for reflection:** · Which were the main challenges in your team to identify the purpose, policy and research questions? · What were the main highlights of the discussion regarding policy and research questions? · What do you think is the main purpose of policy questions as far as decision-making is concerned? · What do you think is the main purpose of research questions as far as decision-making is concerned? · What is the importance of understanding the decision to inform, influence or change to determine the purpose, target audience and policy and research questions? · Do participants have any real-life examples that contribute to the discussion?
Key messages	· Valuation is not an end itself, but a means to an end – better informed decision-making. · It is important to clarify the purpose and intended outcome of valuation to ensure that it fits to purpose in decision-making terms. · For clarifying the purpose and intended outcome of the valuation, it is crucial to think through the intended decision to influence, the target audience and the focus of the study. · Economic valuation should be guided by a clear policy question, which reflects the decision-making context. · Policy and research questions provide a logical storyline to support the valuation purpose.

Below, you will find the information on Bakul, each one of the case studies, the exercise 1 and some exemplary answers for the exercises, for each one of the case studies.

INTRODUCTION TO BAKUL AND CASE STUDIES

Welcome to Bakul!
Bakul, officially the Republic of Bakul (Bakulesi: Sathalanalat dschoik Bakul), is a tropical developing country covering an area of 300,000 km2 (a size similar to the Philippines, Ecuador or Ivory Coast). It is a beautiful place, with great geographical, economic and ethnic diversity. The currency is the Bakuloop (BKL). Currently, the exchange rate is USD 1 = BKL 10.

Population and administrative units
As of 2018, the total population of Bakul is 15 million, 55% of whom live in cities and 45% in rural areas. Almost a third of people are classified as poor. Around a quarter of Bakulesi come from indigenous groups, including the Bakumoken, Hankules and Tabakalues communities.

Bakul consists of three provinces: Belandu, Exportul and Indare. Hanku, the capital and largest city is located on the east coast in Indare. Nevertheless, the city of Moneila in the southeastern province of Exportul is considered the economic hub of Bakul. Around the country, there are other towns and commercial centres such as Kalu in Belandu Province.

Economy
Bakul is a developing country with a market-oriented economy. The IMF estimates 2015 per capita income to be approximately US$ 5,195.

- Together, the agricultural and fisheries sectors generate more than half of the national GDP.
- Small-scale fishing and subsistence agriculture, supplemented by the collection of forest and wetland products, underpin the livelihoods of the rural population.
- Presently, the main export crops are palm oil, fish and shrimp, and, to a lesser degree, timber.
- Manufacturing and industry are still oriented largely towards servicing the domestic market, with some trade to other countries within the region. However, this is projected to change, as there is now a major economic policy focus on export promotion.
- Tourism is gaining importance as the nation's fastest growing industry in terms of revenue. The country's beautiful beaches and coral reefs are a major attraction, and most tourist hotels and dive centres are concentrated on the eastern coastline of the Hanku peninsula.

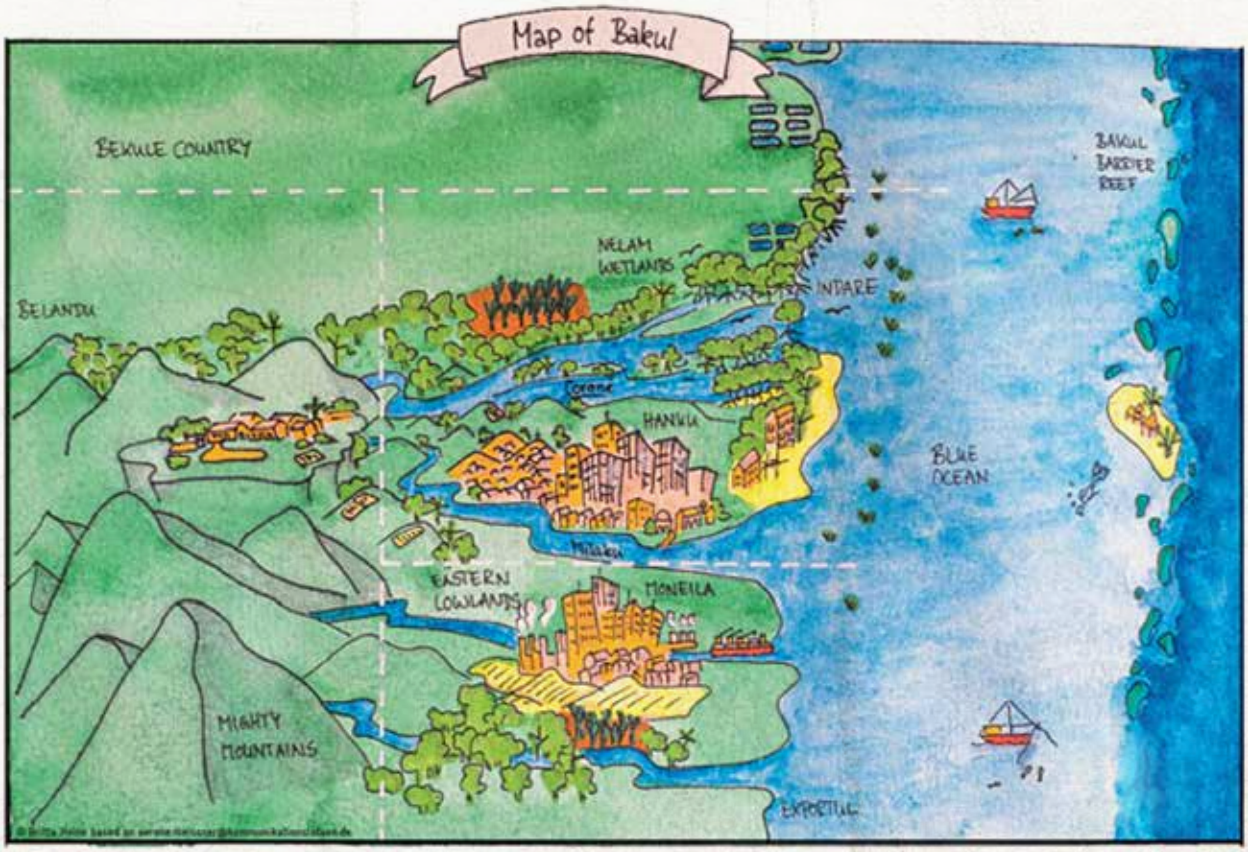
Governance
Bakul is a representative democratic republic that gained independence in 1964. There is a decentralised governance structure. Provinces have considerable autonomy, including powers to set taxes and enact by-laws. However, although each province generates (and mostly retains) its own revenues, the majority of the annual budget is provided by the national government.

Ministries cover all important sectors at both national and provincial levels. The Ministry of Environment was created in 2004, but unfortunately suffers from a severe lack of budget and weak technical and enforcement capacity. Bakul ratified the *United Nations Framework Convention on Climate Change* (UNFCCC) in 1994 and became a signatory to the Kyoto Protocol in 2003. A designated national authority has been established to certify *Clean Development Mechanism* (CDM) projects, and national regulations are in the process of being created.

Ecological and land use zones
The western highlands are defined by the Mighty Mountains, running north-south across the western part of Belandu Province. These are largely rural, with only a few scattered towns (such as Kalu, in the central mountain range). Land pressure has increased substantially over recent years, with rising rates of in-migration leading to forest clearance for pasture and cropland. The northern part of the mountain range forms the watershed for the Coroné and Milaku Rivers, which together provide almost all the water supply to Hanku and a large part of that to Moneila. The Milaku hydroelectric scheme is located on the middle reaches of the Milaku River, and supplies all of Hanku City's electricity. Most of the hilly slopes of the upper watershed are covered by the Belandu Watershed Forest and the Hankulen Community Ecological Reserve. Belandu Watershed Forest is maintained as a strict protection area by the Forest Department, while Hankulen Community Ecological Reserve is managed as a multipurpose conservation landscape by the local indigenous community (the Hankules). The Hankules depend on subsistence-level farming and the collection of forest products for their livelihoods.

The northern coastal strip in Indare Province consists of two main zones. The northern part is dominated by the Coroné Delta. The entire delta area is fringed by mangroves which are still in mainly good condition, although are beginning to be threatened by the spread of commercial shrimp farming. Just inland of the mangrove belt, the Nelam Wetlands are designated as an Important Bird Area, and include a freshwater marsh with large areas of seasonally-flooded grasslands. The northern shores of the Coroné Delta also form the territory of the Tabakalues indigenous community. The Tabakalues live close to the coastline and depend on fishing for their livelihoods The Hanku peninsula forms the southern zone of Indare Province. It contains the capital city of Hanku and is also the centre of Bakul's beach tourism industry. The mangrove belt of the Coroné Delta continues southwards into the densely settled tourist beaches beside Hanku City, where it becomes more sparse and degraded.
The eastern lowlands span southern Belandu Province and Exportul Province, running west-east from the foothills of the Mighty Mountains down to the coastal city of Moneila. This area is characterised by rich, alluvial soils, which have high potential for agriculture and yet are prone to flooding in the rainy season. While some of this "fertile triangle" is under mixed smallholder farming, large areas have been developed for commercial irrigated agriculture, including rubber and palm oil plantations. Moneila City, Bakul's commercial hub, is located in the coastal zone of Exportul Province. Two smaller tributaries of the Milaku River rise in the lower foothills of the Mighty Mountains and run through the eastern lowlands, providing a minor (and yet still important) contribution to Moneila's water supplies. They face high erosion hazards, and there are increasing concerns about the effect of agrochemical discharges on downstream water quality.

The world-famous Bakul barrier reef runs along almost the entire Bakul coastline. Only the far southern part of Exportul Province's shoreline is not bordered by coral reef. The reef is rich in biodiversity and serves as an important breeding ground for many of the commercial fish caught in Bakul waters, as well as offering a key site for dive tourism. In addition to coral reefs, other marine habitats include seagrass beds, uninhabited atolls and sandy islands. The entire southern portion of the reef area adjacent to Exportul Province has been gazetted as the Bakul Reef Marine Protected Area.



CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN

The Milaku hydropower facility (which provides the main energy supply for Hanku City) is in the process of being upgraded. The capacity of the scheme will be increased from 20 MW to 40 MW by adding a new turbine, and will also replace old power generation and transmission infrastructure. This investment has already been approved, and its design is finalised. A public investment plan is being prepared which outlines all the expenditures that are necessary to undertake this new construction, and to maintain the hydropower facility in the future.

One of the key challenges facing the hydropower facility is high sediment levels in the Milaku River. The reservoir and dam are becoming silted and will soon require frequent dredging. There are beginning to be regular power outages due to silt-related breakdowns in machinery, and also because the reduced reservoir and dam capacity means that dry season water levels are sometimes insufficient to enable electricity generation. These problems are costly in terms of additional equipment needs (such as silt traps, abrasion-resistant materials and more frequent replacement intervals), remedial measures (such as bypass weirs, flushing and dredging) and reduced lifespan of the scheme.

The Forest Department has just developed an Integrated Landscape Management Plan for the Belandu-Hankulen forest complex (2018-2038). The two main goals are: (a) to safeguard the livelihoods and cultural heritage of the local Hankules community, and (b) to safeguard forest watershed protection values. In particular, improved forest cover and quality is expected to decrease erosion, control runoff, reduce siltation and sedimentation, and thereby better regulate waterflow, attenuate droughts and floods, and enhance year-round water security.

You represent the Belandu Forest Department. Your task is to design and deliver a valuation study to make the case that the Belandu-Hankulen forest complex is an essential part of the Milaku hydropower facility's natural water infrastructure, and that the public investment plan should therefore include a budget line to support the Integrated Landscape Management Plan.

KEY CHARACTERISTICS OF THE BELANDU-HANKULEN FOREST COMPLEX AND MILKAU WATERSHED

- The Belandu-Hankulen forest complex is located in north-west part of the Mighty Mountains (Belandu Province), and protects the sources of the Milaku River.
- The Forest Department manages Belandu Watershed Forest (50,000 ha) as a strict protection forest. No extractive activities are permitted.
- Hankulen Community Ecological Reserve (10,000 ha) is managed as multipurpose conservation landscape by the Hankules indigenous community.
- The Hankules indigenous community (12,000 households or 50,000 people) live in and around the Hankulen Community Ecological Reserve, and depend on subsistence farming and forest products.
- Milaku hydropower scheme currently has an installed capacity of 20 MW. This is in the process of being extended to 40 MW (2 X 20 MW).
- Milaku hydropower scheme supplies all of Hanku City's electricity demand.

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE

The Hanku peninsula in Indare Province contains a striking concentration of settlement, industry and tourist infrastructure. This area is extremely vulnerable to natural disasters, including floods, tidal surges, storms and cyclones, as well as coastal erosion. Both the incidence and the severity of these phenomena are worsening due to the effects of climate change. Climate change also threatens the livelihoods of poor fishing and farming communities living in the northern part of the coastal strip, including the Tabakalues indigenous group.

In response, the Ministry of Construction and Public Works, together with the Indare Coastal Zone Management Authority, have allocated a budget of 171 billion Bakuloops (about USD 17 billion) over the next 20 years to set in place coastal adaptation infrastructure which will help to protect against extreme weather events, tackle coastal erosion and strengthen the resilience of local communities. A menu of options is being considered, based on various combinations of grey and green infrastructure including structural measures such as seawalls, groynes and breakwaters as well as ecological measures involving the rehabilitation, restoration and conservation of mangroves in the coastal strip.

You represent a consultancy company that has been hired to appraise the various coastal adaptation options that are being proposed, and make recommendations as to their relative desirability in terms of public investment potential. Your task is to design and deliver a valuation study which will ensure that green/EbA approaches (mangrove restoration and conservation) are adequately considered and compared alongside grey or 'hard' infrastructure options (seawalls, groynes and breakwaters).

KEY CHARACTERISTICS OF THE NORTHERN COASTAL STRIP

- Located in Indare Province
- Coastal strip is highly vulnerable to cyclones, storms, high tides, floods and erosion
- Hanku City located on peninsula between Coroné and Milaku Rivers
- Population of Hanku City is 1,000,000 people as well as numerous businesses and industries
- Coastal strip around Hanku City contains more than 100 tourist hotels
- Tabakalues indigenous community (population 5,000 households) live on the northern short of the Coroné Delta and depend on fishing and livestock
- Delta and Hanku peninsula are fringed by mangroves
- Northern mangroves threatened by commercial shrimp farming
- Mangroves used as fishing grounds by Tabakalues
- Mangroves also provide nursery and breeding habitat for nearshore fish species caught by Tabakalues

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR

The National Development Plan for 2018-2038 lays great stress on expanding export-oriented industries and establishing Bakul as a regional trade centre. It also emphasises the tourism sector as a key area for future development and economic growth. The upgrading of Moneila port is key to these plans. This project would involve blasting and dredging a passageway through the southern part of Bakul barrier reef to allow access for large cargo vessels and tourist cruise ships. This would destroy most of Bakul Reef Marine Protected Area.

Bakul barrier reef only extends about 15 km south of Moneila City. The Bakul Nature and Wildlife Protection Society are campaigning to maintain the existing shipping route, which loops downwards around the end of the coral reef, and then enters Moneila from a southerly direction. Although being able to pass directly through the Bakul barrier reef would provide the most direct entryway into the harbour, they argue that the slightly longer distance that ships have to travel to loop around the reef is more than justified by the economic benefits that are generated by conserving the reef via Bakul Reef Marine Protected Area.

You represent the *Bakul Nature and Wildlife Protection Society* (BNWPS). Your task is to design and deliver a valuation study to show the costs that would arise from blasting and dredging the barrier reef to facilitate access to Moneila Deep Water Harbour. You wish to advocate for maintaining the existing shipping route around the southern end of the barrier reef.

KEY CHARACTERISTICS OF BAKUL REEF MARINE PROTECTED AREA

- Covers a sea area of 100 km2 at the southern end of the Bakul barrier reef (adjacent to Exportul Province)
- Includes more than 30 uninhabited atolls and islands with sandy beaches
- Coral reef covers approximately 25 km2 with a length of 25 km.
- The reef hosts exceptional biodiversity including beautiful coral fishes, turtles, stingrays and sharks as well as seasonal populations of whales and dolphins.
- Is a major centre for diving, snorkelling and island visits, including day trips from Moneila, Hanku and adjacent hotel zones as well as visits from liveaboards
- Reef areas provide important breeding, nursery and habitat for a number of commercially-important food fish which are caught by local artisanal fishers as well as commercial boats

EXERCISE 1: DEFINING THE PURPOSE, TARGET AUDIENCE AND QUESTIONS

For your valuation study, what is the:

1. Purpose and objective:

a) which issue or challenge does it aim to address?
b) what decision does it aim to inform, influence or change?
c) do you (the study proponent or leader) have a particular position that you want to represent or 'push' when attempting to inform, influence or change this decision?
d) what is the overall objective of the valuation study?

2. Target audience:

a) who does it seek to inform and influence?
b) what do they need or want to know to make their decision?

3. Scope of policy and research questions:

a) what is the overarching policy question that it seeks to answer? (this addresses the issue that the decision-maker needs to decide on or resolve … and you might want to influence)
b) which 3-5 research questions will generate the information required to get to this answer? (these provide the information that will answer the policy question … and may elaborate the particular arguments you want to make).

Exemplary answer of exercise 1: Defining the purpose, target audience and questions

Case study Group A Integrating forest conservation measures into the Milaku hydropower scheme public investment plan	Case study Group B Comparing grey and green adaptation options to strengthen coastal protection in Indare Province	Case study Group C Assessing the impacts of coral reef degradation from the development of Moneila Deep Water Harbour
1. Purpose and objective: a) Issue or challenge: The effective planning and operation of the Milaku hydropower facility depends on ES that are not taken into account in its investment plan. The same forest is of importance for the Hankules community. b) Decision to inform, influence or change: Have a better-informed new investment plan for the hydropower facility, so that it integrates the values of ES to different stakeholders, including the Hankules. Promote the inclusion of a forest management plan that potentialize the benefits received. c) Particular position: The contribution of the forest to the hydropower plant and to the Hankules community is relevant enough to be considered in the investment plan of the Milaku hydropower facility. If the forest was properly managed, the received benefits by the stakeholders would be higher and more equitably distributed. In this sense, the forests' values should be considered in the investment plan and include a budget line for the Landscape Management Plan. d) Objective: Demonstrate the value of ES provided by the forest to the hydropower facility and Hankules. Provide information to integrate them in the investment plan.	**1. Purpose and objective:** a) Issue or challenge: Adequately consider the costs and benefits of all the options, not only related to the financial budget, but also in terms of the costs and benefits to other associated stakeholders. b) Decision to inform: Decision on the portfolio investment of the coastal adaptation options that maximize the benefits and opportunities associated to ES and other stakeholders. c) Particular position: Green infrastructure options have a better benefit-cost ratio (considering the impacts on ES and all related stakeholders). d) Objective: provide information of the socio-environmental-economic costs and benefits of each one of the coastal adaptation options, in order to optimize an investment portfolio in the long term.	**1. Purpose and objective:** a) Issue or challenge: The dredging of a passageway would destroy most of the Bakul Reef Marine Protected Area, generating high costs for different stakeholders and national and international sectors. b) Decision to inform: Decision on whether to dredge a passageway is the best way to increase the port productivity and it is a profitable option. c) Particular position: Mostly, the overall costs and benefits of dredging (including costs and benefits related to ES and its beneficiaries from different sectors), make this project a non-profitable option. Moreover, there is an unequal distribution of costs and benefits of dredging a passageway for increasing port productivity. d) Objective: Assess the overall long-term profitability of the dredging, considering all the socio-environmental-economic aspects. Provide information regarding the convenience of this option as a sustainable growth strategy.

2. Target audience: a) Who seeks to inform and influence? Authorities in charge of developing the investment and management plan of the Hanku hydropower facility and the consumers benefited from the electricity generated, authorities in charge of the assignation of energy budget, Hankules community and important allies for lobbying. b) What they need to know? The magnitude of contributions of the forest to the hydropower plant and the Hankules with and without the investment in the Landscape Management Plan: costs and benefits in both scenarios and for different stakeholders. A "profitability of investment" indicator would be appropriate.	**2. Target audience:** a) Who seeks to inform and influence? Ministry of Construction and Public Works, Indare Coastal Zone Management Authorities, Tabakalúes, Fishing and Farming communities, beneficiaries and cost bearers of the coastal adaptation options. b) What they need to know? Benefit-Cost of different portfolios of coastal adaptation options in the long term, and how such costs and benefits are distributed among the different stakeholders.	**2. Target audience:** a) Who seeks to inform and influence? Bakul Development authorities and Ministry of Finance (investment unit), sectorial representatives that would receive the benefits and accrue the costs of this infrastructure project, other affected sectors who can support with lobbying. b) What they need to know? The environmental, social and economic costs and benefits of the dredging in the long term: "profitability of investment".
3. Scope of policy and research questions: a) Policy question: Will investment on the Integrated Management Plan increase profitability of the Hydropower project and generate public savings? Or: What needs to be considered to have a better-informed investment and management plan for the new Hydropower project? b) Research questions: From which ES does the hydropower facility benefit? What is the contribution (economic value) of such ES to the operation of the hydropower facility? What is the profitability of investment in case that the hydropower plant would invest in the Landscape Management Plan? Which are the costs and benefits of integrating the values of ES in comparison to the business as usual scenario?	**3. Scope of policy and research questions:** a) Policy question: Which is the most social-environmental-economic profitable portfolio of coastal adaptation options in the long term? b) Research questions: Which are the relevant stakeholders related to the coastal adaptation options? Which are the costs and benefits of each coastal adaptation option? Which are the ES related to each option and which are the costs and benefits associated (including those to stakeholders related)? How are the costs and benefits distributed among the stakeholders?	**3. Scope of policy and research questions:** a) Policy question: Is dredging a profitable and equitable decision for encouraging growth in the long-term? b) Research questions: Which are the ES related to the coral reef, and who are the main stakeholders related? Which ES would be affected by the dredging of the passageway? By how much? Which are the environmental-social-economic long-term costs and benefits of dredging the passageway? How does these costs and benefits change with and without the dredge of the passageway? Which would be other recommendations for encouraging tourism and export-oriented industries?

APPLICATION OF EXERCISE 2: UNDERSTANDING ECONOMIC LINKS AND STAKEHOLDERS

Exercise 2 is applied after the reflection on the results of exercise 1. *Below*, find the step to step for the application of exercise 2.

EXERCISE 2 – UNDERSTANDING ECONOMIC LINKS AND STAKEHOLDERS	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure participants have the information and results of exercise 1 at hand, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Following from exercise 1, participants identify the ES that relate to the decision purpose, target audience and research questions in their valuation study. They will also identify the economic linkages and key stakeholders; and prioritize the 3-5 most important ES for their valuation.
Instructions and recommendations	After the reflection discussion of the answers of exercise 1, explain the objectives and instructions of exercise 2. Remind participants that this exercise follows up from exercise 1: each one of the studies will require to understand the benefits that stakeholders involved receive from the *ecosystems* (ES) and how they value them. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. Remind participants that, in order to identify the main ES for their valuation, they can refer to the Ecosystem Services list included in their workbooks. Ask participants to choose a person of their team, who will have 5 minutes to present their results in plenary.

