Knowledge Broker Support Program

Volume 2 – Knowledge Broker Tools – The Wellbeing Tool module

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Cover photo: Knowledge broker in action. Photo by Tom Greenwood, 2017. Photo below by Seona Meharg.

The Wellbeing Tool – Assets Drivers Wellbeing Interaction Matrix (ADWIM)

This module will introduce you to a tool called the Assets Drivers Wellbeing Interaction Matrix (ADWIM). It was developed to support community and regional planning for climate change adaptation and development planning.

In this module, you will learn:

1 **What is ADWIM?**

2 **Why use ADWIM?**

3 **How ADWIM works**

4 **What are Ecosystem Goods and Services (EGS)?**

We will also provide an example of the ADWIM process used with Huhu Local Level Government (LLG) Papua New Guinea, including some results.

What is ADWIM?

ADWIM stands for Assets Drivers Wellbeing Interaction Matrix.

It is a tool that can be used to value ecosystem goods and services (EGS) and assess the impact of drivers such as climate change and population growth on the EGS and community wellbeing.

It was developed to help communities and regions plan for the future. The analysis is usually focused at the community level, but can be applied at any scale, and also can be used for different social units such as gender or age groups.

ADWIM was developed for application primarily in remote and/or rural settings to help with projects focused on community and regional planning for climate change

What is my community's natural resource reliance, and how will this be impacted in the future by drivers such as climate change and population growth, and what can we do about it?

ADWIM was developed by CSIRO and has been applied to many projects in Papua New Guinea, Indonesia, the Solomon Islands and Fiji. It has also been used in a multi-jurisdictional context in the Torres Strait, and in a semi-urban setting in South-East Queensland, Australia.

The ADWIM tool has also been developed to allow the integration of different sources of knowledge:

- **Scientific knowledge** – How are drivers going to change in the future, and what is the impact of those changes on habits and ecosystem goods and services?
- **Local knowledge** – What are the ecosystem goods and services utilised by communities, and what is their importance to human wellbeing?

Why use ADWIM?

ADWIM can support community adaptation strategies and prioritise interventions for aid and development programs.

ADWIM can be used in participatory planning for designing community adaptation activities. It can answer two questions:

1. **Which natural resources are important to your local community's wellbeing?**
2. **How are these natural resources going to be impacted in the future?**

In planning workshops, stakeholders can then prioritise strategies to tackle the specific drivers of future impacts on the most highly valued EGS or diversify by utilising EGS, which will be less impacted by future change.

Transparent

- Values easily identified by stakeholders
- Information sources clearly defined

Relevant

- Outputs designed for existing processes
- "System approach" based on all of the natural resources used now and in the future

Replicable

- Methods and assumptions well documented
- Simplicity allows rapid assessments

Credible

- Easily cross-checked by stakeholders
- Integrates local and scientific knowledge

Types of ecosystem goods and services (EGS)

One way to categorise the benefits that humans derive from ecosystems is through four types of EGS. These were defined by the Millennium Ecosystem Assessment (2005) as provisioning, cultural, regulating, and supporting.

While all types of EGS are important, the ones that ADWIM focuses on are the benefits derived from the direct utilization of ecosystems.

This combines the Millennium Ecosystem Assessment's classification of 'provisioning' ecosystem services (products obtained from ecosystems) and 'cultural' ecosystem services (non-consumptive benefits). It does not include the 'regulating' benefits obtained from the regulation of ecosystem processes (coastal protection, water purification and carbon sequestration) or 'supporting' services (those necessary for the production of all other ecosystem services).