Hints on carrying out the exercise	In this exercise, participants need to go through the list of ES and decide which ones will be prioritized in their valuation study, depending on the decision, issue or policy they want to influence. Most of the times, participants will go through the entire list of ES and analyse the relevance of each one of them for the purpose of their study cases. Considering that most of the times there is not enough time for the application of the exercises, suggest participants to make a preselection of ES and then prioritize a more detailed analysis on this short list. Remind them that the prioritization criteria can differ from case to case, and that they need to use the results of the previous exercise for guidance. When analysing the links of the ecosystem services to economic activities, social and cultural aspects, recommend the teams to use their own real-life experiences. Warn them regarding spending too much time in discussing the existence of links that they are not sure of, especially if the ES is not crucial for the case study. Finally, encourage them to be more careful when answering question number 3, referred to the stakeholders related to the ES in their case study. It is important to differentiate specifically the stakeholders and their links to ES. For example, the dependence and impact on/of ecosystem services is different in the massive tourism sector, the eco-tourism, and divers. Clarifying these relationships will help to be more precise in the valuation of ES. Remember that you should try to guide the teams and correct them when needed, but you should never directly suggest them an answer. If teams do not need guidance, let them work and discuss themselves.
Presentation of results	Give no more than 5 minutes to each group for their presentation. After the presentation, other groups can ask questions and provide feedback.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. · Use the exemplary answers of the exercise to encourage discussion on different results and to ask questions that have not been raised during the reflection. **Possible guiding questions for reflection:** · In terms of the economic valuation, why is it important to link ES to the economic activities and related stakeholders? · Which were the main points of discussion when selecting criteria to select the most important ES? · Does the decision-making context is important for selecting the prioritization criteria? Why? · What are some advantages and disadvantages of prioritizing ES? · Do participants have any real-life examples that contribute to the discussion? *You can mention the criteria used in the IES approach to prioritize ES, which is based on assess the impacts and dependencies of economic activities towards each ES. Even though these prioritization criteria are easily applicable, they can tend to be misleading, as provisioning services tend to be more tangible, and thus often rank higher than other services.
Key messages	· Economic valuation focuses in identifying and measuring the values of ES to the stakeholders involved in a decision-making process. That is why it is crucial to first identify the ES and find the links with the economic activities and/or well-being aspects relevant for such stakeholders. · ES need to be prioritized because not all ES can be valued, and to emphasize those that are more relevant to the decision-making context for different stakeholders involved. · The selected prioritization criteria and the ES prioritized will also depend on the decision-making context and the target audience of the economic valuation.

Below, you will find the exercise 2 and some exemplary answers for the exercises, for each one of the case studies.

EXERCISE 2: UNDERSTANDING ECONOMIC LINKS AND STAKEHOLDERS

In the light of your valuation study purpose, target audience and questions:

1. Which ecosystem services are of relevance to and/or stand to be impacted by the decision question you are addressing?
2. How is each of these ecosystem services linked to economic processes and activities? Do they have any additional social, cultural or other significance that should be noted?
3. Who are the key stakeholders that depend on these processes and activities, and/or stand to be affected if they are impacted in any way?
4. Which 3-5 ecosystem services (benefits and/or costs) are the highest priority and will be covered in your valuation study? Which criteria did you use to prioritise them?

Example:

Ecosystem service	Economic links	Other links/ significance	Key stakeholders
Maintenance of soil fertility	Supports crop production	Supports continued farming of indigenous crop breeds using local knowledge and practices	• Smallholder farmers • Woman market traders

Exemplary answer of exercise 1: Defining the purpose, target audience and questions

CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN			
Ecosystem service	**Economic links**	**Other links/ significance**	**Key stakeholders**
• Erosion control • Reduction in sediment transport • Regulation of water flows • Attenuation of floods and droughts • Water security • Water provision • Carbon sequestration • Provision of raw materials and timber • Provision of food	• Create savings in the production of electricity in the hydropower facility, increasing the productivity and profitability • Ensures the ecological flow for water provision: domestic use and for other economic activities (fishing, recreation, etc.) • Subsistence of the Hankules	• More beneficiaries out of the Landscape Management Area: consumers of electricity and consumers of water in catchment • Cultural heritage for the Hankules • There are other ES provided by the forest and beneficiaries, such as tourists (benefit from recreation), habitants (benefited from soil retention and local temperature regulation), etc.	• Authorities in charge of developing the investment and management plan of the Hanku hydropower facility • Consumers benefited from the electricity generated (taxpayers?) • Authorities in charge of the assignation of energy budget • Hankules community

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE			
Ecosystem service	**Economic links**	**Other links/ significance**	**Key stakeholders**
• Moderation of extreme events • Prevention of coastal erosion • Habitat and nursery for commercial fishing species • Water filtration • Recreation	• Decrease the loss and damages (and expenses) for most of coastal protection activities, such as tourism, fishing, aquaculture, industries etc. • Provide main source of income for tourism and fisheries, as well as main subsistence food for Tabakalues • Water provision for domestic and economic activities uses	• Cultural heritage for the Tabakalues • Coastal population is also benefited from the moderation of extreme events and coastal protection	• Ministry of Construction and Public Works • Indare Coastal Zone Management Authorities • Tabakalúes • Fishing and Farming communities • Beneficiaries and cost bearers of the coastal adaptation options

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR			
Ecosystem service	**Economic links**	**Other links/ significance**	**Key stakeholders**
• Habitat and nursery for commercial fishing species • Recreation (diving) • Coastal protection • Water filtration	• Provide main source of income for tourism and fishing. • Decrease the loss and damages (and therefore expenses) for most of coastal protection activities, such as tourism and fishing.	• Coastal population also benefits from the coastal protection and water filtration.	• Bakul Development authorities and Ministry of Finance (investment unit) • Sectorial representatives that would receive the benefits and accrue the costs of the infrastructure project

MODULE 3: SELECTING AND APPLYING VALUATION METHODS

This module introduces participants to the different frameworks, levels and types of valuations required to provide the necessary inputs to the ecosystem valuation. It accentuates that economic valuation always requires some level of social and biophysical assessments to understand the decision-making context and requires their inputs. Also, during this module, participants are introduced to the monetary economic valuation methods, their rationale, expected outcomes, advantages and disadvantages; and get to apply them for their study cases.

MODULE 3: SELECTING AND APPLYING VALUATION METHODS	
Objectives	· Identify the types of assessments, which results are required as inputs in the economic valuation. · Understand the technical and methodological standards to apply the most commonly used methods in economic valuations. · Understand the meaning of the outcomes/results of the application of most common economic valuation methods.
Key messages	· There are different types and levels of valuation: descriptive, qualitative, quantitative and monetary. Differently from common perception, economic valuation does not always imply a monetary valuation. · Biophysical, economic and social valuation are all linked and complement each other. All of them are usually required in a valuation study. · There is no such thing as the best method: valuation requires a variety of methods in order to capture diverse stakeholders' values and perspectives, and increase the accuracy of results. · Before choosing a method, it is absolutely crucial to count on the following: purpose and policy and research questions of the valuation study (based on the decision-making that will be influenced/changed), target audience to whom the study is addressed to, the prioritized ES and their links to economic activities and/or aspects of well-being, and other possible assessments that will provide relevant inputs to the monetary valuation (biophysical, social, governance, etc.). · The selection of methods should fulfill technical and practical criteria: a) the outcomes of the application contribute to fulfill the purpose of the study and to answer the policy and research questions; b) there is information and data availability; and c) there is enough budget, time and experts to apply the method accurately. · Transparency and replicability of the economic valuation increases its credibility, and therefore, its potential impact.
Overview	**Presentation 6.** When and how to value? **Exercise 3:** Worked example of social and participatory valuation **Presentation 7.** Economic valuation: concepts and methods **Exercise 4:** Choosing and applying economic valuation methods **Exercise 5:** Worked example of economic valuation **Presentation 8:** Dealing with change **Exercise 6:** Developing scenarios and assumptions of change

PRESENTATION 6. WHEN AND HOW TO VALUE?

Before starting this new module, make a recap of the key messages of previous modules, and clarify the connection with this new presentation.

- Ecosystem valuation is all about articulating the value of ES for human wellbeing, for different stakeholder groups and towards different conservation and development outcomes.

- Ecosystem valuation is not an end itself, but it is a tool for better-informed decision-making.

- In order to frame the valuation into the decision-making context and assure its impact, it is necessary to frame it according to a practical purpose and intended outcome. This implies to determine the purpose itself, the target audience, the policy question and research questions.

- Once the economic valuation has been framed according to the decision-making context, it is required to identify the ES and its links to economic activities and stakeholders. This allows recognising the values of ES for the relevant stakeholders.

Main presentation points and notes for the presenter

- Once the ES have been identified, it is crucial to decide in which ways and levels valuation will be carried. This will give the necessary information inputs to the valuation and increase its potential to generate the desired changes. This presentation provides the necessary concepts to understand which are the valuation frameworks and levels that can be applied to the ecosystem valuation.

- The presentation starts with the *total economic value framework* (TEV), which categorizes the types of values according to its uses or non-uses, and associates different ES to each one of such categories. Clarify that very few (if any) valuation studies value all elements of TEV in a single study. They pick out the most important ES based on the study purpose and questions. In fact, it is not possible to value all elements of TEV.

Content covered in presentation 6

- Total Economic Value framework
- Different levels of valuation
- Characteristics of, and linkages between biophysical, economic and social valuation
- Why is it necessary to combine methods and valuation perspectives?
- Concept of multiple values.

- Another important concept to be accentuated is that there are different levels of valuation: monetary, quantitative and qualitative. Emphasize that the economic valuation of ES is not synonym of a monetary valuation. Maybe you can bring some real-life examples of valuations made in the different levels, and which results are expressed in different levels (not always monetary or quantitative).

- Even though this course focuses on an economic assessment, mention the other existing types of assessments and how they contribute to the economic one: biophysical and social assessments. In reality, economic valuation is rarely carried out in isolation. When presenting the types of assessments, mention their differences, but also how they complement each other: economic valuation always requires some level of social and biophysical assessment to understand the decision-making context, and most of the times, it requires their inputs.

- ES can be valued in terms of their biophysical effects, economic costs and benefits, livelihood and wellbeing impacts and social/institutional outcomes. As in the case of the types of assessments, economic valuations also require a level of assessment of each one of these categories. Ask participants to give examples on each one of these categories. Try to exemplify with some case studies how each category complements each other when undertaking an economic valuation.

- Since valuation examine the value of ES from diverse stakeholder's perspectives, it cannot use a single method. An appropriate mix of methods is also necessary to be able to compare the outcomes and approximate to the most accurate results. Remind participants that the methods should also be selected in terms of their contribution to answer the policy question and the purpose of the whole valuation.

- Refer to the concept of diverse and multiple values using the framework provided by IPBES. Exemplify it by asking participants the perceived values of an ecosystem, under the perspective of different stakeholders. The presentation already gives some examples, but it is highly recommended to provide examples that fit to the participant's interests and work. After the exemplification of the concept, emphasize that when assessing multiple values, it is often required to apply a mix of valuation methods with participatory techniques and give some examples.

- Finally, present a case study where participatory methods were used to assess multiple values. We have suggested the sustainable livelihoods framework, but this is of course not the only option feel free to substitute it with your own preferred method(s) or example(s). The point is to illustrate that economic valuation is not just to do with the 'classic' toolbox of valuation techniques presented in the next section.

- If using the sustainable livelihoods framework example, explain that this approach is based on the fact that stakeholders require a combination of different types of capital to accomplish well-being. Carefully explain the examples on the types of capital (that constitute the livelihood asset), since exercise 3 will require participants to think of such elements for their study cases. In case that is required, leave a slide with examples for the participants to have some guide while making the exercise. Try to use a different example than the one provided in the presentation, so it fits better to the participants' interests and experience.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation. **It is important to mention that even though the references for examples are included, it is highly recommended to use different examples which are relevant for the participant s interests and experience. In case of using the examples provided in the presentation, read the whole case carefully in order to transmit the information correctly. Also, cite the sources adequately.**

Emerton, L. 2015. Summary of the Economic Value of Biodiversity and Ecosystem Services in Lake Nabugabo Wetland Complex. Ministry of Water and Environment. The Republic of Uganda.

Emerton, L.; Kaludjerovic J. and Jovetic, I. 2011. The Economic Value of Protected Areas in Montenegro. United Nations Development Programm. Global Environmental Fund.

Conservation Strategy Fund. 2017. Brochure: Valution of Ecosystem Services Provided by Iztaccíhuatl-Popocatépetl National Park. Commission for Natural Protected Areas (Mexico). Deutsche Gesellschaft fürt International Zusammenarbeit. Retrieved from: *https://www.giz.de/de/downloads/giz2017-en-popo-policy.pdf*

Chan, Kai M.A.; Balvanera, Patricia; Benessaiah, Karina; Chapman, Molie; Díaz, Sandra; Gómez-Baggethun, Erik; Gould, Rachelle; Hannahs, Neil; Jax, Kurt; Klain, Sarah; Luck, Gary W.; Martín-López, Berta; Muraca, Barbara; Norton, Bryan; Ott, Konrad; Pascual, Unai; Satterfield, terre; Tadaki, Marc; Taggart, Jonathan and Turner, Nancy. 2016. Why protect Nature? Rethinking values and the environment. PNAS vol. 113. No. 6. Pp 1462-1465.

Gonzalez-Jimenez, David; Berghöfer, Uta; Berghöfer, Augustin; Heubach, Katja; Kosmus, Marina and von Bertrab-Tamm Alejandro. 2018. Beyond Measurements: Multiple Values of Nature and their Diverse Conceptualization. Retrieved from: *http://www.aboutvalues.net/ru/data/ipbes/ipbes_values_of_nature_en.pdf*

Gantioler S., Rayment M., Bassi S., Kettunen M., McConville A., Landgrebe R., Gerdes H. and P. ten Brink. 2010. Costs and Socio-Economic Benefits associated with the Natura 2000 Network. Final report to the European Commission, DG Environment.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. 2015. Preliminary guide regarding diverse conceptualization of multiple values of nature and its benefits, including biodiversity and ecosystem functions and services. Plenary of the IPBES. Fourth Session. Kuala Lumpur, February 2016.

LIFE Viva Grass. Assessment of Ecosystem Services. Retrieved from: *http://vivagrass.eu/ecosystem-services/valuation-of-ecosystem-services/*

Nicholles, N., Vardakoulias, O. and O. Johnson. 2014. Counting on uncertainty: The economic case for community-based adaptation in North-East Kenya. Report prepared for CARE International by *New Economics Foundation* (NEF). London

Organisation for Economic Cooperation and Development. 2002. Handbook of Biodiversity Valuation. A Guide for Policy Makers. France. Retrieved from: *https://www.oecd-ilibrary.org/environment/handbook-of-biodiversity-valuation_9789264175792-en*

Secretariat of the Convention on Biological Diversity. 2007. An Exploration of Tools and Methodologies for Valuation of Biodiversity and Biodiversity Resources and Functions. Technical Series no. 28, Montreal, Canada, 71 pages.

ValuES. Methods for integrating ecosystem services into policy, planning and practice. Method profile: Participatory economic valuation methods. Retrieved from: *http://aboutvalues.net/data/method_navigator/values_method_profile_participatory_valuation_en.pdf*

Department for International Development. 2001. Sustainable Livelihoods Guidance Sheets. London. Retrieved from: *http://www.livelihoodscentre.org/documents/20720/100145/Sustainable+livelihoods+guidance+sheets/8f35b59f-8207-43fc-8b99-df75d3000e86*

APPLICATION OF EXERCISE 3: WORKED EXAMPLE OF SOCIAL AND PARTICIPATORY VALUATION

Below, you will find the step by step to apply the exercise 3, the instructions, as wells as further information for each one of case studies and some exemplary answers.

EXERCISE 3 – WORKED EXAMPLES OF SOCIAL AND PARTICIPATORY VALUATION	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure participants have the information and results of exercise 1 and 2 at hand, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Participants will give examples on non-monetary valuation methods for their own case studies, so they incorporate stakeholders' perceptions and preferences.
Instructions and recommendations	After giving the presentation on "When and how to value" explain the objectives and instructions of exercise 3. Tell them that for answering this exercise, they will receive additional information of their case studies. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. Ask participants to choose a person of their team, who will have 5 minutes to present their results in plenary. Remind participants that they can guide themselves through the exercise by looking at the sustainable livelihoods framework and the examples in the slides. Also, to answer this exercise, they should take into account the information and results of exercises 1 and 2.

Presentation of results	In this exercise, participants will identify indicators of livelihood assets to be measured for their economic valuation studies. In some cases, participants will require to take a second look into the examples provided in the presentation to solve this exercise. If this is the case, make sure that you leave the slide with examples visible and provide guidance to the teams that require it. When there is confusion regarding the meaning of the livelihood assets, suggest participants to look to the additional information provided with the exercise and explain again if necessary. If there is not enough time for undertaking the exercise, indicate the participants to answer question number one just for two or three livelihood assets. Try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	Give no more than 5 minutes to each group for their presentation. After the presentation, other groups can ask questions and provide feedback.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. Use the exemplary answers of the exercise to encourage discussion on different results and to ask questions that have not been raised during the reflection. **Possible guiding questions for reflection:** · Which were the main challenges in finding indicators for the livelihood assets in your own study cases? · Do you think this perspective is relevant? Why? Do you have any real examples where this approach would be useful/relevant? · What do you think are the main advantages and disadvantages of this approach? · How can this approach provide information that helps achieving the purpose of your economic valuations?
Key messages	· There are different types and levels of valuation, descriptive, qualitative, quantitative and monetary. Differently from common perception, economic valuation does not always imply a monetary valuation. · Biophysical, economic and social valuation are all linked and complement each other. All of them are usually required to be included in a valuation study. · Economic valuation requires capturing diverse stakeholders' values and perspectives. Such multiple values can be integrated in the study by using diverse methods. · Valuation usually requires using a variety of methods in order to capture diverse stakeholders' values and perspectives, and increase the accuracy of results.

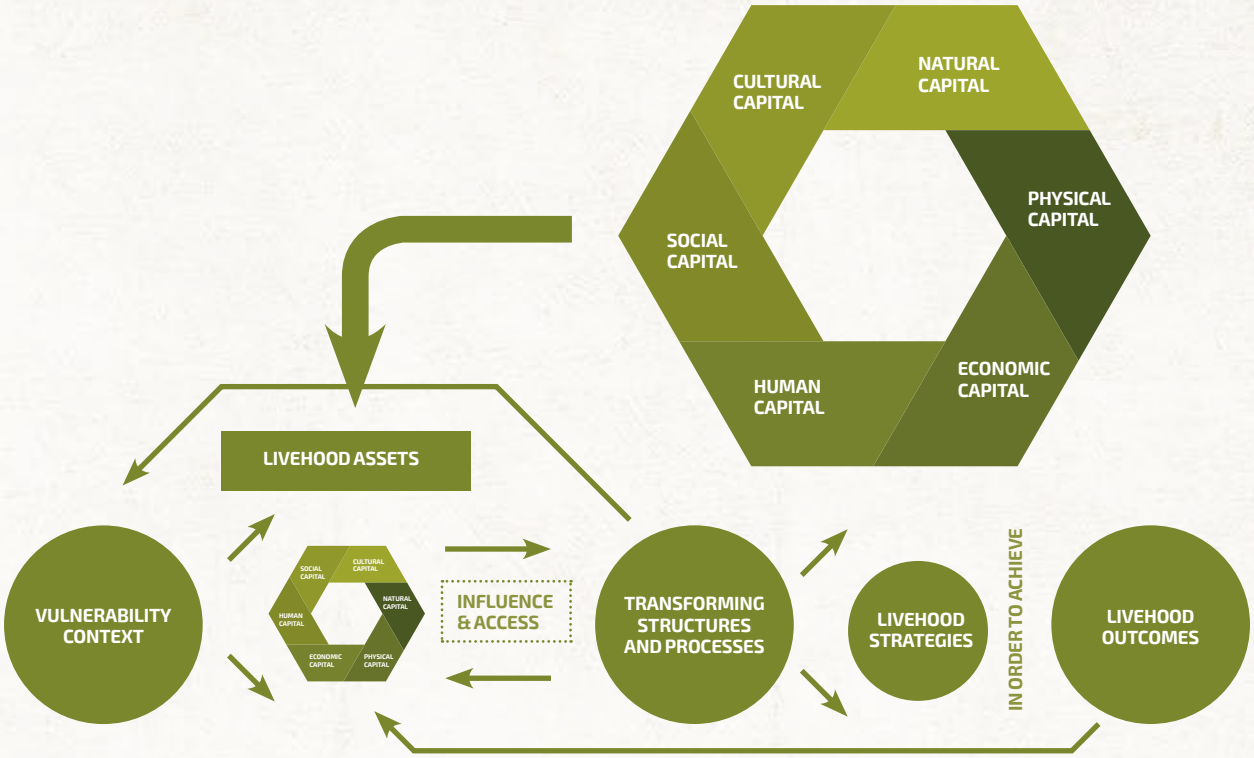
EXERCISE 3: WORKED EXAMPLE OF SOCIAL AND PARTICIPATORY VALUATION

In relation to the particular aim of your social and participatory valuation exercise (see further information *below*):

1. Identify up to 3 indicators that could be used to measure outcomes and impacts for the local community in relation to each of the following livelihood assets (see explanation of the six capitals *below*):
   a) Physical capital;
   b) Economic capital;
   c) Human capital;
   d) Social capital;
   e) Human capital; and
   f) Natural capital.

2. How could these indicators be quantified and (if applicable/possible) monetised?

THE SUSTAINABLE LIVELIHOODS FRAMEWORK AND SIX CAPITALS



Source: Adapted from: DFID (1999) Sustainable Livelihoods Guidance Sheets. Department for International Development, London; Roseland, M. (2012) Toward Sustainable Communities: Solutions for Citizens and their Governments. New Society Publishers, Gabriola Island.

Physical capital: the basic facilities and infrastructure that people need to survive and make a living, as well as the tools and equipment that they use to do so. For example: buildings, transport and communication systems, water and sanitation systems, energy, etc.

Economic capital: the material resources that people use to achieve their livelihood objectives as well as the systems and institutions, which have been developed to allocate and make decisions about material resources. For example: savings, cash earnings and other inflows that can be exchanged or transformed into other goods, banks, markets, barter systems, etc.

Human capital: the skills, knowledge, ability to labour and good health that enable people to pursue different livelihood strategies and achieve their livelihood objectives. Note that good health and education are not simply means to earning a livelihood; they are of course also ends in themselves.

Social capital: the social resources that people draw on to make a living and facilitate collective action, such as relationships with either more powerful people (vertical connections) or with others like themselves (horizontal connections), membership of formal and informal groups and organisations. Like human capital, social capital has an intrinsic value; good social relationships are not simply a means, they are an end in themselves.

Cultural capital: the shared values, norms and heritage that hold significance at the communal level as a means of defining identity, reinforcing worth, promoting cohesion and articulating (or reflecting) worldviews. For example: customs, history, language, arts, styles of dress, habits, artefacts, sites, etc.

Natural capital: the natural resource stocks from which products and services useful for livelihoods are derived. For example: land, air, water, minerals, trees, wetlands, etc.

FURTHER INFORMATION FOR CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN

For the last 15 years (since 2003), the 50,000 hectare Belandu Watershed Forest has been managed as a strict protection zone by the Forest Department. Much of the area that is now the forest reserve was formerly owned, used and managed by the Hankulen community. Not only were the Hankulen alienated from their traditional lands (including some key cultural sites), but they lost access to a key source of the products that they depend on for their day-to-day survival. Since 2003, the community have found it hard to meet their needs for fuelwood, building materials, medicinal plants, wild foods and materials for handicraft items from the 10,000-hectare Hankulen Community Ecological Reserve (the only forest area that they are now allowed access to). They are forced to walk long distances to obtain these products from other, distant forest areas, or to spend cash on purchased alternatives.

One of features of the Integrated Landscape Management Plan is that the entire 60,000-hectare forest complex (both the Belandu Watershed Forest and the Hankulen Community Ecological Reserve) will be managed under a 20-year community forest management agreement. This will be guided by a forest management and utilization plan, to be developed and agreed jointly between the Belandu Forest Department and the Hankules Community Natural Resource Management Committee.

The aim of the social and participatory valuation is to set up a baseline from which the costs, benefits and impacts of joint forest management for the Hankules community can be monitored and evaluated over time.

FURTHER INFORMATION FOR CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE

As well as protecting urban and tourist areas around Hanku City, a key goal of the coastal adaptation strategy is to safeguard the livelihoods of poor and marginalized communities such as the Tabakalues. The Tabakalues are vulnerable to the effects of climate change in a number of ways. One key vulnerability is to the physical effects of storms, tidal surges, coastal erosion and sea-level rise. The Tabakalues live in low-lying areas next to the coast, and have seen whole settlements (including houses, fishing boats and farms) being washed away over recent years. Salt-water intrusion is also threatening domestic water sources and poisoning the soil on farms and in pasturelands. In addition to the problems associated with the salinization of agricultural soils, both fisheries and crop production possibilities are also changing (and becoming considerably more uncertain) due to shifts in temperature patterns.

The Indare Coastal Zone Management Authority wants to ensure that the planned coastal protection measures (whether they are grey, green or a hybrid mixture of the two) take account of local needs for stable and secure livelihoods, social wellbeing and resilience in the face of climate change. The consultancy company has been asked to work with members of the Tabakalues community to identify key indicators of impact that the adaptation infrastructure (and any co-benefits they might generate) should be measured against, which will reflect local needs, preferences and perceptions.

The aim of the social and participatory valuation is to set up a baseline from which the costs, benefits and impacts of coastal protection activities for the Tabakalues community can be measured, and against which the relative desirability of different adaptation options can be appraised.

FURTHER INFORMATION FOR CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR

The Bakumoken, popularly (although incorrectly) known as "Sea Gypsies" live in the waters of the Southern Blue Ocean. Most follow a semi-nomadic hunter-gatherer existence, roaming the seas in their small wooden boats, which serve as both transportation and houses. Their in-depth knowledge of marine species allows them to live off fish and other natural products, using simple tools such as nets and spears to forage for food. What is not consumed is dried, and used to barter for other necessities at local markets. During the stormy monsoon season, the Bakumoken confine themselves to the sheltered inlets and lagoons of the reef and its surrounding coral atolls. Bakul Reef Marine Protected Area is a particularly important monsoon refuge, as well as a rich fishing ground. Several of the islands that are included in the MPA also hold special historical and religious significance for the Bakumoken, as it is believed that the first ancestors of the community emerged from the seas below these islands.

The aim of the valuation is to ensure that the potential impacts of coral reef destruction on the Bakumoken will be fairly represented and taken into account in decision-making. The intention is to come up with a set of indicators that would demonstrate the significance of the MPA reef area for the Bakumoken culture, livelihoods and economy and could be used to monitor the effects of any changes in its status.

Exemplary answer of exercise 1: Defining the purpose, target audience and questions

CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN		
Type of capital	**Indicators**	**How could these indicators be quantified/monetised?**
Physical capital	Amount of fuelwood, building materials and medicinal plants	Change in weight/volume and commercial price of fuelwood, building materials and medicinal plants
Economic capital	Opportunity cost of recollection of fuelwood, building materials and medicinal plants	Change in time/money spent in recollection/purchase of fuelwood, building materials and medicinal plants in alternative sites
Human capital	Health of Hankulen population	Change in epidemiologic profile and sickness incidence of Hankulen community
Social capital	Population of Hankules participating/included in the Integrated Landscape Management Plan	% of Hankule community participating in the Integrated Landscape Management Plan (can include gender quota)
Cultural capital	Access of Hankules to relevant cultural sites	% of key cultural sites where Hankulen can access to
Natural capital	Natural coverage under the Integrated Landscape Management Plan	% of change of natural coverage % of land under different management categories

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE		
Type of capital	**Indicators**	**How could these indicators be quantified/monetised?**
Physical capital	Losses and damages in infrastructure	Monetary losses and damages in infrastructure
Economic capital	Losses and damages in farms and fishing boats	Monetary losses and damages in agriculture and fishing
Human capital	Health of Tabakalues population	Change in epidemiologic profile and sickness incidence of Tabakalues community
Social capital	Population of Tabakalues participating/included in the determination of coastal protection measures	% of Tabakalues population participating/included in the determination of coastal protection measures
Cultural capital	Threaten to traditional fishing and agricultural practices of Tabakalues Shift to other economic activities	% change in productivity derived from change in traditional agricultural and fishing practices Change in number of Tabakalues which have shifted their economic activities from agriculture and fishing
Natural capital	Water affected by saline intrusion	Volume of water affected by saline intrusion and impact in agriculture productivity

Exemplary answer of exercise 1: Defining the purpose, target audience and questions

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR		
Type of capital	**Indicators**	**How could these indicators be quantified/monetised?**
Physical capital	Boats used as transport and houses	Change in the number of boats used as transport and houses % of Bakumoken population living in boats used as transport and houses
Economic capital	Losses in availability of fish and marine resources for its consumption and sale by the Bakumoken	Change in the volume of fish and marine resources used for consumption and sale by the Bakumoken Change in income for the sale of fish and marine resources
Human capital	Health of Bakumoken population	Change in epidemiologic profile and sickness incidence of Bakumoken community
Social capital	Bakumoken living in semi-nomadic communities	Change in number of Bakumoken living in semi-nomadic communities (can be % of population)
Cultural capital	Permanence of natural sites of religious significance for the Bakumoken	Change in quantity and quality of the natural sites of religious significance for the Bakumoken
Natural capital	Health condition of the reef	Change in quality of reef Change in fish population species depending on the reef

PRESENTATION 7. ECONOMIC VALUATION: CONCEPTS AND METHODS

In this section, the most used economic valuation methods are presented. It is worth emphasising that in many cases, this is what participants expect the course to cover and think they will learn, before they come to the course. For this reason (and because it goes over the very fundamentals of economic valuation methods), it is a crucial component of the course. It is important for participants to become familiar with the terminology and applications of different valuation methods; but a key message to keep on reinforcing is that, what matters most is the purpose of the valuation and tailoring the methods to the decision context. This recaps on module 2.

Before embarking on explaining economic valuation methods, make sure that you go through a recap that highlights the key messages of previous presentations and exercises.

- The objective of economic valuations of ES is to influence decision-making to encourage an efficient, equitable and sustainable use of resources, and promote economic welfare.

- Before thinking on the selection of methods, it is absolutely crucial to count on the following: purpose and policy and research questions of the valuation study (based on the decision-making that will be influenced/changed), target audience to whom the study is addressed to, the prioritized ES and their links to economic activities and/or aspects of well-being, and other possible assessments that will provide relevant inputs to the monetary valuation (biophysical, social, governance, etc.).

- There are different levels and types of valuations: valuations can be descriptive, qualitative, quantitative and monetary; and most of the times they need to count on inputs from social and biophysical assessments.

- Go back to explain the TEV framework and remind participants that not all the elements of the TEV should/can be valued. This responds to the fact that only some of them will contribute to fulfil the study's purpose and policy and research questions.

Content covered in presentation 6

- Total Economic Value framework
- Different levels of valuation
- Characteristics of, and linkages between biophysical, economic and social valuation
- Why is it necessary to combine methods and valuation perspectives?
- Concept of multiple values.

- Finally warn participants that in this section and the corresponding exercises, the level of valuation being covered is the monetary valuation. Nevertheless, this one is not always necessary (to fulfil the study's purpose) or possible to be undertaken. As mentioned before, depending on the study's purpose and questions, valuations can be purely descriptive, qualitative, quantitative and/or monetary.

Main presentation points and notes for the presenter

- To introduce the methods presentation, explain the most traditional way in which goods and services are valued: market prices. Ask participants to clarify the limitations of this method to value ES. In case participants do not underlay it, the key message relies in that many ES do not have market prices (and if they do, they are distorted), which would suggest they do not have a value. That is the reason why economists have tried to develop methods that do capture the ES values.

- The most used methods (almost all ecosystem valuation studies use one or more of these methods) are integrated in the "economic valuation toolbox". Do not take time to explain each one of the methods at this moment: only explain how they are categorized and their rationale, for example: "revealed preference methods", imply to observe people's behaviour to understand how they value something, instead of asking directly, as it is the case for the "stated preference methods").

- Once you start presenting each one of the methods, make sure that you explain its rationale with the least complicated language as possible. Remember that participants should not be experts in the application on each one of the methods, but they should understand what the logic of each one of them is and the type of results and outcomes of their application. The explanation on the methods should allow them to identify which methods could be potentially useful for the specific purposes and ES of their case studies.

- When explaining each one of the methods, make sure to clarify:
  - Their rationale in easy and understandable language
  - For which types of purposes, ES values and contexts can they be applied
  - The information and data needs for their application
  - Expected outcomes of their application
  - The advantages and disadvantages of their application
  - Main challenges
  - Example of a case study where it is possible to identify the practical purpose and how the method contributed to fulfil the study's objective (remember to try to put your own examples and case studies, so they are tailored to the participants' needs, interests and mandates).

- Many participants might be interested in learning how to apply each one of the methods "step-by-step". Mention that there is a lot of free guidance (documents, tools, publications, case studies, etc.) and that there should be no problem to find it. You can also share some of the resources provided in this manual, or some other sources you find relevant.

- Once you finish presenting each one of the methods, give participants some practical tips on how to select the most adequate method for their purpose, policy and research questions. It is crucial to communicate that there is no such thing as the best method, and it is always the method that must adapt to the context and the purpose of the study, not the other way around. Explain that each valuation can (and desirably should) use a range of methods to crosscheck the results and present a range of possible values. The most appropriate method should fulfil both technical and practical criteria. Some of the criteria they should consider when selecting the method are: a) the outcomes of the application contribute to fulfil the purpose of the study and to answer the policy and research questions; b) there is information and data availability; and c) there is enough budget, time and experts to apply the method accurately.

- Encourage participants not to stop considering the key messages on the last presentation regarding the different levels and types of valuations: valuations can be descriptive, qualitative, quantitative and monetary; and most of the times they need to count on inputs from social and biophysical assessments.

- Finalize the presentation with a practical example in which different valuation methods were used, and quickly exemplify all the steps of valuation for this specific case study as follows. Remember that it is highly desirable to choose a different example from the one provided in the presentation, so it fits the participants' interests and experience.
  - Environmental, social, economic and political context
  - Purpose of the study
  - Policy and research questions
  - Identification of ES, its links with economic activities and well-being aspects
  - Selected methods
  - Overview of the arithmetic and data behind the application of each method

- As already suggested in previous sections, this is a point at which you might also want to extend the time allocated to this module and bring in some local/national experts (or people from the sector or theme that the course is dealing with) to make more detailed presentations. These would show how valuation has been applied in practice and (hopefully!) served to influence decision-making.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation. **It is important to mention that even though the references for examples are included, it is highly recommended to use different examples, which are relevant for the participant s interests and experience. In case of using the examples provided in the presentation, read the whole case carefully in order to transmit the information correctly. Also, cite the sources adequately.**

ValuES. Methods for integrating ecosystem services into policy, planning and practice. ValuES Method Navigator. Retrieved from: *http://aboutvalues.net/method_navigator/*

Bann, C. 1999. A Contingent Valuation of the Mangroves of Benut, Johor State, Malaysia. Johor State Forestry Department, Johor.

Bliem, M. and M. Getzner. 2008. Valuation of ecological restoration benefits in the Danube River basin using stated preference methods. Institute for Advanced Studies Carinthia/ Department of Economics, Klagenfurt University.

Ceroni, M. 2007. Ecosystem services and the local economy in Maramures Mountains Natural Park, Romania. Report submitted to U*nited Nations Development Programme* (UNDP), Bucharest.

Chong, J. 2005. Valuing the Role of Wetlands in Livelihoods: Constraints and Opportunities for Community Fisheries and Wetland Management in Stoeng Treng Ramsar Site, Cambodia. IUCN Water, Nature and Economics Technical Paper No. 3, IUCN — The World Conservation Union, Colombo.

Conservation Strategy Fund. Econ Video Lessons. Videos on Economic Valuation Methods. Retrieved from: *https://www.conservation-strategy.org/en/csf-econ-video-lessons.*

Delang, C.O. 2005. Economic valuation of non-marketed wild edible plants in Thailand. Environmental Conservation 32(4): 285-287.

Department for Environment Food and Rural Affairs. 2007. An introductory guide to valuing ecosystem services. Retrieved from: *http://ec.europa.eu/environment/nature/biodiversity/economics/pdf/valuing_ecosystems.pdf*

Do, T. and J. Bennett. 2007. Estimating Wetland Biodiversity Values: A choice modelling application in Vietnam's Mekong River Delta. Economics and Environment Network Working Paper EEN0704, Australian National University, Canberra.

Eftec. 2014. Valuing the UK Marine Environment – an Exploratory Study of Benthic Ecosystem Services. Project ERG1202 – Valuing Ecosystem Services in the Marine Environment, ABPmer, University of Stirling and eftec, London.

Emerton, L. 1996. Valuing the Subsistence Use of Forest Products in Oldonyo Orok Forest, Kenya. Rural Development Forestry Network Paper 19e, *Overseas Development Institute* (ODI), London.

Emerton, L. 2015. The economic value of the ecosystem services generated by Tokio Marine & Nichido's mangrove planting activities, Mitsubishi Research institute, Tokyo.

Emerton, L., Ha Tran Thi Thu, Hoang Thach Mai, Viet Anh Hoang and E. Ebert. 2014. The economic value of Cat Tien National Park. GIZ/MARD project Conservation of Biodiversity in Forest Ecosystems in Vietnam, Hanoi.

Emerton, L., Iyango, L., Luwum, P., and A. Malinga. 1999. The Economic Value of Nakivubo Urban Wetland, Uganda, IUCN, Nairobi.

Gallai, N., Salles, J-M, Settele, J. and B.E. Vaissière, 2007. Economic valuation of the vulnerability of world agriculture confronted to pollinator decline. Institut National de la Recherche Agronomique, Paris.

Getzner, M. 2009. Valuation of Ecosystem Services in Tatra and Slovensky Raj National Parks. WWF for Nature Danube Carpathian Programme, Vienna

Hatfield, R. and Malleret-King, M. (2007) The economic value of the Mountain Gorilla protected forests (the Virungas and Bwindi Impenetrable National Park). *International Gorilla Conservation Programme* (IGCP), Nairobi

Hoberg, J. 2011. Economic Analysis of Mangrove Forests: A case study in Gazi Bay, Kenya. *United Nations Environment Programme* (UNEP), Nairobi.

Kumar, Pushpam; Verma, Madhu; Wood, Michael D. and Negandhi, Dhaval. 2010. Guidance Manual for the Valuation of Regulating Services. United Nations Environment Programme.

McAllister, D.E., 1991. What is a coral reef worth? Sea Wind 5(1):21-24.

Mahan, B.L. 1997. Valuing Urban Wetlands: A Property Pricing Approach,

US Army Corps of Engineers Institute for Water Resources, Report 97-R-1, Washington DC.

Majule, A., Yanda, P., Kangalawe, R. and R. Lokina. 2011. Economic Valuation Assessment of Land Resources, Ecosystems Services and Resource Degradation in Tanzania. Report prepared for The Global Mechanism by the Institute for Resource Assessment, University of Dar es Salaam.

Mombo, F., Lusambo, L., Speelman, S., Buysse, J., Munishi, P. and can Huylenbroeck, G. (2014) Scope for introducing payments for ecosystem services as a strategy to reduce deforestation in the Kilombero wetlands catchment area. Forest Policy and Economics 38: 81-89.

Munyuli, B. 2014. Social and Ecological Drivers of the Economic Value of Pollination Services Delivered to Coffee in Central Uganda. Journal of Ecosystems vol. 2014.

Navrud, S. and E.D. Mungatana. 1994. Environmental valuation in developing countries: The recreational value of wildlife viewing. Ecological Economics 11(2): 135-151.

Organisation for Economic Cooperation and Development. 2002. Handbook of Biodiversity Valuation. A Guide for Policy Makers. France. Retrieved from: *https://www.oecd-ilibrary.org/environment/handbook-of-biodiversity-valuation_9789264175792-en*

Pagiola, Stefano; von Ritter, Konrad and Bishop, Joshua. 2004. How Much is an Ecosystem Worth? World Bank, Nature Conservancy, IUCN. Washington. Retrieved from: *https://portals.iucn.org/library/node/8529*

Pattanayak, S. and D. Mercer. 1998. Valuing soil conservation benefits of agroforestry: contour hedgerows in the Eastern Visayas, Philippines. Agricultural Economics 18: 31-46.

Ricketts et al. 2004. Economic value of tropical forest to coffee production. PNAS

Shahwahid, M., Awang Noor, A., Abdlu Rahim, N., Zulkifli, Y. and U. Razani. 1997. Economic Benefits of Watershed Protection and Trade-Off with Timber Production: A Case Study in Malaysia. EEPSEA Research Report, Singapore & Ottawa

Sjaastad, E., Chamshama, S., Magnussen, K., Monela, G., Ngaga, Y and Vedeld, P. 2003. Resource economic analysis of catchment forest reserves in Tanzania. Report to Ministry of Natural Resources and Tourism. Forestry and Beekeeping. Division. Dar es Salaam, Tanzania

Seenprachawong, U. 2003. Economic valuation of coral reefs at Phi Phi Islands, Thailand. International Journal of Global Environmental Issues 3(1): 104–114

Turpie, J., Joubert, A., van Zyl, H., Harding, B. and Leiman, A. 2001. Valuation of Open Space in the Cape Metropolitan Area. Report to the City of Cape Town; Van Zyl, H. and Leiman, A. (2002) Hedonic approaches to estimating the impacts of open spaces: a case study in the Cape. South African Journal of Economic and Management Sciences 5(2): 379-394.

Van Beukering, P., Grogan, K., Hansfort, S. and D. Seager. 2009. An Economic Valuation of Aceh's forests: The road towards sustainable development. Report R-09/14, Institute for Environmental Studies, VU University, Amsterdam.

APPLICATION OF EXERCISE 4: CHOOSING AND APPLYING ECONOMIC VALUATION METHODS

EXERCISE 4 – CHOOSING AND APPLYING ECONOMIC VALUATION METHODS	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure participants have the information and results of exercise 2 and 3, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Participants will indicate which economic methods they would use to value each of the ecosystem services prioritized in their own case studies. For each one of the methods, they will identify the biophysical data and information requirements, and they will specify which supplementary social and/or participatory methods could be needed to engage key stakeholders.
Instructions and recommendations	After the economic valuation methods presentation, explain the objectives and instructions of exercise 4. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. It is important for participants to note that the inputs for this exercise (prioritized ES) come from exercise 2. Remind participants that they can find complementary guidance on each one of the valuation methods in their workbooks. Ask participants to choose a person of their team, who will have 5 minutes to present their results in plenary.

Hints on carrying out the exercise	This is the first of two exercises in which participants take a closer look to the monetary economic valuation methods. For solving this exercise, it is very important that the teams understand the rationale, expected results, data required and advantages and disadvantages of each one of the methods. Even though the presentation covered this content, point out that they can look for additional information in their workbooks. It might be the case that participants have some questions regarding the meaning of question 2, associated to the data sources required for the application of the method. Indicate that this question tries to encourage participants to reflect on the type of data they will require for the application of the method, from where they could get it, and very importantly, the scope of application. It is in this moment, when participants also must face the scope in which ES will be valued and the level of information they will need (local, national, regional, etc.). In case there is not much time for the application of this exercise, participants could answer all the questions but just for 1 or 2 ES. Try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	Give no more than 5 minutes to each group for their presentation. After the presentation, other groups can ask questions and provide feedback.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. · As a trainer, use the exemplary answers of the exercise to encourage discussion on different results and to ask questions that have not been raised during the reflection. **Possible guiding questions for reflection:** · Which criteria did you use to select the methods for valuing the prioritized ES? · Which were the main points of discussion when selecting the methods to value the prioritized ES? · Which were the main challenges? · Did the purpose of the study and the target audience was important for selecting the methods criteria? Why? · Would the results of the application of the methods you chose, give relevant information to the target audience (to change/influence their decision-making)? · What are some advantages and disadvantages of the methods you selected? · Do participants have any real-life examples that contribute to the discussion?
Key messages	· Depending on the study's purpose and questions, valuations can be purely descriptive, qualitative, quantitative and/or monetary. In this section, only monetary valuation methods are presented. · Most of the times, valuations need to count on inputs from social and biophysical assessments. · Not all elements of the TEV should/can be valued, since only some of them will contribute to fulfill the study's purpose. · There is no such thing as the best method: each valuation desirably should use a range of methods to crosscheck the results and present a range of possible values. · Before choosing a method, it is absolutely crucial to count on the following: purpose and policy and research questions of the valuation study (based on the decision-making that will be influenced/changed), target audience to whom the study is addressed to, the prioritized ES and their links to economic activities and/or aspects of well-being, other possible assessments that will provide relevant inputs to the monetary valuation (biophysical, social, governance, etc.). · The selection of methods should fulfill technical and practical criteria: a) the outcomes of the application contribute to fulfill the purpose of the study and to answer the policy and research questions; b) there is information and data availability; and c) there is enough budget, time and experts to apply the method accurately.

Below, you will find the exercise 4 and some exemplary answers for the exercises, for each one of the case studies.

EXERCISE 4: CHOOSING AND APPLYING ECONOMIC VALUATION METHODS

For each of the priority ecosystem services selected for your valuation study:

1. Which economic method(s) would you use to value this ecosystem service (see overview of commonly used economic valuation methods *below*)?

2. How would you collect the data required to apply the economic valuation method?

Example:

ECOSYSTEM SERVICE	ECONOMIC LINKS	DATA SOURCES
Flood prevention by wetlands	Damage costs avoided	Government records of natural disaster impacts and spending on relief & rehabilitation Survey of flood-affected households

Overview of commonly-used economic valuation methods

CATEGORY	METHOD	ELEMENT(S) OF TEV	APPLICATION	STRENGTHS	LIMITATIONS
Market prices Market prices	Market prices	Direct & indirect use	Money paid for ecosystem goods and services that are traded in commercial markets (e.g. timber, fish)	Market data readily available and robust	Limited to those ecosystem services for which a market exists
	Substitute prices		The market price of a close substitute for a naturally-occurring product (e.g. kerosene for fuelwood, roof tiles for thatching grass, purchased feed for pasture)	Market data readily available and robust	Limited to those ecosystem services for which a market substitute exists
Production function approach	Effect on Production	Indirect use	Value is inferred by considering the changes in quality and/or quantity of a marketed good that results from an ecosystem change (e.g. fisheries income resulting from improvements in water quality)	Market data readily available and robust	Data-intensive and data on changes in services and the impact on production often missing

CATEGORY	METHOD	ELEMENT(S) OF TEV	APPLICATION	STRENGTHS	LIMITATIONS
Surrogate market approaches	Travel cost	Direct & indirect use	It assumes that the value of a site is reflected in how much people are willing to pay to travel to the site. Costs considered are travel expenditures, entrance fees and the value of time.	Based on observed behaviour	Generally limited to recreational benefits. Difficulties arise when trips are made to multiple destinations or for multiple motivations.
	Hedonic price		Value of environmental amenities (air quality, scenic beauty, cultural benefits, etc.) that affect prices of marketed goods (e.g. the higher market value of waterfront property, or houses next to green spaces)	Based on market data, so relatively robust figures	Very data-intensive and limited mainly to services related to property
Cost-based approches	Replacement costs	Direct & indirect use	Value is based on the cost of replacing the ecosystem service (function) or providing substitutes (e.g. previously clean water that now has to be purified in a plant)	Based on observed behaviour	Generally limited to recreational benefits. Difficulties arise when trips are made to multiple destinations or for multiple motivations.
	Damage costs avoided		Value is based on the costs of actions taken to avoid damages if a specific ecosystem service did not exist (e.g. the costs to protect a property from flooding)	Market data readily available and robust	Can potentially overestimate actual value
	Mitigative & avertive expenditures		The costs of dealing with the effects of the loss of an ecosystem service, in terms of what has to be spent to remediate any negative impacts (e.g. costs of buying bottled water because of pollution, costss of food relief and resettlement of affected populations, costs of desilting a reservoir)		

CATEGORY	METHOD	ELEMENT(S) OF TEV	APPLICATION	STRENGTHS	LIMITATIONS
Stated preference methods	Contingent valuation	Use & non-use	Involves directly asking people how much they would be willing to pay to prevent loss of, or enhance an ecosystem service (e.g. willingness to pay to keep a local forest intact)	Able to capture use and non-use values	Bias in responses, resource-intensive method, hypothetical nature of the market
	Choice experiments		People chose from a 'menu' of options with differing levels of ecosystem services and differing costs, e.g. policy decisions where a set of possible actions might result in different impacts on ecosystems.		
	Participatory economic valuation	All	Based on stakeholders' own participation, perceptions, preferences and categories of value. There is no fixed approach or method for participatory economic valuation, but PRA techniques often used.	Able to capture use and non-use values, not based on externally-imposed categories	May not be comparable between sites or contexts. Often cannot be monetised.
Benefit transfer methods	Benefits transfer	All	Transferring a value from studies already completed in another location and/or context (e.g. estimating the value of a forest using the calculated economic value of a different forest of a similar size and type)	Can reduce the need for primary valuation studies	Degree of accuracy of the valuation might not be sufficient for making a decision

Source: adapted from Integrating Ecosystem Services (IES) into Development Planning Training material. 2017 version. Authors: Kosmus, Marina; Renner, Isabel; and Ullrich, Silvia. To have a broader overview to the methods go to ValuES Inventory of Methods: *www.aboutvalues.net*

EXEMPLARY ANSWER OF EXERCISE 4: CHOOSING AND APPLYING ECONOMIC VALUATION METHODS

CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN		
Ecosystem service	**Economic valuation method(s)**	**Data sources**
Firewood provision	Substitute prices	Companies selling possible substitutes for firewood (could be kerosene): statistics on the substitute price for firewood. Government demographic and economic: statistics on the number of habitants using firewood and use rate of firewood ($/day, year or month)
Water regulation	Mitigative and avertive expenditures	Records of Milaku Hydropower facility: costs of sediment removal (cost of machinery use, cost of operation, etc.), frequency of sediment removal.
Flood control	Benefit transfer	Studies on flood control value in comparable biophysical, social and political decision-making contexts.