The importance of EGS are estimated from their contribution to the Constituents of Wellbeing:

1. **Food**
2. **Income**
3. **Health**
4. **Culture**

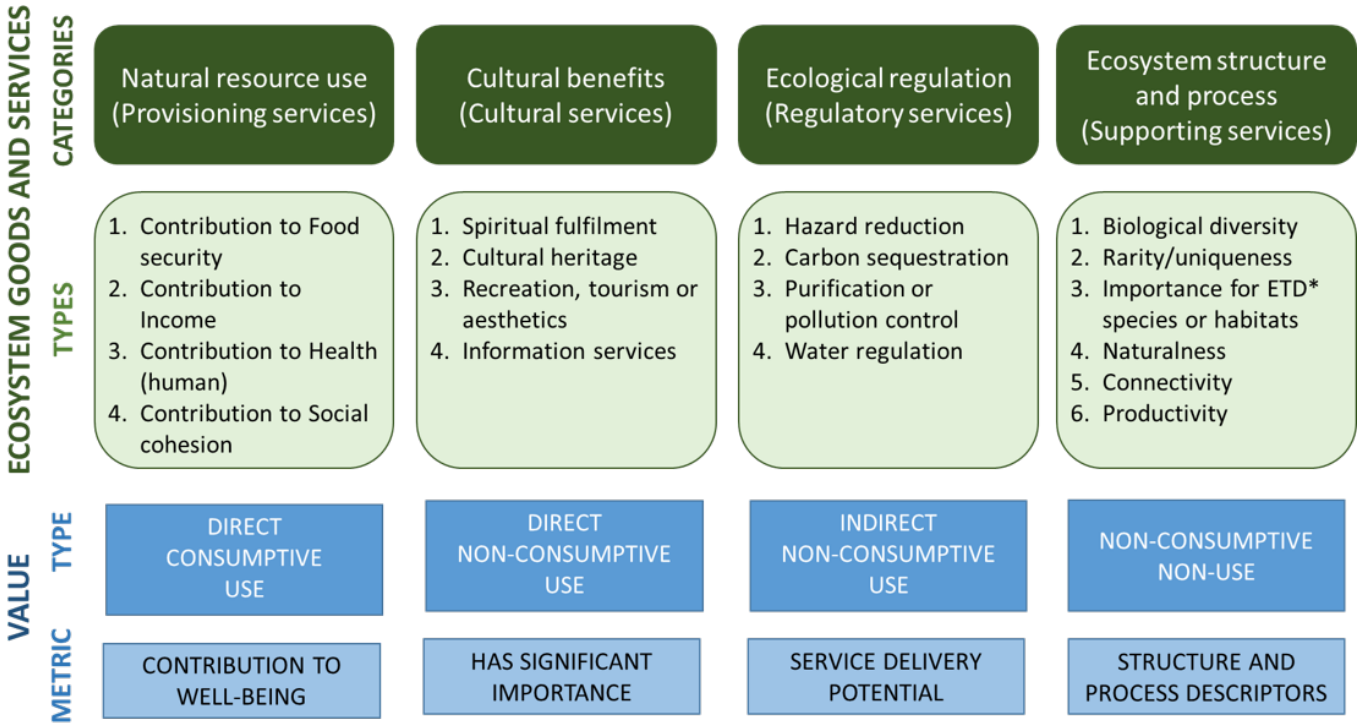


Figure 32 Ecosystem Goods and Services (EGS): their Categories, Types, and ways they can be valued

How does ADWIM work?