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE		
Ecosystem service	**Economic valuation method(s)**	**Data sources**
Food provision (fish)	Market prices	Government (Ministry of Agriculture and Fisheries): statistics on the number of fishermen, prices of fish and the volume of fish extracted by Tabakalues communities.
Coastal protection	Damage costs avoided	Research institutes, universities or government (environmental or risk management authorities): statistics on frequency of extreme events. Land planning authorities: statistics on area protected by mangroves and dunes, cost of construction of housing and industrial infrastructure, population density in the area.
Erosion control	Benefit transfer	Studies on erosion control value in comparable biophysical, social and political decision-making contexts.

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR		
Ecosystem service	**Economic valuation method(s)**	**Data sources**
Recreation	Contingent valuation	Diving service providers: statistics on the number of divers in the protected area. Design and implementation of surveys to diver's willingness to pay.
Food provision (fish)	Market prices	Government (Ministry of Agriculture and Fisheries): statistics on the number of fishermen, prices of fish and the volume of fish extracted.
Blue Ocean Turtle	Benefit transfer	Studies on Blue Ocean Turtle value, or similar species, in comparable biophysical, social and political decision-making contexts.

APPLICATION OF EXERCISE 5: WORKED EXAMPLE OF ECONOMIC VALUATION

Right after the presentation of results and reflection of exercise 4, give the instructions and apply exercise 5. *Below,* you will find the step by step to apply the exercise 5, the instructions, as wells as further information for each one of case studies and some exemplary answers.

EXERCISE 5 – WORKED EXAMPLE OF ECONOMIC VALUATION	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure all the teams have laptops where they can upload the excel file with exercise number 5. · Distribute the excel file with the exercise 5 to each one of the groups (<<Exercise _5 templates (participants)>>). · Make sure participants have the information and results of previous exercises at hand, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.

Objective	Participants will apply economic methods to value some of the ecosystem services of their own case studies. The application consists in selecting relevant data of their case studies and perform arithmetic calculations in the excel sheet template to come up with monetary values.
Instructions and recommendations	After results of exercise 4 have been discussed, make sure that each group has at least one laptop, and that all of them have uploaded the excel file with exercise 5 template (<<Exercise _5 templates (participants)>>). Then, explain the objectives and instructions of exercise 5. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to a questions and answers session for the exercise. Remind participants that they need to go through the complementary information of their case studies to solve the exercise. Also, indicate that the excel template already has some useful prepared information to guide them through the calculations. Participants can also make use of the results of previous exercises in case they require reminding the information of their case studies.
Hints on carrying out the exercise	This is the second exercise in which participant learn about the application of the monetary economic valuation methods. Since this exercise requires the use of a predetermined excel sheet, try to let participants know in advance so they can bring their own laptops, and most of the people in the team can understand and get involved with the calculations. Consider that many participants might not be used to the excel format, nor the arithmetic required to solve the exercise, therefore, give them some time to familiarize with it. It might be the case that, depending on how much experience they have, some participants might be more active than others when solving this exercise. This might cause participants with less experience to avoid participating. Try to encourage an active participation of all the members of the work groups, and incite them to help each other to understand and clarify how the exercise is being or can be solved. It is highly recommended to have "a resource person" in each team that knows the exercise and corresponding calculations, to help the participants in case they need guidance. The resource person should revise the consistency of participant's work and help them with the arithmetic and accuracy of units of measure of each variable. This resource person will also make sure that participants do not lose focus and must continuously remind them of the purpose of the calculations and the overall objective of the valuation. Agree with the organisers on the best candidates for being the "resource persons" for this exercise. Remember that they should have experience on economic valuation methods and have no doubts on how the exercise is solved, its objectives and importance for the economic valuation process. Consider that such "resource persons" could be you, your co-trainer, other members of the organising team or stakeholders, and even participants. If there is not enough time to apply the exercise, you can suggest participants to choose to work on only 1 or 2 of the proposed valuation methods. Try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	In this case, there are not presentations. In this moment, you can give participants the correct answers to each one of their study cases. Otherwise, you can give them at the end of the training (together with the report and documentation of the training). The idea in this session is to have a discussion in plenary regarding the relevance and usefulness of the exercise.

Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. **Possible guiding questions for reflection:** · Did you find the exercise useful? Why? · Which were the main points of discussion when selecting the information for solving the exercise and performing the calculations in your team? Which were the main challenges? · What are some advantages and disadvantages of the methods you used? · What challenges do you think exist when applying the methods in real -life cases? · Would the results of the application of the methods you used, give relevant information to the target audience of your case study (to change/influence their decision-making)? · Would you like to share any real-life experiences on the application of valuation methods?
Key messages	· When applying the methods, it is rather easy to "get lost in the calculations". Have in mind that these calculations will provide information that contribute to the overall purpose of your study and will be communicated to your target audience. · Data and information availability constitute one of the most common challenges when applying economic methods. It is important to make sure to have legitimate data and information. · It is relevant to be as accurate as possible when preparing the data and making sure that each variable has the right measurement units. · It is crucial to be transparent regarding the assumptions made for the application of each method, as well as the performed calculations. · Transparency and replicability of the economic valuation increases its credibility, and therefore, its potential impact. There is no such thing as the best method: each valuation desirably should use a range of methods to crosscheck the results and present a range of possible values.

EXERCISE 5: WORKED EXAMPLE OF ECONOMIC VALUATION

Case study Group A: Integrating forest conservation measures into the Milaku hydropower scheme public investment plan

Note: use the Excel spreadsheet templates provided

Apply as many of the valuation methods listed *below* as you can in the allotted time (see further information *below*):

A. Substitute prices, to value firewood use by the Hankules community. Hint: what would people use for fuel if firewood were no longer available?;

B. Mitigative & avertive expenditures, to value regulation of water quality (prevention of downstream siltation and sedimentation) for Milaku hydropower scheme. Hint: what action could the hydropower scheme managers take to try and deal with its sediment problems?;

C. Effect on production, to value regulation of water quality (prevention of downstream siltation and sedimentation) and water flow (maintenance of dry season flows) for Milaku hydropower scheme. Hint: how would sediments and low dry season flows impact on machinery and equipment, and affect electricity revenues and costs of production?; and

D. Benefit transfer, to value flood control for downstream settlements and infrastructure. Hint: how can the findings of other studies be adjusted for the Belandu-Hankulen forest complex?

Fill the following table of results:

A. Firewood	Total value		BKL/year
	Average value per user (firewood harvesters only)		BKL/hhold/year
	Average value per hectare of forest (HCER area only)		BKL/ha/year
B. Regulation of water quality (sediment)	Total value		BKL/year
	Average value per hectare of forest (all forest)		BKL/ha/year
C. Regulation of water quality (sediment) + dry season flow	Total value		BKL/year
	Average value per hectare of forest (all forest)		BKL/ha/year
D. Flood control	Total value		BKL/year
	Average value per hectare of forest (all forest)		BKL/ha/year

Further information on the situation at the case study site

The Integrated Landscape Management Plan for the Belandu-Hankulen forest complex (2018-2038) covers a total of 60,000 hectares of natural forest, including both the Belandu Watershed Forest and the Hankulen Community Ecological Reserve. It is planned that the entire forest complex will be managed as a multipurpose conservation landscape under a joint forest management agreement with the Hankules community. However, only 10,000 ha of the forest complex will be zoned for local extractive activities such as fuelwood harvesting.

Local dependence on forest resources is high among the 12,000 Hankules households or 50,000 people that live in and around the Ecological Reserve. Three quarters of the population cook with firewood. On average, women must visit the forest 10 times a month to fulfil household fuel needs, coming back with a headload of firewood (average weight 20 kg) each visit. This 'free' energy source is particularly important for poorer households. The only locally available alternative to firewood is kerosene, which is expensive to purchase at a price of BKL 2/litre. Fallen branches and dead trees have an energy content of 15,900 KJ/kg, as compared to a specific energy for kerosene of 36,300 KJ. Currently, with good forest status in the upper watershed, water quality does not pose a major problem for Milaku hydropower scheme. It is only necessary to carry out a major dredging exercise only every 15 years (at a cost of BKL 6 million each time). However, if current rates of deforestation continue, there will be a sharp increase in the amount of sediments transported to the reservoir and dam. Under a scenario of forest degradation and loss, it will be necessary to dredge the reservoir and dam every year.

Sedimentation also affects annual electricity generation (and thus revenues). Whenever major repairs need to be carried out, it is necessary to shut the power plant down. In addition, it is impossible to generate power when the water levels in the dam and reservoir become too low. Deforestation in the upper catchment will lead to more frequent, and longer, shutdowns. This is because there will be more silt-related wear and tear (especially abrasion) on the plant and machinery. In addition, the build-up of sediments will reduce the storage capacity in the dam and reservoir.

Currently, with good forest cover, the power plant's turbines shut down for an average of 4 hours each month to carry out essential repairs and maintenance, and for an average of 1 day a year in the dry season (due to low water levels). Under a scenario of forest degradation and loss it will be necessary to suspend power generation for 10 days each year to carry out repairs on machinery, while dry season load shedding will average out at 340 hours a year. After upgrading, the Milaku hydropower scheme has an installed capacity of 40 MW, which translates into power generation of approximately 200 GWh/year. The electricity tariff in Bakul is BKL 2/unit (kWh).

Even though there are no reliable data on either the incidence of flooding in downstream areas of Hanku City or of the damages and losses caused to infrastructure, a number of studies to value the flood control function of natural forests have been carried out in other parts of Bakul with similar socio-economic, ecological and hydrological conditions, as well as in the neighbouring country of Bekule. For example the value of forest flood control was found to be BKL 200/ha/yr in the Upper Mighty Mountains (Kosmus and Emerton 2001), some BKL 250/ha/yr in the Bekule Grande forest reserve (Contreras del Valle and Campos 2007), BKL 222/year in the Marinakul catchment forest (Bertrab and Jung 2000), BKL 301/ha/yr in the Lower Mighty Mountains (Heubach 2016) and BKL 242/ha/yr in the Bekule Meso forest reserve (Renner, Unicorn and Black-Kitty 2004).

Copy of Excel data sheet to be filled in

GENERAL BACKGROUND INFORMATION		
2018 Hankules population	12.000	households
Total area of Belandu-Hankulen forest complex	60.000	hectares
Area of Belandu-Hankulen forest complex used for fuelwood extraction	10.000	hectares

A. SUBSTITUTE PRICES/FIREWOOD USE BY THE HANKULES COMMUNITY		
Forest firewood users	75%	percent of hholds
	9.000	no. of households
Firewood consumption	10	headloads/hhold/month
Weight of headload of firewood	20	kg/headload
Energy value of firewood	15.900	KJ/kg
Energy value of kerosene	36.300	KJ/litre
Price of kerosene/litre	2	BKL/litre
Total amount of forest firewood used by Hankules community	21.600.000	kg/year
Total energy value of forest firewood used by Hankules community	343.440.000.000	KJ/year
Amount of kerosene required to fulfil energy needs of Hankules who use forest firewood	9.461.157	litres/year
Cost of kerosene required to fulfil energy needs of Hankules who use forest firewood	18.922.314	BKL/year
Total value	**18.922.314**	**BKL/year**
Average value per user (firewood harvesters only)	**2.102**	**BKL/hhold/year**
Average value per hectare of forest (area zoned for fuelwood extraction only)	**1.892**	**BKL/ha/year**

B. MITIGATIVE & AVERTIVE EXPENDITURES/REGULATION OF WATER QUALITY (SEDIMENT) FOR THE MILAKU HYDROPOWER SCHEME		
Cost of sediment dredging	6.000.000	BKL per dredging
Average annual frequency of sediment dredging if good forest cover	0,07	number of years
Average annual frequency of sediment dredging if forest is degraded/lost	1,00	number of years
Total value	**5.600.000**	**BKL/year**
Average value per hectare of forest (all forest)	**93**	**BKL/ha/year**

C. EFFECT ON PRODUCTION/REGULATION OF WATER QUALITY (SEDIMENT) + DRY SEASON FLOW FOR THE MILAKU HYDROPOWER SCHEME		
Power generation	200	GWh/year
	547.945	kWh/day
Loss of generation for machinery repairs/replacement if good forest cover	2	days/year
Loss of generation for machinery repairs/replacement if forest is degraded/lost	10	days/year
Loss of generation due to dry season low water levels if good forest cover	1	days/year
Loss of generation due to dry season low water levels if forest is degreaded/lost	14,17	days/year
Electricty tariff	2	BKL/kWh
Average value per hectare of forest (all forest)	**23.196.347**	**BKL/year**
Average value per hectare of forest (all forest)	**387**	**BKL/ha/year**

D. BENEFIT TRANSFER/FLOOD CONTROL FOR DOWNSTREAM SETTLEMENTS AND INFRASTRUCTURE		
Site	Year of study	Current BKL/ha/yr
Upper Mighty Mountains	2001	200
Bekule Grande forest reserve	2007	250
Marinakul catchment forest	2000	222
Lower Mighty Mountains	2016	301
Bekule Meso forest reserve	2004	242
Average value per hectare of forest	**243**	**BKL/ha/year**
Total value	**14.580.000**	**BKL/year**

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE

Note: use the Excel spreadsheet templates provided

Apply as many of the valuation methods listed *below* as you can in the allotted time (see further information *below*):

A. Market prices, to value the mangrove fishery for the Tabakalues community. Hint: how much do people catch and what is it worth?;

B. Substitute prices, to value mangrove firewood use by the Tabakalues community. Hint: what would people use for domestic energy if firewood were no longer available?;

C. Effect on production, to value mangrove support to nearshore fisheries productivity for the Tabakalues community. Hint: how do mangroves support nearshore fisheries, and by how much?;

D. Damage costs avoided, to value mangrove protection against storms and tidal surges for coastal settlements and infrastructure. Hint: what would be the impacts of storms on rural and urban areas if there were no mangroves protecting the coastline?; and

E. Benefit transfer, to value mangrove shoreline erosion control for coastal settlements and infrastructure. Hint: how can the findings of other studies be adjusted for Indare Province?

Fill the following table of results:

A. Mangrove fishery	Total value		BKL/year
	Average value per hectare (all mangroves)		BKL/ha/year
B. Firewood	Total value		BKL/year
	Value per user		BKL/hhold/year
	Average value per hectare (Coroné Delta mangroves)		BKL/ha/year
C. Nearshore fish productivity	Total value		BKL/year
	Average value per hectare (all mangroves)		BKL/ha/year
D. Protection against storms & tidal surges	Total value		BKL/year
	Average value per hectare (all mangroves)		BKL/ha/year
	Average value per hectare (Coroné Delta mangroves)		BKL/ha/year
	Average value per hectare (Hanku peninsula mangroves)		BKL/ha/year
E. Erosion control	Total value		BKL/year
	Average value per hectare (all mangroves)		BKL/ha/year

Further information on the situation at the case study site

The green/ecosystem-based adaptation option will restore, rehabilitate and conserve the mangroves that fringe the Coroné Delta and adjacent coastline. There are currently 10,000 hectares of mangroves growing along 100 km of coastline (the average width of the mangrove belt is 1 km). Of this total, 7,500 hectares (along 75 km of coastline) are found on the north shore of the Coroné Delta while 2,500 hectares (along 25 km of coastline) are located on the east side of the Hanku peninsula.

Half of the Tabakalues population cook with firewood obtained from the mangroves on the north shore of the Coroné Delta (the mangroves on the Hanku peninsula are too far away to harvest). On average, women must visit the mangrove forest 10 times a month to fulfil household fuel needs, coming back with a headload of firewood (average weight 20 kg) each visit. This 'free' energy source is particularly important for poorer households. The only locally available alternative to firewood is kerosene, which is expensive to purchase at a price of BKL 2/litre. Mangrove wood has an energy content of 15,900 KJ/kg, as compared to a specific energy of 36,300 KJ for kerosene.

The Tabakalues carry out two types of fishing. The first is fishing in the mangroves themselves. The second is nearshore fishing in the open sea. Forty percent

of Tabakalues households fish in the mangroves of north Coroné Delta and the Hanku peninsula. The average annual catch per household is 150 kg of finfish, crustaceans and other marine animals, which can be sold at an average price of BKL 12/kg. In addition, 300 artisanal fishing boats are engaged in nearshore fisheries, each catching an average of 4 tonnes of seafish per year. These fetch an average price of BKL 18/kg in local markets. Some 15% of nearshore fish species are dependent on mangrove areas at some stage in their life cycle for feeding, breeding and/or nursery habitat.

Mangroves also serve to protect the human settlements that are located in the coastal strip. On average, a major storm or tidal surge event is experienced once every five years, destroying a quarter of houses, roads, bridges and other infrastructure in areas that are not protected by mangroves. In the predominantly rural parts of the north Coroné Delta, an average of 30 households are spaced along each kilometre of coastline. Each wood and coconut thatch house in these fishing villages costs BKL 50,000 to build. Almost all of the mangrove-fringed east coast of the Hanku peninsula is occupied by hotels, shopping areas, restaurants, roads and other urban and tourist infrastructure, with an average capital value of BKL 2.25 million per km for property along the sea-facing shoreline. Even though there are no reliable data on either the rate of coastal erosion in Indare Province or the role of mangroves in protecting the shoreline against erosion, a number of studies have been carried out in other parts of Bakul with similar socio-economic, ecological and hydrological conditions, as well as in the neighbouring country of Bekule. For example the value of mangrove erosion control was found to be BKL 270/ha/yr in Bekule north (Kosmus and Emerton 2001), some BKL 260/ha/yr in South Exportul (Contreras del Valle and Campos 2007), BKL 210/year in the Marinakul mangroves (Bertrab and Jung 2000), BKL 380/ha/yr in Silviakoko (Heubach 2016) and BKL 300/ha/yr in Bekule south (Renner, Unicorn and Black-Kitty 2004).

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GENERAL BACKGROUND INFORMATION		
2018 Tabakalues population	5.000	households
Total area of mangroves	10.000	ha
Coroné Delta area of mangroves	7.500	ha
Hanku peninsula area of mangroves	2.500	ha
Total length of coastline protected by mangroves	100	km
Coroné Delta length of coastline protected by mangroves	75	km
Hanku peninsula length of coastline protected by mangroves	25	km

A. MARKET PRICE/MANGROVE FISHERY FOR THE TABAKALUES COMMUNITY		
Mangrove fishers	40%	percent of hholds
	2.000	households
Average catch of mangrove fish per year	150	kg/year
Average price of mangrove fish	12	BKL/kg
Total value	**3.600.000**	**BKL/year**
Average value per hectare of mangroves (all mangroves)	**360**	**BKL/ha/year**

B. SUBSTITUTE PRICES/FIREWOOD FOR THE FOR THE TABAKALUES COMMUNITY		
Mangrove firewood users	50%	percent of hholds
	2.500	no. of households
Firewood consumption	10	headloads/hhold/month
Weight of headload of firewood	20	kg/headload
Energy value of firewood	15.900	KJ/kg
Energy value of kerosene	36.300	KJ/litre
Price of kerosene/litre	2	BKL/litre
Total amount of firewood used by Tabakalues community	6.000.000	kg/year
Total energy value of firewood used by Tabakalues community	95.400.000.000	KJ/year
Amount of kerosene required to fulfil Tabakalues energy needs	2.628.099	litres/year
Cost of kerosene required to fulfil Tabakalues energy needs	5.256.198	BKL/year
Total value	**5.256.198**	**BKL/year**
Value per user household	**2.102**	**BKL/hhold/year**
Average value per hectare of mangroves (Coroné Delta only)	**701**	**BKL/ha/year**

C. EFFECT ON PRODUCTION/NEARSHORE FISHERIES PRODUCTIVITY FOR THE TABAKALUES COMMUNITY		
Nearshore fishing boats	300	boats
Nearshore fish catch	4.000	kg/boat/year
Price of nearshore fish	18	BKL/kg
% of nearshore fish that depend on mangroves for breeding or nursery	15%	percent of catch
Total value	**3.240.000**	**BKL/year**
Average value per hectare of mangroves (all mangroves)	**324**	**BKL/ha/year**

D. DAMAGE COSTS AVOIDED/PROTECTION AGAINST STORMS AND TIDAL SURGES FOR COASTAL SETTLEMENTS AND INFRASTRUCTURE		
Frequency of severe storm/tidal surge	5	years
Average annual severe storms/tidal surges	0,20	storms or surges/year
Rate of destruction of coastal infrastructure	25%	percent of infrastructure
Length of rural coastline (Coroné Delta) protected by mangroves	75	km
Population density in rural (Coroné Delta) coastal strip	30	hholds/km
Cost of constructing rural house (Coroné Delta)	50.000	BKL/house
Length of urban/tourist coastline (Hanku peninsula) protected by mangroves	25	km
Cost of urban/tourist infrastructure along coastline (Hanku peninsula)	2.250.000	average BKL/km
Total value	**8.437.500**	**BKL/year**
Average value per hectare of mangroves (all mangroves)	**844**	**BKL/ha/year**
Average value per hectare of mangroves (Coroné Delta only)	**750**	**BKL/ha/year**
Average value per hectare of mangroves (Hanku peninsula only)	**1.125**	**BKL/ha/year**

E. BENEFIT TRANSFER/SHORELINE EROSION CONTROL FOR COASTAL SETTLEMENTS AND INFRASTRUCTURE		
Site	Year of study	Current BKL/ha/yr
Bekule north mangroves	2001	270
South Exportul mangroves	2007	260
Marinakul mangroves	2000	210
Silviakoko mangroves	2016	380
Bekule south mangroves	2004	300
Average value per hectare of mangroves (all mangroves)	**284**	**BKL/ha/year**
Total value	**2.840.000**	**BKL/year**

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR

Note: use the Excel spreadsheet templates provided

Apply as many of the valuation methods listed *below* as you can in the allotted time (see further information *below*):

A. Market prices, to value tourism revenues for the MPA authority. Hint: how much do tourists pay to enter the MPA?;

B. Effect on production, to value coral reef support to fisheries productivity for fisherfolk. Hint: how do coral reefs support fisheries, and by how much?;

C. (Simplified) travel cost, to value MPA visitor use values. Hint: how much do different categories of tourists spend in total to visit and use the MPA?; and

D. (Simplified) contingent valuation, to value MPA visitor non-use values. Hint: how much would different types of tourists be willing to contribute to a marine conservation fund?; and

E. Benefit transfer, to value heritage and existence values associated with Blue Ocean Turtles for urban dwellers. Hint: how can the findings of other studies be adjusted for Hanku and Moneila?

A. Tourism revenues for the MPA	Total value		BKL/year
B. Fish productivity	Total value		BKL/year
C. Visitor use values	Total value (divers)		BKL/year
	Total value (day-trippers)		BKL/year
	Average value per diver		BKL/trip
	(across all divers)		BKL/trip
D. Visitor non-use values	Total value (divers)		BKL/year
	Total value (day-trippers)		BKL/year
	Average value per diver (across all divers)		BKL/trip
	Average value per day-tripper (across all day-trippers)		BKL/trip
E. Turtle heritage & existence values	Total value		BKL/year
	Average value per urban hhold (those WTP only)		BKL/hhold/year
	Average value per urban hhold (across all households)		BKL/hhold/year

Further information on the situation at the case study site

The development of the deep-water harbour at Moneila will completely destroy the coral reef habitats of Bakul Reef Marine Protected Area.
One of the most obvious ways in which the MPA contributes to the local economy is through tourism. Bakul Barrier Reef is considered one of the prime dive sites in the world, and Bakul supports a substantial dive-tourism industry for visitors who come to the country solely to dive the reef. Every year 4,000 divers visit the MPA, each of whom makes an average of 5 trips to the site. A combined entrance/dive fee of BKL 250 is charged for each trip. Each year around 6,000 day-trippers also visit one of the islands in the MPA, where they are provided with a barbecue lunch and an afternoon of swimming, snorkeling, sea-kayaking and sunbathing. Although most of the day-trippers are holidaymakers, few (if any) come to Bakul because of the coral reef. Most are attracted by its world-famous

art galleries and the renowned nightclubs in Hanku and Moneila. Non-divers pay an entrance fee of BKL 50 to visit the MPA.

Looking at total tourist spending and travel costs is one way of estimating the visitor use values that are associated with MPA recreational activities. Divers generate a considerable amount of leisure spending, all of which can be attributed to the MPA because it is the coral reef, which, is the reason for their visit to Bakul. In addition to the MPA entrance fee (see *above*), the cost of a dive boat is BKL 400 per person for a trip to the MPA (including lunch and equipment hire). The average length of holiday in Bakul is 7 nights, with almost all divers staying in mid-range hotels priced at BKL 1,000/night. Most tourists also spend money on other items such as meals, entertainment, souvenirs and shopping (an average of BKL 250 a night). Almost all divers come from Western Europe, paying around BKL 10,000 for a return airfare to Hanku City. While the cost of day-trippers' holidays cannot strictly be linked to the MPA (as most are art-loving partygoers who merely visit the coral reef for a small diversion from museums and nightclubs), the direct spending they make during their day trip can be counted as a MPA-related value. The price per person of a day-trip to the MPA (including lunch) is BKL 250. In addition, most day-trippers pay extra to kayak, snorkel or to buy a souvenir t-shirt or cap – on average BKL 50 per visitor. As part of their routine visitor satisfaction and profiling surveys, the MPA authority administers a short questionnaire to both dive tourists and day-trippers. The aim is to gauge the non-use values associated with the MPA (i.e. over and above the use values associated with the recreational activities they have carried out). These include aspects such as biodiversity, scenic beauty, existence and bequest values. This information is collected by asking visitors about their willingness to pay to contribute to a marine conservation fund, which would be used solely to maintain coral reef biodiversity in a near-pristine condition. Last year, these surveys found that 95% of divers would be willing to make such a contribution (an average of BKL 1,000 for their entire stay in the area) and 27% of day-trippers would be willing to pay (an average of BKL 120 per visitor).

Reef-dependent species play a key role in the Exportul Province fishery. Spiny lobsters are particularly important and are sold in tourist hotels as well as being exported overseas. Some 160 boats fish the waters around the MPA, each harvesting an average annual catch of 1.2 tonnes. The catch is mainly comprised of high-value food fish and crustaceans, which fetches an average price of BKL 150/kg. Around 65% of this catch is made up of coral reef-dependent species. Bakul Reef Marine Protected Area contains a number of marine species of national and global conservation significance. One of these is the Blue Ocean Turtle. The sandy islands of the MPA provide one of only two nesting sites in the region, a feature which is a great source of pride to the Bakulesi population. The Blue Ocean Turtle is the national symbol of Bakul, and appears on the country's flag.

Even though there are no reliable data on the heritage and existence value of the Blue Ocean Turtle to the Bakul population, four studies have been carried out over the last 18 years in neighbouring Bekule, which looked at the value placed by urban residents on Blue Ocean Turtles. These found an average annual willingness to pay of BKL 222 per household in Bekuleville (Contreras del Valle and Campos 2007), BKL 174 in Pambala (Bertrab and Jung 2000), BKL 420 in Kontiki (Heubach 2016) and BKL 199 in Pwani (Renner, Unicorn and Black-Kitty 2004). Some 65% of urban residents stated that they would be prepared to contribute an additional voluntary levy on their monthly garbage bills, which would be spent on activities to secure and protect the nesting beaches and maintain the population of turtles in national waters. The residents of these four cities are considered to be very similar in terms of their tastes, worldviews and income levels to those in Hanku (total population 1 million, average household size 4.2) and Moneila (total population 700,000, average household size 3.1).

Copy of Excel data sheet to be filled in

GENERAL BACKGROUND INFORMATION		
2018 Hanku population	1.000.000	Persons
	238.095	Households
2018 Moneila population	700.000	Persons
	225.806	Households
MPA divers	4.000	visitors/year
MPA day-trippers	6.000	visitors/year
MPA visits made by divers	5	MPA visits/trip

A. MARKET PRICE/TOURISM REVENUES FOR THE MPA AUTHORITY		
MPA divers	4.000	visitors/year
Entry ticket + dive fees (diver)	250	BKL/person/MPA visit
MPA visits made by divers	5	MPA visits/trip
MPA day-trippers	6.000	visitors/year
Entry ticket (day-tripper)	50	BKL/MPA visit
Total value	**18.720.000**	**BKL/year**

C. (SIMPLIFIED) TRAVEL COSTS/MPA VISITOR USE VALUES		
MPA divers	4.000	visitors/year
MPA visits made by divers	5	MPA visits/trip
Entry ticket + dive fees (diver)	250	BKL/person/MPA visit
Dive boat fees	400	BKL/person/MPA visit
Diver length of stay in Bakul	7	nights/trip
Diver hotel price/night	1.000	BKL/night
Diver other spending (meals, entertainment, souvenirs, shopping, etc.)	250	BKL/night
Diver airfare to Bakul	10.000	BKL/return fare
MPA day-trippers	6.000	visitors/year
Entry ticket (day-tripper)	50	BKL/MPA visit
Day-tripper boat and excursion fees	250	BKL/trip
Day-tripper other spending/day (water sports, souvenirs, etc..)	50	BKL/trip
Total value (divers)	**88.000.000**	**BKL/year**
Total value (day-trippers)	**2.100.000**	**BKL/year**
Average value per diver (across all divers)	**22.000**	**BKL/visitor**
Average value per day-tripper (across all day-trippers)	**350**	**BKL/visitor**

D. (SIMPLIFIED) CONTINGENT VALUATION/MPA VISITOR NON-USE VALUES		
MPA divers	4.000	visitors/year
Diver interest in contributing to marine conservation fund	95%	percent of visitors
Diver willingness to pay to fund	1.000	BKL/person/MPA visit
MPA day-trippers	6.000	visitors/year
Day-tripper interest in contributing to marine conservation fund	27%	percent of visitors
Day-tripper willingness to pay to fund	120	BKL/visit
Total value (divers)	**3.800.000**	**BKL/year**
Total value (day-trippers)	**194.400**	**BKL/year**
Average value per diver (across all divers)	**950**	**BKL/visitor**
Average value per day-tripper (across all day-trippers)	**32**	**BKL/visitor**

E. BENEFIT TRANSFER/BLUE OCEAN TURTLES HERITAGE AND EXISTENCE VALUES FOR URBAN DWELLERS		
Site	Year of study	Current BKL/ha/yr
Bekuleville	2007	222
Pambala	2000	174
Kontiki	2016	420
Pwani	2004	199
Urban dweller interest in contributing to turtle conservation	65%	percent of hheholds
Average value per urban hhold (for the people who are willing to contribute to turtle conservation)	**254**	**BKL/hhold/year**
Average value per urban hhold (average across all urban households)	**165**	**BKL/hhold/year**
Total value	**76.514.785**	**BKL/year**

EXEMPLARY ANSWER OF EXERCISE 5: WORKED EXAMPLE OF ECONOMIC VALUATION

To find out the calculations behind the results *below*, go to the excel file (<<Exercises _5 & _7 calculations & answers (trainers)>>) included in the electronic documentation attached to this manual.

CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN			
A. Firewood	Total value	18,922,314	BKL/year
	Average value per user (firewood harvesters only)	2,102	BKL/hhold/year
	Average value per hectare of forest	1,892	BKL/ha/year
B. Regulation of water quality (sediment)	Total value	5,600,000	BKL/year
	Average value per hectare of forest (all forest)	93	BKL/ha/year
C. Regulation of water quality (sediment) + dry season flow	Total value	23,196,347	BKL/year
	Average value per hectare of forest (all forest)	387	BKL/ha/year
D. Flood control	Total value	243	BKL/year
	Average value per hectare of forest (all forest)	14,580,000	BKL/ha/year

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE			
A. Mangrove fishery	Total value	3,600,000	BKL/year
	Average value per hectare (all mangroves)	360	BKL/ha/year
B. Firewood	Total value	5,256,198	BKL/year
	Value per user	2,102	BKL/hhold/year
	Average value per hectare (Coroné Delta mangroves) (all forest)	701	BKL/ha/year
C. Nearshore fish productivity	Total value	3,240,000	BKL/year
	Average value per hectare (all mangroves)	324	BKL/ha/year
D. Protection against storms & tidal surges	Total value	8,437,500	BKL/year
	Average value per hectare (all mangroves)	844	BKL/ha/year
	Average value per hectare (Coroné Delta mangroves)	750	BKL/ha/year
	Average value per hectare (Hanku peninsula mangroves)	1,125	BKL/ha/year
E. Erosion control	Total value	284	BKL/year
	Average value per hectare (all mangroves)	2,840,000	BKL/ha/year

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR			
A. Tourism revenues for the MPA	Total value	5,300,000	BKL/year
A. Fish productivity	Total value	18,720,000	BKL/year
C. Visitor use values	Total value (divers)	88,000,000	BKL/year
	Total value (day-trippers)	2,100,000	BKL/year
	Average value per diver (across all divers)	22,000	BKL/trip
	(Average value per day-tripper (across all day-trippers)	350	BKL/trip
D. Visitor non-use values	Total value (divers)	3,800,000	BKL/year
	Total value (day-trippers)	194,400	BKL/year
	Average value per diver (across all divers)	950	BKL/trip
	(Average value per day-tripper (across all day-trippers)	32	BKL/trip
E. Turtle heritage & existence values	Total value	254	BKL/year
	Average value per urban hhold (those WTP only)	165	BKL/hhold/year
	Average value per urban hhold (across all households)	76,514,785	BKL/hhold/year

PRESENTATION 8. CHANGE AND SCENARIOS: VALUING AT THE MARGIN

Content covered in presentation 8

- Concept of change and dynamism in ecosystem services valuation
- Valuing at the margin: value incremental changes

Once participants have learned about the application of economic valuation methods, this presentation introduces them to the importance of undertaking the valuation with incremental changes.

As it was recommended in the preceding presentations, it is important to recap the previous key messages. Even though it might seem as too repetitive, this helps participants to follow up the process of valuation as a whole, as well as to understand the rationale of each one of the modules.

- Ecosystem valuation is all about articulating the value of ES for different stakeholder groups, in order to provide a piece of information that encourages better decision-making.

- In order assure the economic valuation has impact, it is necessary to frame it according to a practical purpose and intended outcome, and design it into the decision-making context. This implies to determine the purpose itself, the target audience, the policy and research questions.

- Nevertheless, a single "snapshot" of the value of ES is not enough to generate impact.

Main presentation points and notes for the presenter

- To introduce participants to this topic, go back to the main objective of any economic valuation study: influence/change a decision. This means, to change from the status quo or a specific decision, to a better informed one.

- Point out that, a valuation which shows total aggregated values or shows a "snapshot" of a single scenario, do not help to accomplish such desired changes. A "snapshot" valuation does not help to convince/influence the target audience, since it is not clear what the difference is between their "business as usual decision" and a decision that integrates the value of ES. A single figure also does not point out the shifts in social, economic, environmental and institutional contexts. To illustrate this, you can also refer to the Costanza et. al. (1997) study, in which the single figure of US$33 trillion per year, undoubtfully reflected the importance of the value of ES, but did not indicated how this figure relates to different policies and/or decision-making scenarios.

- Clarify that, valuing "at the margin" and showing incremental changes in values, allows the target audience of the economic valuation to differentiate the consequences of taking particular courses of action. By recognizing the changes that a decision generates in ES values, environmental, social and economic indicators, as well as in the costs and benefits for the associated stakeholders; it can become clearer which scenario allows a better combination of efficiency, equity and sustainability. Only in this way can economic valuation generate the desired impact.

- In order to undertake a valuation with incremental changes, it is important to set a baseline to which the other scenarios will be compared, and to determine a period in which valuation will be estimated. Also, such scenarios need to be defined according to the decision-making context and the target audience. Accentuate that visual aids and graphics are of great importance to show a more graphic comparison of changes.

- For illustrating this, find an example of an economic valuation that clearly counts with all the elements of a study designed for generating impact (has a defined purpose, policy and research question, target audience, prioritized ES), and that shows the impact of different courses of action in the values of ES and socioeconomic variables. The presentation provides an example case study. Nevertheless, you should try to put your own examples and case studies, tailored to your participants' needs, interests and mandates.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation. **It is important to mention that even though the references for examples are included, it is highly recommended to use different examples which are relevant for the participant s interests and experience. In case of using the examples provided in the presentation, read the whole case carefully in order to transmit the information correctly. Also, cite the sources adequately.**

Bark, Rosalind H.; Colloff, Matthew J.; MacDonald, Hatton Darla; Pollino, Carmel A.; Jackson, Sue and Crossman, Neville D. 2016. Integrated valuation of ecosystem services obtained from restoring water to the environment in a major regulated river basin. Ecosystem Services 22 (2016) Pp. 381-391.

Callan, Scott J. and Thomas, Janet M. 2013. Environmental Economics and Management: Theory, Policy and Applications. Sixth Edition. South-Western. USA.

Emerton, L., Ha Tran Thi Thu, Hoang Thach Mai, Viet Anh Hoang and E. Ebert. 2014. The economic value of Cat Tien National Park. GIZ/MARD project Conservation of Biodiversity in Forest Ecosystems in Vietnam, Hanoi.

Daily, C. Gretchen; Söderqvist, Tore; Aniyar, Sara; Arrow, Kenneth; Dasgupta, Partha; Ehrlich, R. Paul; Folke, Carl; Jansson, AnnMari; Jansson, Bengt-Owe; Kautsky, Nils; Levin, Simon; Lubchenco, Jane; Mäler, Karl-Göran; Simpson, David; Starrett, David; Tilman, David and Walker, Brian. 2000. The Value of Nature and the Nature of Value. Science, New Series, Vol. 289, No. 5478. Pp. 395-396.

APPLICATION OF EXERCISE 6: DEVELOPING SCENARIOS AND ASSUMPTIONS OF CHANGE

Below, you will find the step by step to apply the exercise 6, the instructions and some exemplary answers.

EXERCISE 6 – DEVELOPING SCENARIOS AND ASSUMPTIONS OF CHANGE	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure participants have the information and results of previous exercises, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Participants will identify the change they want to evidence with their economic valuation, in order to influence the decision-making of their case study. For that, they will formulate two or three scenarios and select key variables and parameters of their case studies, and show how these change through time in each one of the scenarios.
Instructions and recommendations	After the presentation on change and scenarios, explain the objectives and instructions of exercise 6. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. Remind participants that to answer this exercise, they need to take into account the information and results of previous exercises. Ask the groups to choose a person of their team, who will have 5 minutes to present their results in plenary.

Hints on carrying out the exercise	In this exercise, participants stablish the scenarios that will show how the change in ES and their value, affect the issue, decision or policy to influence. Depending on their experience on the topic and understanding of the associated presentation, participants might require specific examples on types of scenarios and evidencing change of the variables relevant for influencing the decision-making. Try to go from group to group to identify if this is the case and provide more examples and guidance in case it is required. Notice if the teams established a "baseline" scenario (or business as usual, in which tendential conditions remain) and an "influenced" scenario (in which the decision has been influenced by the economic valuation study and a strategy is set up). In case they do not include this, try to guide them: one suggestion is to play the role of the target audience of their study and question why you should change your decision-making. In some cases, participants would like to have all the information available as possible to construct very detailed scenarios. Remind them that the objective of this exercise is not to be as accurate as possible with the scenarios, but to know which relevant scenarios and main variables to include in order to influence the decision-making. Indicate them to make assumptions regarding the behaviour of variables, and to mention them when presenting their results. If there is not enough time to apply the exercise, you can ask participants to answer the exercises' questions for two or three key variables or parameters. Try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	Give no more than 5 minutes to each group for their presentation. After the presentation, other groups can ask questions and provide feedback.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. · Use the exemplary answers of the exercise to encourage discussion on different results and to ask questions that have not been raised during the reflection. **Possible guiding questions for reflection:** · Which were the main challenges of determining the scenarios and selecting the variables and parameters? · How did the target audience and purpose of your study influence the selection on scenarios and variables/parameters? · What do you think are the differences between presenting an aggregate value ("snapshot value") and presenting scenarios to your target audience? · Would you like to share any real-life experiences or examples on the development of scenarios and assumptions of change?
Key messages	· Decision-making involves choosing between alternative pathways to reach certain goals. · By trying to influence/change such decision-making to a better-informed one, economic valuation requires to show processes and scenarios of change. · By valuing at the margin, economic valuation shows the implications of different decisions in terms of changes in ES and well-being, for different groups and goals. · By estimating incremental values, valuation show the decision-maker (target audience), the consequences of taking (or failing to take) a particular course of action.

EXERCISE 6: DEVELOPING SCENARIOS AND ASSUMPTIONS OF CHANGE

In relation to your valuation study purpose, questions and underlying decision process:

1. What dynamic situation, change or comparison do you want to demonstrate the effects of? (remember, this should show the decision-maker the consequences of taking (or failing to take) a particular course of action)

2. Define two or three scenarios (may include business as usual/continuation of the status quo) that you would model

3. What would be your assumptions of change under each scenario for the 3-5 most important variables or parameters that have a bearing on ecosystem values?

Fill the following table of results:

Key variable/ parameter	Assumption of change		
	Scenario A	Scenario B	Scenario C (if applicable)

EXEMPLARY ANSWER OF EXERCISE 6: DEVELOPING SCENARIOS AND ASSUMPTIONS OF CHANGE

CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN			
Change to demonstrate: change in key variables and parameters with and without investment in the Integrated Forest Management Plan (IFMP)			
Key variable/ parameter	**Assumption of change**		
	Scenario A Business as usual	**Scenario B Project without investment in IFMP**	**Scenario C Project with investment in IFMP**
Sedimentation	↗	↗	↘
Costs sediment removal	↗	↗	↘
Social profitability of investment	→	⤳	↗
Social savings	→	↘	↗
% of electricity coverage	⤵	⤳	↗

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE

Change to demonstrate: comparison of coastal adaptation options in term of their effectiveness in climate change adaptation, as well as in social profitability in the long term

Key variable/ parameter	Assumption of change		
	Scenario A Business as usual	Scenario B Portfolio without Green Infrastructure	Scenario C (if applicable) Portfolio with Green Infrastructure
% damaged infrastructure (extreme events)			
Costs of reconstruction (extreme events)			
Habitat of commercial fishing species			
Income of fishermen			
Costs of maintenance of coastal adaptation measures			

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR (MDWH)

Change to demonstrate: social profitability of de construction of the MDWH, impacts on other economic activities and livelihoods

Key variable/ parameter	Assumption of change		
	Scenario A Business as usual	Scenario B Construction of MDWH	Scenario C (if applicable) Alternative for sustainable growth of commerce and tourism
Number of tourists			
Income tourism			
Income exports and imports			
Costs of reconstruction as a result of impacts of extreme events			
Fishing productivity			
Income fishermen			

MODULE 4: USING ECONOMIC VALUATION TO PROVIDE DECISION SUPPORT

This module looks at the ways in which the results of valuation studies can be practically integrated into decision-making and effectively communicated to decision-makers. It also reinforces the message regarding the fact that valuation should always be targeted to a strategic purpose and tailored to the decision-making context and decision makers that it seeks to influence.

MODULE 4: USING ECONOMIC VALUATION TO PROVIDE DECISION SUPPORT	
Objectives	· Learn the ways in which results of valuation studies can be practically integrated into decision-making frameworks and effectively communicated to decision-makers. · Reinforce the key messages regarding economic valuation: it should be targeted to a strategic purpose and tailored to a decision-making context (and decision-makers) that it seeks to influence. · Learn some communication and stakeholder engagement strategies.
Key messages	· The costs and benefits related to the value of ES can be integrated in decision-making frameworks, to encourage more efficient, equitable and sustainable policies. · Just valuing ecosystems is not enough to generate impacts: value of ES needs to be captured in mechanisms, instruments, policies, etc. to generate real changes. · When capturing the value of ES in mechanisms, instruments, policies, etc. it is crucial to understand the distributional issues of the status quo and the tendential decision-making: who bears the costs and who receives the benefits. · Valuation has the most impact when the findings are relevant, credible and legitimate. · However technically good the valuation study is, if it is to influence decision-making, it needs to be communicated in a clever and strategic manner.
Overview	**Presentation 9.** Influencing decision-making I: Economic analysis frameworks **Exercise 7:** Worked example of cost-benefit analysis and discounting **Presentation 10.** Influencing decision-making II: Communicating effectively **Exercise 8:** Formulating messages and communicating information **Presentation 11.** Economic instruments: Value capture and distribution **Exercise 9:** Incentives, finance and policy instruments **Discussion 4:** Where do we go from here?

PRESENTATION 9. INFLUENCING DECISION-MAKING I: ECONOMIC ANALYSIS FRAMEWORKS

Content covered in presentation 9

- Analytical and decision-support frameworks for assessing financial and economic benefits and costs
  - Cost-benefit analysis
  - Cost-effectiveness analysis
  - Least-cost analysis
- Indicators to measure economic profitability, performance and impacts
- Methods for adjusting and comparing different policy, programme and project alternatives

Once participants are clear about the economic valuation process, the trainers will introduce them to how to integrate its results into the most used decision-making support frameworks in economics.
As in previous sections, before starting this presentation it is important to make a recap of the preceding key messages.

- Valuation is meant to help to guide decision-makers to make more effective, equitable and sustainable decisions.

- Valuation information will have little impact unless it is presented in a form that can actually be integrated into real-world decision-making processes and procedures, and it addresses the target audience's interests.

Main presentation points and notes for the presenter

- Decision-makers use different frameworks depending on what they want to achieve. For the purpose of this training, the focus will be in frameworks used in the appraisal of projects and policies: cost-benefit analysis, cost-effectiveness analysis, least cost analysis and value for money approaches. The reason relies in the fact that these frameworks are widely used and are particularly influential in different sectors for assessing the relative profitability or desirability of policies, programmes and projects. For instance, public and private sector use them in the allocation of investment on programmes and infrastructure projects, private sector uses them for analysing credit assignation for specific projects, and NGO require them to decide how to undertake the funding.

- The presentation guides you on how to go through each one of the frameworks (least cost analysis, cost-effective analysis and cost-benefit analysis). Try not to explain its rationale with complicated language. We recommend explaining through the examples provided. For instance, in the case of the least cost analysis, ask participants to figure out what is the cheapest option of the three alternatives in the slide. After presenting the three frameworks, ask participants to mention which are the differences between them.

- It is also crucial that participants understand what the difference between financial and economic analysis is. Explain that these represent different perspectives: individual (private) or public interest (social). Also, refer back to the concept of market value and economic value for exemplifying that the financial analyses use market prices, while the economic analyses are performed including non-market values.

- A key issue when performing valuation studies is making the data comparable. Explain that most of the times, data used in valuation is obtained in different currencies, moments of time and countries. This implies that such data need to be "homogenised" by adjusting it for inflation, purchasing power parity and discounting. Try to use simple language to explain each one of these concepts. Also, even though the presentations include some worked examples, try to come up with your own examples, always thinking in what is relevant for the participant's needs and interests. For each one of the examples, be as explicit as possible in explaining where the adjusted data comes from (the calculations, the years, etc.), since participants will have to make their own calculations in the following exercise.

- We encourage you to prepare different ways of explaining the principle of discounting and the discount rate, since it can be a challenging concept for participants that are not familiarized with it. Even though examples are given in the presentation, try to find examples that suits better with your participant's needs and interests. The key message regarding discounting is that, with a discount rate, the further into the future a cost or benefit accrues, the less it is worth today. This will allow you to discuss with them, why is discounting a problem for ecosystem costs and benefits: discounting environmental costs and benefits that go far in the future, would suggest that they have little value today. Ask them, what would be some ideas of solutions to this?

- After explaining "discounting", describe the different performance measures that economists come up with to indicate the relative desirability of different alternatives or projects: Net Present Value, Benefit-Cost Ratio, Return of Investment, Payback Period and Internal Rate of Return.

- Finally, show participants an example in which different alternatives are compared using one of the decision-support frameworks. Make sure that the example shows the different alternatives in comparison to a baseline scenario, and that adjustments for data comparability have been made. It would be desirable for each alternative to count on different performance measures so that participants can discuss regarding the most suitable options. When discussing the example, encourage participants to use arguments related to the key messages raised during the whole training.

- This session could also be extended to incorporate some more detailed case studies from the country, site or sector on which the course is focusing. This is a good way of fleshing out the presentations and group work, and showing how these frameworks are used in the topics and areas that participants themselves work in.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation. **It is important to mention that even though the references for examples are included, it is highly recommended to use different examples which are relevant for the participant s interests and experience. In case of using the examples provided in the presentation, read the whole case carefully in order to transmit the information correctly. Also, cite the sources adequately.**

Buncle, Aaron; Daigneault, Adam; Holland, Paula; Fink, Anna; Hook, Scott and Manley, Marita. 2013. Cost-Benefit Analysis for Natural Resource Management in the Pacific. A Guide. Secretariat of the Pacific Regional Environment Programme, Secretariat of the Pacific Community, Pacific Island Forum Secretariat, Landcare Research and Gesellschaft für Internationale Zusammenarbeit.

Conservation Strategy Fund. Econ Video Lessons. Videos on Cost-Benefit Analysis, Retrieved from: *https://www.conservation-strategy.org/en/csf-econ-video-lessons*

Campbell, Harry and Brown, Richard. 2003. Benefit-Cost Analysis. Financial and Economic Appraisal using Spreadsheets. The University of Queensland. Cambridge University Press.

Emerton, L. and Yan Min Aung. 2013. The Economic Value of Forest Ecosystem Services in Myanmar and Options for Sustainable Financing. IMG, Yangon and Ministry of Environmental Conservation and Forests, Nay Pyi Daw.

Philibert, C. 2003. Discounting the future. International Society for Ecological Economics, Encyclopaedia. Retrieved from: *http://philibert.cedric.free.fr/Downloads/Discount2003.pdf]*

Norgaard, R. B., and Howarth, R. B. 1991. Sustainability and discounting the future. Ecological economics: the science and management of sustainability. Pp. 88-101.

Nyborg, Karine. 1996. Environmental Valuation, Cost-Benefit Analysis and Policy Making: A Survey. Statistics Norway Research Department. Oslo.

Thompson, Gavin. 2009. How to adjust for inflation. Statistical literacy guide. House of Commons. UK

United Nations Framework Convention on Climate Change. 2011. Assessing the Costs and Benefits of Adaptation Options. The Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change. Retrieved from: *https://unfccc.int/resource/docs/publications/pub_nwp_costs_benefits_adaptation.pdf*

ValuES. Methods for integrating ecosystem services into policy, planning and practice. Method profile: Cost Benefit Analysis. Retrieved from: *http://about-values.net/data/method_navigator/values_method_profile_cost_benefit_analysis_en.pdf*

Wegner, Giulia and Pascual, Unai. 2011. Cost-Benefit Analysis in the Context of Ecosystem Services for Human Well-Being: A Multidisciplinary Critique. Ecosystem Services Economics: Working Paper Series. Paper No. 13. The United Nations Environment Programme.

World Bank. 2011. Cost-Benefit Analysis in World Bank Projects. Independent Evaluation Group. Washington.

APPLICATION OF EXERCISE 7: WORKED EXAMPLE OF COST-BENEFIT ANALYSIS AND DISCOUNTING

Below, you will find the step by step to apply the e xercise 7, the instructions and some exemplary answers.

EXERCISE 7 – WORKED EXAMPLE OF COST-BENEFIT ANALYSIS AND DISCOUNTING	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure all the teams have laptops where they can upload the excel file with exercise number 7. · Distribute the excel file with the exercise 7 to each one of the groups (<<Exercise _7 templates (participants)>>). · Make sure participants have the information and results of previous exercises at hand, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Participants will carry out a cost-benefit analysis of their case studies. For this, they will be required to apply discounting techniques for estimating the *Net Present Value* (NPV), *Internal Rate of Return* (IRR) and *Benefit-Cost Ratio* (BCR).
Instructions and recom-mendations	After the presentation on "economic analysis frameworks", make sure that each group has at least one laptop, and that all of them have uploaded the excel file with exercise 7 template (<<Exercise _7 templates (participants)>>). Then, explain the objectives and instructions of exercise 7. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to a questions and answers session for the exercise. Remind participants that they need to go through the complementary information of their case studies to solve the exercise. Also, indicate that the excel template already has some useful prepared information to guide them through the calculations. Participants can also make use of the results of previous exercises in case they require to remind the information of their case studies.

Hints on carrying out the exercises	Since this exercise requires the use of a predetermined excel sheet, try to let participants know in advance so they can bring their own laptops, and most of the people in the team can understand and get involved with the calculations. Consider that many participants might not be used to the excel format, nor the arithmetic required to solve the exercise, therefore, give them some time to familiarize with it. It might be the case that, depending on how much experience they have, some participants might be more active than others when solving this exercise. This might cause participants with less experience to avoid participating. Try to encourage an active participation of all the members of the work groups, and incite them to help each other to understand and clarify how the exercise is being or can be solved. It is highly recommended to have "a resource person" in each team that knows the exercise and corresponding calculations, to help the participants in case they need guidance. The resource person should revise the consistency of participant's work and help them with the arithmetic and accuracy of units of measure of each variable. This resource person will also make sure that participants do not lose focus and must continuously remind them of the purpose of the calculations and the overall objective of integrating the valuation of ES in this decision-making framework. Agree with the organisers on the best candidates for being the "resource persons" for this exercise. Remember that they should have experience in economic valuation methods, the cost-benefit analysis and have no doubts on how the exercise is solved, its objectives and importance. Consider that such "resource persons" could be you, your co-trainer, other members of the organising team or stakeholders, and even participants. Try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	In this case, there are no presentations. In this moment, you can give participants the correct answers to each one of their study cases. Otherwise, you can give them at the end of the training (together with the report and documentation of the training). The idea in this session is to have a discussion in plenary regarding the relevance and usefulness of the exercise.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. Possible guiding questions for reflection: · Did you find the exercise useful? Why? · Which were the main points of discussion when applying the exercise? Which were the main challenges? · In your experience with the exercise, what are some advantages and disadvantages of the cost-benefit analysis? What challenges do you think that exist when applying cost-benefit analysis in real -life cases? · Which challenges, advantages and disadvantages exist when integrating the value of ecosystem services in the cost-benefit analysis (and other economic analysis frameworks)? · Would you like to share any real-life experiences on the application of valuation methods?
Key messages	· Economists use different approaches to assess the relative profitability or desirability of policies, programmes and projects. This allows them to compare and weigh up the costs, benefits and impacts of different courses of action. · The costs and benefits related to the value of ES can be integrated in these approaches, to encourage a better informed decision-making. · Various adjustments are required when comparing the values over time (adjustment for inflation and discounting) or between countries (adjustment for purchasing power parity).

EXERCISE 7: WORKED EXAMPLE OF COST-BENEFIT ANALYSIS AND DISCOUNTING

Case study Group A: Integrating forest conservation measures into the Milaku hydropower scheme public investment plan.

Note: Use the Excel spreadsheet templates provided, and integrate the ecosystem values that you calculated in exercise #5. Please ask the facilitator to tell you the value of any ecosystem services that you did not have time to calculate yesterday.

Note: Excel formulae can be used to calculate the NPV, IRR and BCR. You should apply a 10% discount rate to the cost-benefit analyses.

Formula to calculate NPV:	**Formula to calculate IRR:**	**To calculate BCR:**
=NPV (discount rate, range of cells containing the values for which NPV is to be calculated) Calculates the net present value of an investment by using a discount rate and a series of future values. In the example *below*, you would apply this formula to the net cash flow (total benefits minus total costs) of the project over 20 years	=IRR(range of cells containing the values for which IRR is to be calculated) Returns the internal rate of return for a series of future values. The series of future values must contain at least one positive value and one negative value to calculate the internal rate of return. In the example *below*, you would apply this formula to the net cash flow (total benefits minus total costs) of the project over 20 years	Use the NPV formula and apply it to the series of total benefits and total costs of the project over 20 years The BCR is the NPV of future benefits ÷ NPV of future costs

For your project (the Integrated Landscape Management Plan for the Belandu-Hankulen forest complex):

1. What is the NPV, IRR and BCR over a 20-year period (see further information *below*)?
2. Is the investment worthwhile/profitable?

If you have time, for the alternative scenario of business as usual and forest degradation (no expanded Hankulen Community Ecological Reserve and no improved joint forest management for the Belandu-Hankulen forest complex):

3. Calculate the NPV of the alternative scenario (see further information *below*)

4. Compare the NPV of the alternative scenario with that of the project.

5. What would you conclude from this comparison of the project and the alternative scenario, and what would your advice be to decision-makers?

Further information on the situation at the case study site

Under the Integrated Landscape Management Plan for the Belandu-Hankulen forest complex (2018-2038), deforestation and forest degradation will be immediately halted. There will be no further loss of either forest area or forest quality. Local households will be able to keep on utilising (sustainably) the forest for subsistence purposes into the future. There will be no change in the amount or value of fuelwood extracted from the forest. This will be maintained at current levels, with no further deterioration or loss of value.
The other key ecosystem services to take into account are (also as calculated yesterday) the value of the forest for regulation of dry season water flow & quality (sediments), and flood control. These values are provided across the entire 60,000 ha area of the Belandu-Hankulen forest complex.

The Belandu Forest Deparment, working with the Hankulen Community Natural Resource Management Committee, have already put together a budget for the management of the Belandu-Hankulen forest complex (covering both the Belandu Watershed Forest and the Hankulen Community Ecological Reserve). This is as follows:

ITEMS	UNITS	COST/UNIT (BKL)	WHEN SPENDING IS MADE
Construction of new infrastructure and roads	Lump sum	250,000,000	Split equally between years 1,2 & 3
Maintenance of roads and infrastructure	Lump sum	1.5%	of capital cost from year 4
Development of JFM plan	Lump sum	500,000	First year
Consultation and negotiation of JFM agreement	Lump sum	250,000	First year
Purchase of survey and monitoring equipment	Lump sum	800,000	First year, replaced every 5 years
Community forest rangers	Per person per month	10,000	3 guards in year 1, 5 guards from year 2
Office running costs	Per month	10,000	From start
JFM meetings	Per meeting	20,000	Quarterly from year 2
Monitoring of forest quality and cover	Per year	180,000	Every year from year 1
Monitoring of downstream waterflow and quality	Per year	240,000	Every year from year 1

Under a BAU scenario, in the absence of an integrated forest management plan, forest cover in the Belandu-Hankulen forest complex is expected to decrease at a rate of 12.5% per year. The value of forest utilisation will decline at a rate equivalent to the rate of loss of forest cover across the 10,000 ha currently being utilised for wood extraction as well as the entire 60,000 ha of the complex that provides watershed protection services. Note that the unique ecological conditions in the area mean that there is a direct and immediate linear relationship between forest area and ecosystem service provision. In other words, 10 hectares of forest provide exactly double the quantity/value of ecosystem services as 5 hectares do (or, alternatively, every 1% loss of forest cover also translates into a 1% loss of ecosystem service value).

Copy of Excel data sheet to be filled in

PROJECT: Integrated forest management plan					
Forest area	Units	Baseline value (ha)	Change per year	Year 1 (Ha)	Year 2 (Ha)
Area of Belandu-Hankulen forest complex zoned for fuelwood extraction	Hectares	10.000	0%	10.000	10.000
Total area of Belandu-Hankulen forest complex	Hectares	60.000	0%	60.000	60.000
Costs	Units	Cost/unit (BKL)	When spending is made	Year 1 (BKL)	Year 2 (BKL)
Construction of new infrastructure and roads	Lump sum	250.000.000	Split equally between years 1,2 & 3	83.333.333	83.333.333
Maintenance of roads and infrastructure	Lump sum	1,5%	of capital cost from year 4		
Development of JFM plan	Lump sum	500.000	First year	500.000	
Consultation and negotiation of JFM agreement	Lump sum	250.000	First year	250.000	
Purchase of survey and monitoring equipment	Lump sum	800.000	First year, replaced every 5 years	800.000	
Community forest rangers	Per person per month	10.000	3 guards in year 1, 5 guards from year 2	360.000	600.000
Office running costs	Per month	10.000	From start	120.000	120.000
JFM meetings	Per meeting	20.000	Quarterly from year 2		80.000
Monitoring of forest quality and cover	Per year	180.000	Every year from year 1	180.000	180.000
Monitoring of downstream waterflow and quality	Per year	240.000	Every year from year 1	240.000	240.000
Total costs				85.783.333	84.553.333
Benefits	Units	Value/unit (BKL)	Applied to	Year 1 (BKL)	Year 2 (BKL)
Local woodfuel use **(value A)**	Per hectare/year	1.892	Area zoned for fuelwood extraction only	18.922.314	18.922.314
Downstream sediment control & waterflow regulation **(values B+C)**	Per hectare/year	480	All forest	28.796.347	28.796.347
Downstream flood control **(value D)**	Per hectare/year	243	All forest	14.580.000	14.580.000
Total benefits				62.298.661	62.298.661
Net cashflow				Year 1 (BKL)	Year 2 (BKL)
Net cashflow				- 23.484.672	- 22.254.672
Net present value (NPV)	288.134.979				
Discounted benefit-cost ratio (BCR)	2,19				
Internal rate of return (IRR)	52%				

ALTERNATIVE: Business as usual - forest degradation					
Forest area	Units	Baseline value (ha)	Change per year	Year 1 (Ha)	Year 2 (Ha)
Area of Belandu-Hankulen forest complex zoned for fuelwood extraction	Hectares	10.000	-12,5%	10.000	8.750
Total area of Belandu-Hankulen forest complex	Hectares	60.000	-12,5%	60.000	52.500
Costs	Units	Cost/unit (BKL)	When spending is made	Year 1 (BKL)	Year 2 (BKL)
Community forest rangers	Per person per month	10.000	3 guards	360.000	360.000
Office running costs	Per month	10.000	From start	120.000	120.000
Total costs				480.000	480.000
Benefits	Units	Value/unit (BKL)	Applied to	Year 1 (BKL)	Year 2 (BKL)
Local woodfuel use **(value A)**	Per hectare/year	1.892	Area zoned for fuelwood extraction only	18.922.314	16.557.025
Downstream sediment control & waterflow regulation **(values B+C)**	Per hectare/year	480	All forest	28.796.347	25.196.804
Downstream flood control **(value D)**	Per hectare/year	243	All forest	14.580.000	12.757.500
Total benefits				62.298.661	54.511.328
Net cashflow				Year 1 (BKL)	Year 2 (BKL)
Net cashflow				61.818.661	54.031.328
Net present value (NPV)	269.948.011				

Comparison of project/alternative	
Net present value-added/cost-incurred by integrated forest management plan (over BAU)	18.186.968

Case study Group B: Comparing grey and green adaptation options to strengthen coastal protection in Indare Province

Note: use the Excel spreadsheet templates provided, and integrate the ecosystem values that you calculated in exercise #5. Please ask the facilitator to tell you the value of any ecosystem services that you did not have time to calculate yesterday

Note: Excel formulae can be used to calculate the NPV, IRR and BCR. You should apply a 10% discount rate to the cost-benefit analyses.

Formula to calculate NPV:	**Formula to calculate IRR:**	**To calculate BCR:**
=NPV (discount rate, range of cells containing the values for which NPV is to be calculated) Calculates the net present value of an investment by using a discount rate and a series of future values . In the example *below*, you would apply this formula to the net cash-flow (total benefits minus total costs) of the project over 20 years	=IRR(range of cells containing the values for which IRR is to be calculated) Returns the internal rate of return for a series of future values. The series of future values must contain at least one positive value and one negative value to calculate the internal rate of return. In the example *below*, you would apply this formula to the net cash-flow (total benefits minus total costs) of the project over 20 years	Use the NPV formula and apply it to the series of total benefits and total costs of the project over 20 years *The BCR is the NPV of future benefits ÷ NPV of future costs*

For your project (green/ecosystem-based adaptation measures for Indare Province coastline – mangrove restoration, rehabilitation and conservation):

1. What is the NPV, IRR and BCR over a 20-year period (see further information *below*)?

2. Is the investment worthwhile/profitable?

If you have time, for the alternative scenario of grey infrastructure option (structural measures such as seawalls, groynes and breakwaters):

3. Calculate the NPV of the alternative scenario (see further information *below*)

4. Compare the NPV of the alternative scenario with that of the project

5. What would you conclude from this comparison of the project and the alternative scenario, and what would your advice be to decision-makers?

Further information on the situation at the case study site

The *ecosystem-based adaptation* (EbA) option will restore, rehabilitate and conserve mangroves in both the Coroné Delta and Hanku peninsula. Overall, the area under mangroves will be expanded by a quarter between the second and sixth years of the project at a rate of 400 hectares a year in the Coroné Delta and 100 hectares a year on the Hanku peninsula.

The expansion of forest area and improvement in the quality of existing mangroves means that all ecosystem service values will increase under the EbA option project. The unique ecological conditions in the area mean that there is an immediate and direct linear relationship between mangrove area and ecosystem service provision. In other words, 10 hectares of mangroves provide exactly double the quantity/value of ecosystem services as 5 hectares do (or, alternatively, every 1% loss of mangrove cover also translates into a 1% loss of ecosystem service value). As a very fast-growing species of mangroves will be planted, these ecosystem service values will accrue in full in the year of planting. Firewood harvesting, mangrove and near-shore fisheries, protection against storms and tidal surges and coastal erosion control will all improve in line with the increase in mangrove area. These can be valued using the estimates calculated yesterday.

The Indare Coastal Zone Management Authority have already put together a budget for ecosystem-based adaptation activities. This is as follows:

ITEMS	UNITS	COST/UNIT (BKL)	WHEN SPENDING IS MADE
Mangrove seedlings	Per hectare	1,000	500 hectares per year between second and sixth years
Mangrove preparation and planting	Per hectare	1,500	500 hectares per year between first and fifth years
Tending mangroves	Per hectare	500	Required for two years after planting: 500 hectares in years 2 and 7; 1,000 hectares in years 3-6
Construction & equipping of mangrove protection unit	Lump sum	75,000,000	Split equally between first & second years
Purchase of survey & monitoring equipment	Lump sum	85,000	First year, then replaced every 5 years
Public awareness campaign on mangrove conservation	Lump sum	1,500,000	Split equally between first & second years
Support to Hanku University Ecology Department	Per year	250,000	From year 1 onwards
Support of mangrove protection unit	Per year	250,000	From year 1 onwards
Support to community mangrove groups	Per year	100,000	From year 1 onwards
Monitoring of mangroves & climate impacts	Per year	150,000	From year 1 onwards

The grey adaptation option will set in place a package of 'hard' infrastructure measures, including a seawall, breakwaters and groynes. Because they are so expensive to construct and maintain, these will however only be put in place along the 25 km coastline of the Hanku peninsula. The northern shore of the Coroné Delta will not be provided with any additional protection.

The grey infrastructure is expected to be provide a highly effective defence mechanism against storms and erosion. Not only will the seawall be able to deal with the effects of 5-year storms and tidal surges, but also it will protect against more severe 10-year events. For the 25 km stretch of coastline in question, the value of this storm protection in terms of avoided damages is 1.25 times as high as that currently provided by mangroves over the same area (2,500 hectares). The value of coastal erosion control will be the same as that currently provided by mangroves.
The grey infrastructure will take three years to build, meaning that these values will start to accrue in the fourth year of the project. It should however be noted the seawall, breakwaters and groynes will displace and destroy the existing mangroves on the Hanku peninsula. These mangroves will be cleared at the beginning of the first year of the project, meaning that all values for this 2,500 hectare block of mangroves will be lost immediately. Although this will not have any effect on fuelwood harvesting (which is carried out only on the northern short of the Coroné Delta), it will impact on mangrove and nearshore fisheries productivity as well as on the coastal protection functions formerly provided by the mangroves (as noted *above*, the new grey infrastructure will not replace these protection functions until the fourth year of the project).

There is also expected to be a loss of values from the 7,500 hectares of mangroves in the Coroné Delta. Because there will be no active management or conservation activities, mangrove cover is expected to decline at a rate of 5% per annum. This will impact on the fuelwood, mangrove and nearshore fisheries, coastal erosion control and storm protection services that the Coroné mangroves currently provide. As *above*, the unique ecological conditions in the area mean that there is an immediate and direct linear relationship between mangrove area and ecosystem service provision. In other words, ecosystem service values will decline in direct proportion to the loss in mangrove forest cover that is experienced.

The Ministry of Construction and Public Works have already put together a budget for developing grey adaptation infrastructure. This is as follows:

ITEMS	UNITS	COST/UNIT (BKL)	WHEN SPENDING IS MADE
Construction of new infrastructure and roads	Lump sum	100,000,000	Split equally between years 1,2 & 3
Maintenance of roads and infrastructure	Lump sum	1.5%	of capital cost from year 4
Purchase of survey & monitoring equipment	Lump sum	1,000,000	First year, then replaced every 5 years
Monitoring of coastal erosion & storm damages	Per year	500,000	From year 1 onwards

Copy of Excel data sheet to be filled in

PROJECT: Ecosystem-based adaptation

Mangrove area	Units	Baseline value (ha)	Added area per year between years 2-6	Year 1 (Ha)	Year 2 (Ha)
Mangrove area Coronè Delta	Hectares	7.500	400	7.500	7.900
Mangrove area Hanku peninsula	Hectares	2.500	100	2.500	2.600
All mangroves	Hectares	10.000	500	10.000	10.500
Costs	**Units**	**Cost/unit (BKL)**	**When spending is made**	**Year 1 (BKL)**	**Year 2 (BKL)**
Mangrove seedlings	Per hectare	1.000	500 hectares per year between second and sixth years		500.000
Mangrove preparation and planting	Per hectare	1.500	500 hectares per year between first and fifth years	750.000	750.000
Tending mangroves	Per hectare	500	Required for two years after planting: 500 hectares in years 2 and 3; 1.000 hectares ion years 3-6		750.000
Construction & equipping of mangrove protection unit	Lump sum	75.000.000	Split equally between first & second years	37.500.000	37.500.000
Purchase of survey & monitoring equipment	Lump sum	85.000	First year, then replaced every 5 years	85.000	
Public awareness campaign on mangrove conservation	Lump sum	1.500.000	Split equally between first & second years	750.000	750.000
Support to Hanku University Ecology Department	Per year	250.000	From year 1 onwards	250.000	250.000
Support to of mangrove protection unit	Per year	250.000	From year 1 onwards	250.000	250.000
Support to community mangrove groups	Per year	100.000	From year 1 onwards	100.000	100.000
Monitoring of mangroves & climate impacts	Per year	150.000	From year 1 onwards	150.000	150.000
Total costs				39.835.000	40.500.000
Benefits	**Units**	**Value/unit (BKL)**	**Applied to**	**Year 1 (BKL)**	**Year 2 (BKL)**
Local woodfuel use **(value B)**	Per hectare/year	701	Coronè Delta only	5.256.198	5.536.529
Mangrove fisheries **(value A)**	Per hectare/year	360	All mangroves	3.600.000	3.780.000
Nearshore fisheries productivity **(value C)**	Per hectare/year	824	All mangroves	3.240.000	3.402.000
Coastal erosion control **(value E)**	Per hectare/year	284	All mangroves	2.840.000	2.982.000
Rural coastline protection against storms & tidal surges **(value F)**	Per hectare/year	750	Coronè Delta	5.625.000	5.925.000
Urban/tourist coastline protection against storms & tidal surges **(value F)**	Per hectare/year	1.125	Hanku peninsula	2.812.500	2.925.000
Total benefits				23.373.698	24.550.529
Net cashflow				**Year 1 (BKL)**	**Year 2 (BKL)**
Net cashflow				- 16.461.302	- 15.949.471

Net present value (NPV)	155.704.238
Discounted benefit-cost ratio (BCR)	2,97
Internal rate of return (IRR)	59%

ALTERNATIVE: Grey adaptation infrastructure

Coastline and mangrove area	Units	Baseline value (ha)	Change per year	Year 1 (Km/Ha)	Year 2 (Km/Ha)
Length of coastline protected by grey infrastructure Hanku peninsula	Km	25	No change once infrastructure has been built (remember that will be no protection before that!)		
Mangrove area Coronè Delta	Hectares	7.500	-5%	7.500	7.125
Costs	**Units**	**Cost/unit (BKL)**	**When spending is made**	**Year 1 (BKL)**	**Year 2 (BKL)**
Construction of new infrastructure and roads	Lump sum	100.000.000	Split equally between years 1,2 & 3	33.333.333	33.333.333
Maintenance of roads and infrastructure	Lump sum	1,5%	of capital cost from year 4		
Purchase of survey & monitoring equipment	Lump sum	1.000.000	First year, then replaced every 5 years	1.000.000	
Monitoring of coastal erosion & storm damages	Per year	500.000	From year 1 onwards	500.000	500.000
Total costs				34.833.333	33.833.333
Benefits	**Units**	**Value/unit (BKL)**	**Applied to**	**Year 1 (BKL)**	**Year 2 (BKL)**
Grey infrastructure protection against storms & tidal surges	Per km/year	112.500	Hanku peninsula (remember to convert per hectare values to per km values!)	-	-
Grey infrastructure protection against coastal erosion	Per km/year	140.625			
Local woodfuel use **(value B)**	Per hectare/year	701	Coronè Delta only	5.256.198	4.993.388
Mangrove fisheries **(value A)**	Per hectare/year	360	Coronè Delta only	2.700.000	2.565.000
Nearshore fisheries productivity **(value C)**	Per hectare/year	824	Coronè Delta only	2.430.000	2.308.500
Coastal erosion control **(value E)**	Per hectare/year	284	Coronè Delta only	2.130.000	2.023.500
Rural coastline protection against storms & tidal surges **(value F)**	Per hectare/year	750	Coronè Delta only	5.625.000	5.343.750
Total benefits				18.141.198	17.234.138
Net cashflow				**Year 1 (BKL)**	**Year 2 (BKL)**
Net cashflow				- 16.692.135	- 16.599.195

Net present value (NPV)	16.263.161

Comparison of project/alternative	
Net present value-added/cost-incurred by EbA (over grey infrastructure)	139.441.077

Case study Group C: Assessing the impacts of coral reef degradation from the development of Moneila Deep Water Harbour

Note: use the Excel spreadsheet templates provided, and integrate the ecosystem values that you calculated in exercise #5. Please ask the facilitator to tell you the value of any ecosystem services that you did not have time to calculate yesterday

Note: Excel formulae can be used to calculate the NPV, IRR and BCR. You should apply a 10% discount rate to the cost-benefit analyses.

Formula to calculate NPV:	**Formula to calculate IRR:**	**To calculate BCR:**
=NPV (discount rate, range of cells containing the values for which NPV is to be calculated) Calculates the net present value of an investment by using a discount rate and a series of future values. In the example *below*, you would apply this formula to the net cash flow (total benefits minus total costs) of the project over 20 years	=IRR(range of cells containing the values for which IRR is to be calculated) Returns the internal rate of return for a series of future values. The series of future values must contain at least one positive value and one negative value to calculate the internal rate of return. In the example *below*, you would apply this formula to the net cash flow (total benefits minus total costs) of the project over 20 years	Use the NPV formula and apply it to the series of total benefits and total costs of the project over 20 years *The BCR is the NPV of future benefits ÷ NPV of future costs*

For your project (development of Moneila Deep Water Harbour), carry out a financial CBA, looking only at the direct costs and benefits of the project, and calculate:

1. What is the NPV, IRR and BCR over a 20-year period? (see further information *below*)

2. Is the investment worthwhile/profitable?

If you have time, for the alternative scenario of continued MPA and marine conservation (no blasting of the coral reef and use of the longer shipping route):

3. Calculate the economic NPV of the alternative scenario (see further information *below*)

4. Compare the NPV of the alternative scenario with that of the project

5. What would you conclude from this comparison of the project and the alternative scenario, and what would your advice be to decision-makers?

Further information on the situation at the case study site

ITEMS	UNITS	COST/UNIT (BKL)	WHEN SPENDING IS MADE
Infrastructure and equipment	Lump sum	200,000,000	Split equally between years 1,2 & 3
Maintenance of infrastructure and equipment	Lump sum	1.5%	of capital cost from year 4
Blasting coral reef	Lump sum	50,000,000	Split equally between years 1,2 & 3
Dredging harbour entry	Lump sum	100,000,000	Split equally between years 1,2 & 3
Maintaining shipping channels	Per year	10,000,000	From year 4

The dredging and coral reef blasting works that are required to deepen Moneila harbour and create a new entry channel will totally destroy the MPA and all the ecosystem services it provides. These include the contribution of coral reef species to the Moneila fishing economy as well as all tourism values.
In contrast, the continued conservation of the MPA will mean that coral reef fisheries and tourism will be sustained. These can be valued using the estimates calculated yesterday.

Although there is not projected to be any increase in fisheries catch, visitor numbers are predicted to rise by 2.5% a year in the future (i.e. from year 2 onwards) above the current levels of 4.000 divers and 6,000 day trippers. The MPA generates both use and non-use values for these tourists – the former measured through visitor travel costs and the latter revealed by their willingness to contribute to a marine conservation fund. In addition, the MPA and its component species hold considerable national significance for Bakulesi people who live in other parts of the country – for example, the heritage and existence value of Blue Ocean Turtles for city dwellers in Hanku and Moneila.

Copy of Excel data sheet to be filled in

PROJECT: Moneila deep-water harbour					
Number of boats entering harbour	Units	Baseline value	Change per year	Year 1 (Ships)	Year 2 (Ships)
No ships	Ships	1.500	2,5%		
	(remember that ships will only use deep-water channel once construction is complete!)				
Costs	Units	Cost/unit (BKL)	When spending is made	Year 1 (BKL)	Year 2 (BKL)
Infrastructure and equipment	Lump sum	200.000.000	Split equally between years 1,2 & 3	66.666.667	66.666.667
Maintenance of infrastructure and equipment	Lump sum	1,5%	of capital cost from year 4		
Blasting coral reef	Lump sum	50.000.000	Split equally between years 1,2 & 3	16.666.667	16.666.667
Dredging harbour entry	Lump sum	100.000.000	Split equally between years 1,2 & 3	33.333.333	33.333.333
Maintaining shipping channels	Per year	10.000.000	From year 4		
Total costs				116.666.667	116.666.667
Benefits	Units	Value/unit (BKL)	Applied to	Year 1 (BKL)	Year 2 (BKL)
Cost savings in taking more direct route	Per ship	155.000	All ships	-	-
Total benefits				-	-
Net cashflow				Year 1 (BKL)	Year 2 (BKL)
Net cashflow				- 116.666.667	- 116.666.667
Net present value (NPV)	1.300.139.471				
Discounted benefit-cost ratio (BCR)	4,53				
Internal rate of return (IRR)	45%				

ALTERNATIVE: continued MPA + marine conservation					
Tourists numbers	Units	Baseline value	Change per year	Year 1 (Visitors)	Year 2 (Visitors)
Dive tourists	Visitors	4.000	2,5%	4.000	4.100
Day-trippers	Visitors	6.000	2,5%	6.000	6.150
Hanku & Moneila residents	Households	463.902	No change	463.902	463.902
Costs	Units	Cost/unit (BKL)	When spending is made	Year 1 (BKL)	Year 2 (BKL)
Annual investment budget	Lump sum per year	1.000.000	Every year	1.000.000	1.000.000
Annual recurrent budget	Lump sum per year	2.500.000	Every year	2.500.000	2.500.000
Total costs				3.500.000	3.500.000
Benefits	Units	Value/unit (BKL)	Applied to	Year 1 (BKL)	Year 2 (BKL)
Coral reef fisheries **(value B)**	Annual value	18.720.000	Lump sum	18.720.000	18.720.000
Diver use value **(value C)**	Per visit	22.000	Divers	88.000.000	90.200.000
Diver non-use value **(value D)**	Per visit	950	Average across all divers (whether WTP or not)	3.800.000	3.895.000
Day-tripper use value **(value C)**	Per visit	350	Day-trippers	2.100.000	2.152.500
Day-tripper non-use value **(value D)**	Per visit	32	Average across all day-trippers (whether WTP or not)	194.400	199.260
Heritage and existence value of turtles **(value E)**	Per household/year	165	Average across all Hanku & Moneila residents (whether WTP or not)	76.514.785	76.514.785
Total benefits				189.329.185	191.881.545
Net cashflow				Year 1 (BKL)	Year 2 (BKL)
Net cashflow				185.829.185	188.381.545
Net present value (NPV)	1.730.001.098				

Comparison of project/alternative	
Net present value added/cost incurred by harbour development (over maintenance of MPA + coral reef)	- 429.861.627

EXEMPLARY ANSWER OF EXERCISE 7: WORKED EXAMPLE OF COST-BENEFIT ANALYSIS AND DISCOUNTING

To find out the calculations behind the results *below*, go to the excel file (<<Exercises _5 & _7 calculations & answers (trainers)>>) included in the electronic documentation attached to this manual.

CASE STUDY GROUP A: INTEGRATING FOREST CONSERVATION MEASURES INTO THE MILAKU HYDROPOWER SCHEME PUBLIC INVESTMENT PLAN	
NPV	BKL 288,134,979
IRR	52%
BCR	2.19
Is the investment profitable?	Yes
NPV alternative scenario	BKL 269,948,011
Comparison of project/alternative	BKL 18,186,968
What would be your advice?	Implement the Integrated Forest Management Plan. It not only generates a higher NPV, but also allows for a more equitable, efficient and sustainable allocation of resources.

CASE STUDY GROUP B: COMPARING GREY AND GREEN ADAPTATION OPTIONS TO STRENGTHEN COASTAL PROTECTION IN INDARE PROVINCE	
NPV	BKL 155,704,238
IRR	59%
BCR	2.97
Is the investment profitable?	Yes
NPV alternative scenario	BKL 16,263,161
Comparison of project/alternative	BKL 139,441,077
What would be your advice?	Implement the Ecosystem Based Adaptation measures. They not only generate a higher NPV, but also allow for a more equitable, efficient and sustainable allocation of resources.

CASE STUDY GROUP C: ASSESSING THE IMPACTS OF CORAL REEF DEGRADATION FROM THE DEVELOPMENT OF MONEILA DEEP WATER HARBOUR	
NPV	BKL 1,300,139,471
IRR	45%
BCR	4.53
Is the investment profitable?	Yes
NPV alternative scenario	BKL 1,730,001,098
Comparison of project/alternative	BKL -429,861,627
What would be your advice?	Not only the continued MPA and marine conservation generate a higher NPV, but also allow for a more equitable, efficient and sustainable allocation of resources.

PRESENTATION 10. INFLUENCING DECISION-MAKING II: COMMUNICATING EFFECTIVELY

Content covered in presentation 10

- Valuation as "knowledge brokerage"
- Requirements for increasing the policy impact of valuation studies
- Tools for effective communication
- Example of communicating ecosystem values to influence decision-making

This presentation introduces the principles and tools for communicating the valuation process and results with the target audience and relevant stakeholders. However technically 'good' an economic valuation study is, it will have little impact unless decision-makers actually find it useful, interesting, relevant, credible and legitimate.

As in previous presentations, remember to make a recap on the preceding key messages as a way of introduction to this topic:

- Economic valuation only makes sense if it is carried out in a decision-making context and looks for influencing a target audience.

- In this sense, it is crucial to know the principles and tools for communicating the valuation process and results with decision makers and relevant stakeholders.

- This will allow to formulate a strategy to involve the target audience and relevant stakeholders in the valuation process, and to effectively communicate the results to influence decision-making.

Main presentation points and notes for the presenter

- The presentation starts with the concept of valuation as a knowledge brokerage. Here, repeat that the ecosystem valuation is much more than an academic exercise: it is a social process. Also, highlight that this process establishes a bridge between policy makers and scientists/experts, between environment and development: ES valuations take information generated by science and make it useful for decision makers. Ask participants why they think that economic valuation is a social process and why they think that this bridge needs to be built.

- For this bridge to be effective (so that it increases the possibility of impact) and for the target audience to be receptive, the GIZ recommends fulfilling certain principles in the valuation study: 1) balancing credibility, legitimacy and relevance; 2) closing the knowledge-policy-practice gap, and 3) tailoring to practical purposes. These principles can be found in the publication on "Increasing the Policy Impact of Ecosystem Service Assessments and Valuations" (Berghöfer, et al., 2016). Encourage participants to discuss about the challenge of fulfilling them in practice and to give examples of how they have achieved (or failed to achieve) them in their everyday work.

- Other crucial element to take into consideration to increase the impact of valuation, is to determine who the stakeholders involved in the process are and to establish how to communicate with them during different stages of the valuation study. In the presentation, there are some suggestions on how to define stakeholder engagement needs (power-interest grid), how to understand what information is most relevant to them and what does this means in terms of communication (Position-Interests-Needs iceberg), how to be strategic for delivering messages (find out "entry points" and "windows of opportunity") and some recommendations on how to be more persuasive.

- The presentations give some suggestions on tools that can be relevant to the participants, but these are not the only options. If you consider that there are more tools and strategies that can be helpful for the participants when implementing an ecosystem valuation, feel free to integrate and exemplify them.

- Finally, present some case studies that help you exemplify the content of the presentation. As always, remember that you should try to include examples of your own, which are useful to the participants' interests and everyday work.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation. **It is important to mention that even though the references for examples are included, it is highly recommended to use different examples, which are relevant for the participant s interests and experience. In case of using the examples provided in the presentation, read the whole case carefully in order to transmit the information correctly. Also, cite the sources adequately.**

Berghöfer A, C Brown, A Bruner, L Emerton, E Esen, D Geneletti, M Kosmus, R Kumar, M Lehmann, F Leon Morales, E Nkonya, T Pistorius, J Rode, R Slootweg, U Tröger, H Wittmer, S Wunder, H van Zyl. 2016. Increasing the Policy Impact of Ecosystem Service Assessments and Valuations - Insights from Practice. *Helmholtz-Zentrum für Umweltforschung* (UFZ) GmbH, Leipzig, and *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH, Eschborn, Germany. 31pp. *www.aboutvalues.net*

Emerton, L., Iyango, L., Luwum, P. and A. Malinga. 1999. The Economic Value of Nakivubo Urban Wetland, Uganda. IUCN, Nairobi, updated to 2018.

Fisher, B., Turner, R.K. and P. Mauling. 2009. Defining and classifying ecosystem services for decision-making. Ecological Economics 68: 643-653

Gerrard, P. 2004. Integrating Wetland Ecosystem Values into Urban Planning: The Case of That Luang Marsh, Vientiane, Lao PDR. WWF Lao PDR

Kosmus, Marina; Renner, Isabel and Ullrich, Sivlia. 2017. Integrating *Ecosystem Services* (IES) into Development Planning Training material. Deutsche Gesellschaft für International Zusammenarbeit.

Reinecke, Sabine; Hermann, Tony Andrea; Bauer, Anja; Pregernig, Michael; Hogl, Karl and Pistorious, Till. 2013. Innovative Climate Policy Advice: Case Studies from Germany, the Netherlands, Swtizerland and the UK. Institut für Wald, Umwelt und Ressourcenpolitik. Universität für Bodenkultur Wien. Reschaping Science Policy.

APPLICATION OF EXERCISE 8: FORMULATING MESSAGES AND COMMUNICATING INFORMATION

Below, you will find the step by step to apply the exercise 8, the instructions and some exemplary answers.

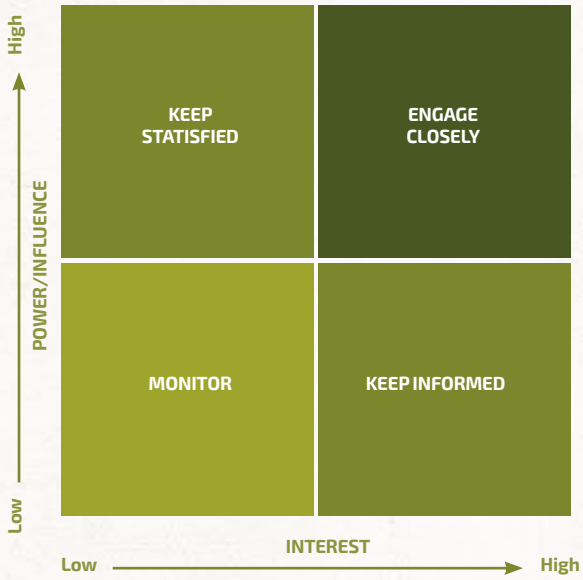
EXERCISE 8 – FORMULATING MESSAGES AND COMMUNICATING INFORMATION	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure participants have the information and results of previous exercises, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Participants are requested to construct a power-interest grid to identify which stakeholders of their case study need to be involved or engaged in the valuation process. Moreover, they need to formulate three credible, relevant and legitimate messages for the main stakeholder groups and they must state a strategy of engagement.
Instructions and recommendations	After the presentation on "communicating effectively", explain the objectives and instructions of exercise 8. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. Remind participants that, in order to answer this exercise, they need to take into account the information and results of previous exercises. Also, encourage them to be as creative as possible when it comes to design the communication strategy and formulation of messages. Also, ask them to choose a person of their team, who will have 5 minutes to present their results in plenary.

Hints on carrying out the exercise	For this exercise, participants will first need to build a stakeholder map, including their target audience. It is common for work groups to spend most of their time identifying the stakeholders than in carrying out the actual exercise. Therefore, suggest them to make a quick short list of stakeholders and then answer the questions of the exercise. It is also common that participants find the suggestions on each one of the quadrants of the power/interest grid a little confusing. Recommend them not to spend much time trying to analyse it, but trying to identify in which location of the grid they would like the stakeholders to be situated. Moreover, they should generate messages that engage them to the process of economic valuation and, more importantly, influence their decision-making. Encourage participants to be as creative as possible and to try to "get into the head" of their primary target audience and relevant stakeholders. They can also make use of the other tools suggested in the presentation, such as the "iceberg" model. In case there is not much time, participants should identify the three main stakeholders (including their target audience) and locate them in the power/interest grid. Then, they should formulate a message to address their primary target audience. Try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	After the presentation on "communicating effectively", explain the objectives and instructions of exercise 8. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. Remind participants that, in order to answer this exercise, they need to take into account the information and results of previous exercises. Also, encourage them to be as creative as possible when it comes to design the communication strategy and formulation of messages. Also, ask them to choose a person of their team, who will have 5 minutes to present their results in plenary.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. · Use the exemplary answers of the exercise to encourage discussion on different results and to ask questions that have not been raised during the reflection. **Possible guiding questions for reflection:** · Did your teams discuss other relevant criteria to select and categorize your main stakeholders and target audience? · Which aspects did you consider when formulating your communication strategy and messages? · Which were the main challenges of this exercise? · What other aspects do you think must be considered to increase the impact of a valuation study? · Would you like to share any real-life experiences or examples?
Key messages	· Ecosystem valuation is a social process, which brokers knowledge to decision-makers. · The valuation process and results should be tailored to a practical purpose and target audience. · Valuation has the most impact when the findings are relevant, credible and legitimate. · However technically good the valuation study is, if it is to influence decision-making, it needs to be communicated in a clever and strategic manner.

EXERCISE 8 – FORMULATING MESSAGES AND COMMUNICATING INFORMATION

For your valuation study:

1. Construct a power-interest grid to identify which stakeholders need to be involved or engaged in the valuation process and sharing of results

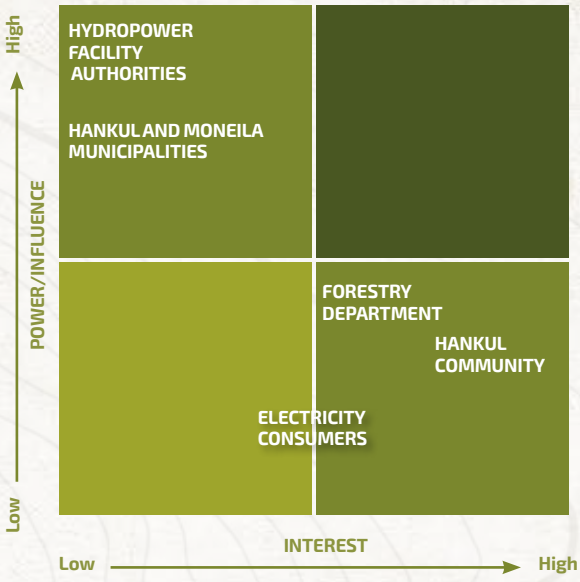


2. Formulate up to three key messages for the primary target audience (be prepared to explain how and why each message is credible, relevant and legitimate to them)

EXEMPLARY ANSWER OF EXERCISE 8: FORMULATING MESSAGES AND COMMUNICATING INFORMATION[3]

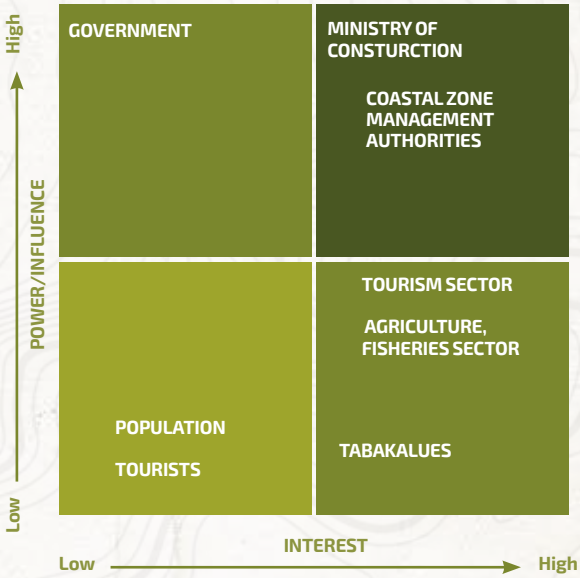
Case study Group A: Integrating forest conservation measures into the Milaku hydropower scheme public investment plan

Key messages:
- Electricity consumers: "Stable forests, stable tariffs"
- Hydropower facility: "Investing in the Forest Management Plan is good for the water business"



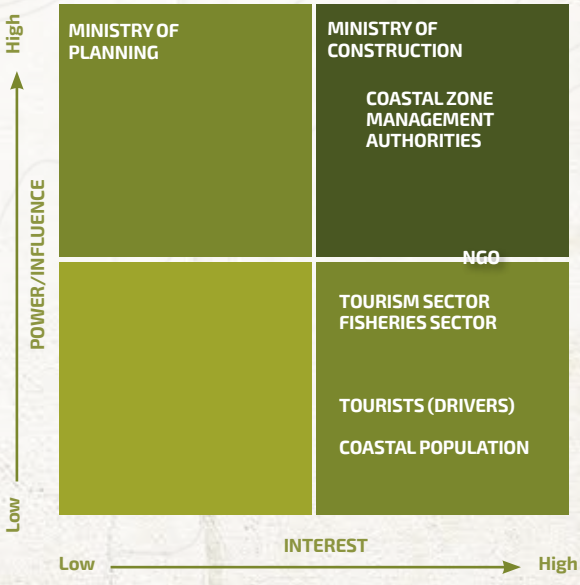
Case study Group B: Comparing grey and green adaptation options to strengthen coastal protection in Indare Province

Key message:
- Ministry of Construction and Government: "Green and grey, sustainable and profitable way"



Case study Group C: Assessing the impacts of coral reef degradation from the development of Moneila Deep Water Harbour

Key message:
- Ministry of Construction and Government: "Green and grey, sustainable and profitable way"



3 Based on the results of the training in Eschborn, Germany, on February 2018.

PRESENTATION 11. ECONOMIC INSTRUMENTS: VALUE CAPTURE AND DISTRIBUTION

Content covered in presentation 11

- Importance of capturing values and encouraging equal distribution of costs and benfits
- Policy tools and "solutions"

This last presentation refers to the process of capturing the value of ES in concrete mechanisms. This allows to motivate changes in decisions associated to ES management, and therefore, on how stakeholders are affected.

When making a recap of previous key messages, emphasize the following:

- The whole point of an economic valuation is to generate changes in ES management, generating a more equitable, efficient and sustainable decision-making.

- Link this message to the third step of TEEB and explain that it is very important to deal with the 'so what?' in valuation. The aim is to influence decision-making, and present practical tools for integrating ES values into people's day-to-day economic decisions. Economic instruments are how it is done. Indicate that the training do not go into this in detail that would be the subject of a separate training course! But it raises and discuss the issues to remind everyone that valuation should, in most cases, be pointing towards needs, niches and opportunities for concrete actions.

Main presentation points and notes for the presenter

- Having the results of an economic valuation is not enough to generate changes in decision-making. Knowing the value of ES will not do much if it remains more profitable to degrade ecosystems than to conserve them. Accentuate that it is necessary to change the mechanisms and incentives that drive economic behaviour and lead to the degradation of ES, generating negative impacts in stakeholders' life quality.

- Recall that most of the decision-making in policy and planning that needs to be changed, involves mechanisms and incentives that do not capture the value of ES, which also leads to an unequal distribution of costs and benefits between stakeholder groups. Therefore, when designing the valuation study and making use of the results, it is important to look on which are those incentives that do not capture the value of ES (and need to), and where the distribution of costs and benefits of conservation are unequal.

- After this, go through some of the policy tools and solutions, and ask participants to exemplify them. Remember that this course will not go into incentives, financing and economic instruments in detail, but get participants to think and discuss briefly about their own ideas and experiences. Finally, give an example relevant to your participants' needs, interests and mandates.

References and sources

The following references and sources are recommended for reviewing the details and examples of the concepts included in this presentation. **It is important to mention that even though the references for examples are included, it is highly recommended to use different examples which are relevant for the participant s interests and experience. In case of using the examples provided in the presentation, read the whole case carefully in order to transmit the information correctly. Also, cite the sources adequately.**

Berghöfer A, C Brown, A Bruner, L Emerton, E Esen, D Geneletti, M Kosmus, R Kumar, M Lehmann, F Leon Morales, E Nkonya, T Pistorius, J Rode, R Slootweg, U Tröger, H Wittmer, S Wunder, H van Zyl. 2016. Increasing the Policy Impact of Ecosystem Service Assessments and Valuations - Insights from Practice. *Helmholtz-Zentrum für Umweltforschung* (UFZ) GmbH, Leipzig, and *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH, Eschborn, Germany. 31pp. *www.aboutvalues.net*

Emerton, L., Erdenesaikhan, N., de Veen, B., Tsogoo, D., Janchivdorj, L., Suvd, P., Enkhtsetseg, B., Gandolgor, G., Dorjsuren, Ch., Sainbayar, D. and A. Enkhbaatar. 2010. The Economic Value of the Upper Tuul Watershed Ecosystem in Mongolia. The World Bank, Washington DC.

TEEB. 2010. The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB

APPLICATION OF EXERCISE 9: INCENTIVES, FINANCE AND POLICY INSTRUMENTS

Below, you will find the step by step to apply the exercise 9, the instructions and some exemplary answers.

EXERCISE 8 – FORMULATING MESSAGES AND COMMUNICATING INFORMATION	
Preparation	· Write the exercise objectives and questions on a flip chart. · Distribute flip charts, cards and markers for groups to take notes and visually represent their group work. · Make sure participants have the information and results of previous exercises, so they can use them in this exercise. · It is important for you to know very well the information on the case studies, so you can clarify all the questions. It is recommended for you to solve all the exercises of each case study before giving the training.
Objective	Participants will form buzz groups to identify, for their case study, who are likely to be the main gainers and losers in the scenarios identified in exercises 6 and 7, and what additional measures may be required to address the resulting inequities or disincentives to ecosystem conservation and equal distribution.
Instructions and recommendations	After the presentation on "economic instruments: value capture and distribution", quickly explain the objectives and instructions of exercise 9. Ask participants to gather in their teams and allow them to go through the instructions again. Give them some time and dedicate some moments to answer their questions about the instructions and the exercise. Remind participants that, in order to answer this exercise, they need to take into account the information and results of exercises 6 and 7. Ask the groups to choose a person of their team, who will have 5 minutes to present their results in plenary.

Instructions and recommendations	In this last exercise, participants need to think about the benefit receivers and cost bearers of the change in the decision-making, and which additional measures need to be implemented to address the resulting financial and economic inequities. It might be useful for them to go through the different suggested measures during the presentation, but also encourage them to rely on their own real-life experiences. It is usual for participants to focus on one single group of stakeholders or one single additional measure. As a trainer, try to encourage participants to think in the appropriate scale of impact of the influence of the decision-making and about all the stakeholders that could be affected by this, so that the suggested measures are the most adequate. In case there is not enough time to go through this exercise, you can encourage a plenary discussion with the participants, going through each one of their case studies. If the participants are doing the exercise in working groups, try to go around the groups and listen to the discussions of each of them. In case there is the need of guidance and correction, intervene, but never suggest an answer. If teams do not need guidance, let them work and discuss among themselves.
Presentation of results	In case the groups are presenting in plenary, give no more than 5 minutes to each for their presentation. After the presentation, other groups can ask questions and provide feedback.
Reflection	· Open discussion in plenary. · Encourage participants to contribute with their knowledge to the discussion. · Write important points, ideas, and questions on flip charts or on cards. · Use the exemplary answers of the exercise to encourage discussion on different results and to ask questions that have not been raised during the reflection. **Possible guiding questions for reflection:** · Which are the main instruments, mechanisms and policies to change in your study case? · What additional elements do you think are required to propose changes in such instruments, mechanisms and policies in order for them to capture the value of ES? · Do you think there are additional changes to be done for assuring a more equal distribution of costs and benefits? In case there is, which changes should be required? · Which do you think are the challenges when trying to capture the value of ES in measures or instruments in real life? · Would you like to share any real-life experiences or examples?
Key messages	· Just valuing ecosystems is not enough to generate impacts: value of ES needs to be captured in mechanisms, instruments, policies, etc. to generate real changes. · The ultimate goal of valuation is to identify needs, niches and opportunities for developing policy instruments, which will serve as incentives or finance for ecosystem conservation and sustainable use. · First step is to understand the distributional issues of the status quo and the tendential decision-making: who bears the costs and who receives the benefits. · Then, it is important to identify the gaps and imbalances: uncompensated costs, unrewarded actions, uncaptured values, untapped opportunities, etc. · The idea is to set in place concrete mechanisms with which to redistribute, capture, charge and reward ecosystem values. · Bottom line is to ensure that conservation is economically and financially viable, effective and sustainable.

EXERCISE 9: INCENTIVES, FINANCE AND POLICY INSTRUMENTS

Case study Group A: Integrating forest conservation measures into the Milaku hydropower scheme public investment plan

For your valuation study (Integrated Landscape Management Plan for the Belandu-Hankulen forest complex, as compared to a continuation of the status quo):

1. Who are likely to be the main beneficiaries and cost-bearers?

2. What additional measures or instruments may be needed to address the resulting financial and economic inequities, disincentives or funding gaps for ecosystem conservation?

Case study Group B: Comparing grey and green adaptation options to strengthen coastal protection in Indare Province

For your valuation study (green/ecosystem-based adaptation measures for Indare Province coastline, as compared to the grey infrastructure option):

1. Who are likely to be the main beneficiaries and cost-bearers?

2. What additional measures or instruments may be needed to address the resulting financial and economic inequities, disincentives or funding gaps for ecosystem conservation?

Case study Group C: Assessing the impacts of coral reef degradation from the development of Moneila Deep Water Harbour

For your valuation study (continued existence of the MPA (no blasting of the coral reef and use of the longer shipping route, as compared to the development of Moneila Deep Water Harbour):

1. Who are likely to be the main beneficiaries and cost-bearers?

2. What additional measures or instruments may be needed to address the resulting financial and economic inequities, disincentives or funding gaps for ecosystem conservation?

EXEMPLARY ANSWER OF EXERCISE 9: INCENTIVES, FINANCE AND POLICY INSTRUMENTS

Case study Group A: Integrating forest conservation measures into the Milaku hydropower scheme public investment plan

Integrated Landscape Management Plan for the Belandu-Hankulen forest complex, as compared to a continuation of the status quo.

1. The main beneficiaries of the implementation of the Integrated Landscape Management Plan (ILMP) for the Belandu-Hankulen forest complex are the Forestry Department, electricity consumers and the Hankul community. The main cost-bearers could be other stakeholders that use and extract resources from the forest, who will not be able to perform their activities once the ILMP is implemented.

2. Additional measures or instruments: adjustment to electricity tariff for savings in operation costs of the dam, information campaign for electricity consumers on the benefits of the ILMP, extraction permits for stakeholders that need to use/extract resources from the ILMP (according to limitations stipulated by the ILMP).

Case study Group B: Comparing grey and green adaptation options to strengthen coastal protection in Indare Province

Green/ecosystem-based adaptation measures for Indare Province coastline, as compared to the grey infrastructure option.

1. The main beneficiaries of the implementation of green/ecosystem-based adaptation measures consist in the population of Hanku Peninsula and Tabakalues community. The urban, fisheries, agriculture, tourism and industrial sector will have benefits but also costs. This is because their infrastructure will be better protected, nevertheless, since there will be rehabilitation and restoration of mangroves in the coastal strip, there will not be able to grow such infrastructure. The coast-bearers would be the investors of shrimp farming.

2. Additional measures or instruments: due to the limitations in use of space resulting from the implementation of green adaptation measures, probably it will be necessary to modify the territorial planning, as well as the development plan of Hanku. This also involves adjusting the incentives for the different sectors to develop their activities within the areas where the rehabilitation and restoration will take place. Maybe it will be necessary to encourage the development of other activities that align to the green adaptation measures.

Case study Group C: Assessing the impacts of coral reef degradation from the development of Moneila Deep Water Harbour

1. The main beneficiaries of the continued existence of the MPA (no blasting of the coral reef and use of the longer shipping route), as compared to the development of Moneila Deep Water Harbour are: low impact tourism, population of Indare and Exportul, fisheries, service tourist providers (diving), the Bakumoken, low impact tourists and divers. The coast-bearers would be: export-oriented industries, port operators and the high-impact-tourism sector.

2. Additional measures or instruments: alternative development plan for Indare when it comes to export oriented industries and high-impact-tourism.

DISCUSSION 4. WHERE DO WE GO FROM HERE?

This discussion focuses on learning how to apply the training in participants' work and every-day experience. To make it useful, the discussion should focus on getting a better understanding on how ecosystem valuation will influence participants' future work and how they plan to multiplicate the training. This can be facilitated in a plenary discussion or can also have a different format: each participant can describe the future use of the economic valuation in their work on one or two cards (no more), and those with similar ideas can get into buzz groups to discuss ideas on how to best implement what they learned in the training. In addition, you could also give some time for participants to present their own cases and get peer advice from the rest of the group. In this case, some participants could shortly present their cases to the rest of the group and then, create teams in which other participants could give specific advice on specific questions of the presenters. To get more information on the format in which peer advice can be implemented, revise *Annex II*.

Annex

ANNEX I. INSTRUCTIONS OF HARVEST GAME FOR PARTICIPANTS

Objectives

- Identify and analyse the motivations for people's economic behaviour regarding the management of wood (extraction for fuelwood), under different institutional settings.

- Identify and analyse the effectiveness/suitability of different measures for wood management.

Introduction

This exercise aims to recreate a context, in which a group of families must decide how to extract fuelwood from a forest. You play the role of one of those families and the extraction decision relies on determining how many months you will spend in the forest harvesting fuelwood. You will play for several rounds that are equivalent, for instance, to months or harvest seasons. Make no assumptions about the number of rounds.

The trainers will indicate the general context.

Requirements

- Participant number (given by the trainer: do not share this number with other participants, only you should know this number)
- Participant cards
- Record sheet
- Payment table

Instructions

1. The trainers will divide the participants in three groups and you will be assigned with a participant number. This number cannot be shared with other participants: only you should know it. All the information provided to the participants will be made through the participant number.

2. For the next 75 minutes, 15-20 rounds will be played and the trainers will let you know about the decision-making context in each one of them.

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Source: Taken from Murphy, J. and J-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47-61.

3. The trainer will indicate you when the round begins. When it does, you must choose how many months, from 0 to 8, you will spend extracting fuelwood from the forest. For each round, write down your decision and your participant number in the "participant card", careful not show it to any other participant. It is very important that you keep in mind that your decisions are completely private and you may not show them to the rest of members of the group. Moreover, the instructor will not know what you decided and will not divulge your decisions to anyone.

4. After a couple of minutes, the trainers will pick up your participant cards and record all the participants decision. Then, they will calculate the total amount of months spent by each of the three groups and indicate it to each group in plenary.

5. Use the "record sheet" to write down the individual and group months spent in the forest for each round (Column A and B). Then, by substracting the individual months of the groups' total months in the forest, obtain the total months that the rest of the group decided to spend in the forest (excluding the months you decided yourself) and write it down in the column "Otheŕ s months in the forest" (Column C). With this information (Column C) and the information on your individual decision (Column A), identify your individual earnings in the "payment table" and write it down in the last column of the "record sheet".

→

RECORD SHEET				
Name:				**Player Number: 1**
	Column A	**Column B**	**Column C**	**Column D**
Round No.	**My month in the forest** (Your decision)	**Total group months in the forest** (Announced by the trainer)	**Others' months in the forest** (Column B minus Column A)	**My earnings in this round (individual income)** (Use your payoff table)
1				
2				
3				
4				

PAYMENT TABLE									
	My months harvesting								
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	619	670	719	767	813	856	896	933	967
1	619	669	717	764	809	851	890	926	959
2	617	667	714	760	804	845	883	918	950
3	615	664	711	756	798	838	875	909	940
4	613	660	706	750	792	831	867	900	929
5	609	656	701	744	784	822	857	889	917
6	605	651	695	737	776	813	847	877	905
7	600	645	688	729	767	803	836	865	891
8	595	638	680	720	757	792	824	852	877
9	588	631	672	711	747	780	811	838	862
10	581	623	663	700	735	768	797	823	846
11	573	614	653	689	723	755	783	808	830
12	565	605	642	678	711	741	768	792	813
13	556	594	631	665	697	726	752	775	795
14	546	583	619	652	683	711	736	758	776
15	536	572	606	638	668	695	719	739	757
16	525	560	593	624	655	678	701	721	737
7	513	547	579	609	636	661	683	701	717

Source: Taken from Murphy, J. and J.-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47–61.

It is very important to clarify that nobody will know your decisions in each round or your earnings for the experiment. Only the group total is announced in public. No one, including the instructor, will know what each participant in your group decided.

6. The rounds are repeated according to the previously described process.

EXTERNAL REGULATION

In addition to the rules for the rounds we just completed, there is now an additional rule in effect. The goal of this new rule is to help obtain the maximum earnings possible for the group. We will try to guarantee that each player in your group chooses to spend no more than one month in the forest.

However, it will be very difficult to inspect everyone's decision. Thus, we will select someone randomly to be monitored. To determine who will be monitored: The instructor will flip a coin. If TAILS, then nobody will be monitored this round. If HEADS, then one person will be monitored this round. The monitor will draw one name from a box with all eight participant numbers. If that person spent more than one month in the forest, a penalty will be imposed.

The penalty is E$100 for each additional month. For example, if a player is selected randomly, and he had chosen to spend three Months in the Forest, the monitor will subtract E$200 from his total earnings in that round.

If someone is monitored in the round, no one will know who that person is. Moreover, only the individual and the monitor will know whether that person was in compliance. The card for the person who was monitored will be returned to the box. Thus, it is possible for someone to be monitored more than once during the experiment. It is also possible that someone may not be monitored at all.

Penalty if you are monitored									
My months spent in the forest for fuelwood extraction	0	1	2	3	4	5	6	7	8
Penalty ($)	0	0	100	200	300	400	500	600	700

Source: Taken from Murphy, J. and J-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47-61.

Materials for the game: Record sheet

RECORD SHEET				
Name:				**Player Number: 1**
	Column A	**Column B**	**Column C**	**Column D**
Round No.	**My month in the forest** (Your decision)	**Total group months in the forest** (Announced by the trainer)	**Others' months in the forest** (Column B minus Column A)	**My earnings in this round (individual income)** (Use your payoff table)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
			Total	

Source: Taken from Murphy, J. and J.-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47-61.

Materials for the game: Participants cards

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Source: Taken from Murphy, J. and J-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47-61.

Materials for the game: Participants cards

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

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Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Participant card

Participant number

Round number

My months spent in the forest for fuelwood extraction

Source: Taken from Murphy, J. and J-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47-61.

This is the table that should be given to students with the instructions. It was created with equation (1) in the paper Murphy, J. and J-C. Cardenas (2004) An Experiment on Enforcement Strategies for Managing a Local Environmental Resource. The Journal of Economic Education 35(1): 47-61. This table is calculated for 24 participants (8 groups of 3 people each). For less than 8 participants, change the table in the excel workbook according to the suggestions included in Murphy and Cardenas, 2004.

	PAYMENT TABLE								
	My months harvesting								
Others' months harvesting		0	1	2	3	4	5	6	7	8
	0	619	670	719	767	813	856	896	933	967
	1	619	669	717	764	809	851	890	926	959
	2	617	667	714	760	804	845	883	918	950
	3	615	664	711	756	798	838	875	909	940
	4	613	660	706	750	792	831	867	900	929
	5	609	656	701	744	784	822	857	889	917
	6	605	651	695	737	776	813	847	877	905
	7	600	645	688	729	767	803	836	865	891
	8	595	638	680	720	757	792	824	852	877
	9	588	631	672	711	747	780	811	838	862
	10	581	623	663	700	735	768	797	823	846
	11	573	614	653	689	723	755	783	808	830
	12	565	605	642	678	711	741	768	792	813
	13	556	594	631	665	697	726	752	775	795
	14	546	583	619	652	683	711	736	758	776
	15	536	572	606	638	668	695	719	739	757
	16	525	560	593	624	655	678	701	721	737
	17	513	547	579	609	636	661	683	701	717
	18	501	534	565	594	620	643	664	681	696
	19	488	520	550	578	603	625	645	661	674
	20	475	506	535	561	585	606	625	640	653
	21	461	491	519	544	567	587	605	619	630
	22	447	476	502	527	548	567	584	597	608
	23	433	460	485	509	529	547	563	575	585
	24	418	444	468	490	510	527	541	553	561
	25	402	428	451	472	490	506	520	530	538
	26	387	411	433	453	470	485	498	507	514
	27	371	394	415	434	450	464	476	484	490
	28	355	377	396	414	430	443	453	461	466
	29	338	359	378	395	409	421	431	438	442
	30	322	341	359	375	389	400	409	415	418
	31	305	324	341	355	368	378	386	392	394
	32	288	306	322	336	347	357	364	368	371
	33	272	288	303	316	327	335	341	345	347
	34	255	270	284	296	306	314	319	323	324
	35	238	253	266	277	286	293	297	300	300
	36	221	235	247	257	265	272	276	278	278
	37	205	218	229	238	245	251	254	256	255
	38	189	300	211	219	226	231	233	234	233
	39	173	184	193	201	206	211	213	213	212
	40	157	167	175	182	188	191	193	193	191
	41	142	151	159	165	169	172	174	173	171
	42	127	135	142	148	152	154	155	154	152
	43	113	120	126	131	134	136	137	136	133
	44	99	106	111	115	118	119	119	118	115
	45	86	92	96	100	102	103	103	101	99
	46	73	78	82	86	87	88	88	86	83
	47	61	66	69	72	73	74	73	71	68
	48	51	54	57	59	60	61	60	58	55
	49	40	44	46	48	49	48	47	45	43
	50	31	34	36	37	38	37	36	34	32
	51	23	25	27	28	28	28	27	25	23
	52	16	18	19	20	20	19	18	17	15
	53	10	12	12	13	13	12	11	10	8
	54	6	7	7	7	7	7	6	5	4
	55	2	3	3	3	3	3	2	2	1
	56	0	1	1	1	1	1	0	0	0

ANNEX II. PEER REVIEW

Peer review is a method used for providing feedback and recommendation between colleagues.

As proposed by the GIZ, it comprehends a series of steps with defined timing.

The process helps to give answer to a very specific question/problem from the "client" (participant who requires the feedback and recommendation).

The "advisors" (participants who provide the feedback and recommendations) provide different ideas on how to solve the question/problem, but the final decision is responsibility of the "client".

The process takes place in the following format:

1. Ask participants who would like to present a case that poses a question/problem related to ecosystem valuation and would like to receive feedback/ recommendations from the group.

2. Plan the time slots in which participants will present their cases in plenary and indicate to the rest of the group that they have to choose one case in which they would like to participate and give their feedback/recommendations.
3. Once the participants presented their cases, ask participants to gather in groups according to the cases they are interested in. Make sure each one of the groups has a moderator.

4. Once the participants are in groups, the process starts.

			Roles		
Time	**Activity**	**Objective**	**Client**	**Advisors**	**Moderator**
5´	The client gives a synthesis of the case from his/her perspective. Must not be interrupted by the advisors	Understand the case	Talks	Listen	Facilitates
15´	Advisors make clarifying questions on the case, but should not give comments, interpretations or judgements.	Deeply comprehend the case	Answers	Ask	Facilitates
5´	The client and the advisor discuss the main question to answer of the case (main problem)	Stablish the scope for recommendations	Discusses	Discuss	Writes down the question
20´	Advisors give many ideas to answer the question (solve the problem)	Provide the client with different perspectives and ideas	Listen (JUST LISTEN)	Formulate hypothesis and give ideas	Writes down the ideas
5´	The client gives feedback on the ideas, focusing only in mentioning which ones were the most useful ones. Should not go into why some ideas worked and some others do not.	Review the ideas and emphasize the most useful ones	Emphasises most relevant ideas.	Listen (JUST LISTEN)	Facilitates

NOTES

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