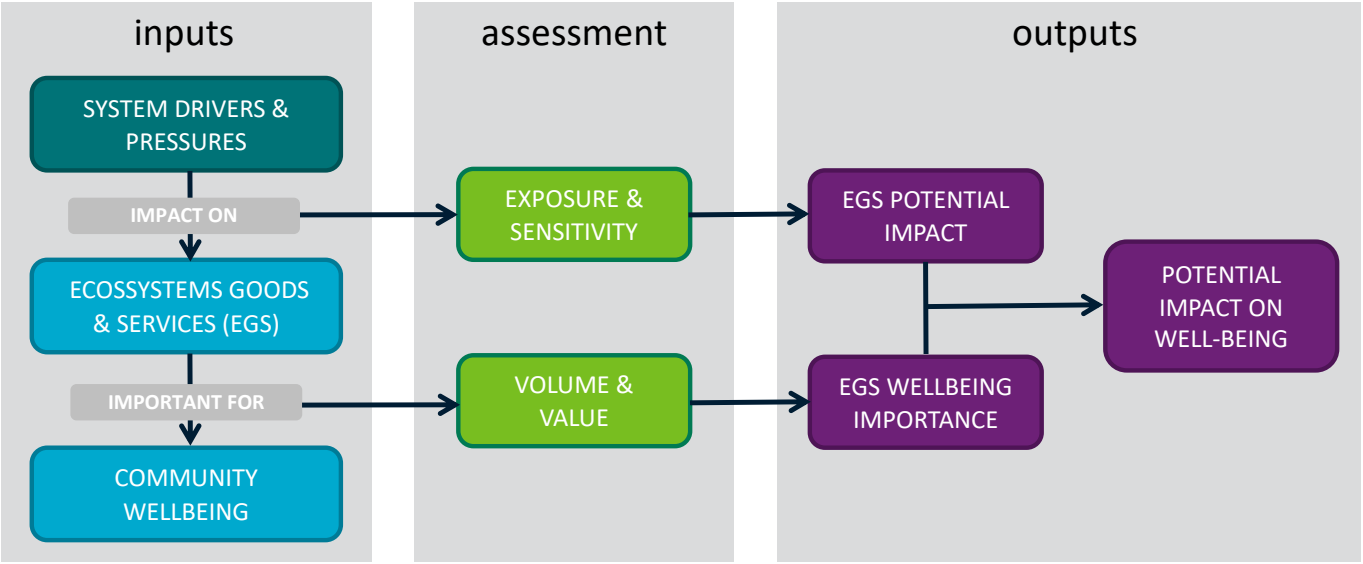


Figure 33 An outline of the ADWIM Tool

ADWIM is set up in Excel spreadsheets which can be populated with data in real time in workshops.

The first part estimates the potential impact of the system drivers and pressures on local EGS, which is based on the exposure and sensitivity of the ecosystem assets that supply the EGS (e.g. animal populations and their supporting habitats) to each pressure.

The second part estimates the importance of each EGS according to their volume utilised and relative value to community wellbeing.

Inputs

SYSTEM DRIVERS & PRESSURES Projections of current and future system drivers (especially climate change and population growth) and their associated pressures (such as temperature change and utilisation).

ECOSYSTEMS GOODS & SERVICES (EGS) The local ecosystem goods and services (EGS) directly utilised by communities.

COMMUNITY WELLBEING The benefits provided by local EGS to communities, measured by four 'constituents of wellbeing': food security, income, health and culture.

Assessment

EXPOSURE & SENSITIVITY The impact of the system drivers and pressures on local EGS as a result of the exposure and sensitivity of the underlying habitats (or 'assets') that generate the EGS.

VOLUME & VALUE The overall importance of each EGS for the wellbeing of the community is assessed in terms of its volume utilised and its relative value to wellbeing (i.e. through food security, income, health and culture).

ADWIM outputs include:

The three main outputs from ADWIM that are used by stakeholders for adaptation and planning are:

1. **The EGS Potential Impact** – changes in EGS due to Pressures
2. **EGS wellbeing importance** – the importance of each EGS as a proportion of overall EGS-derived wellbeing
3. **Overall wellbeing impact** – the impact of all Pressures on all EGS as a proportion of overall EGS-derived wellbeing

Output 1: EGS well-being importance

Valuing EGS is a critical first step of ADWIM because:

1. Remote communities generally have a high reliance on local natural resources.
2. The natural resource base for many remote communities is not well known.
3. The elicitation of EGS values provides a good opportunity to engage community members, build trust and co-produce new knowledge.

Below is an example of the EGS valuation output from the Mangoro Market Meri project in Milne Bay Province, Papua New Guinea. The results show the relative value for communities in Huhu Local Level Government (LLG) area, elicited by The Nature Conservancy.

It shows the top 30 EGS (there are 62 in total), divided between the four constituents of well-being – income, health, food security and culture.

Garden staple foods make up the top five EGS, illustrating the importance of gardens to these communities. Compared to the other EGS, which were important in terms of income, health, food security and culture, betel nut was mostly important for income and culture.

More on the Mangoro Market Meri case study demonstration of ADWIM can be found - (https://learnwithacfid.com/mod/ scorm/view.php?id=702).

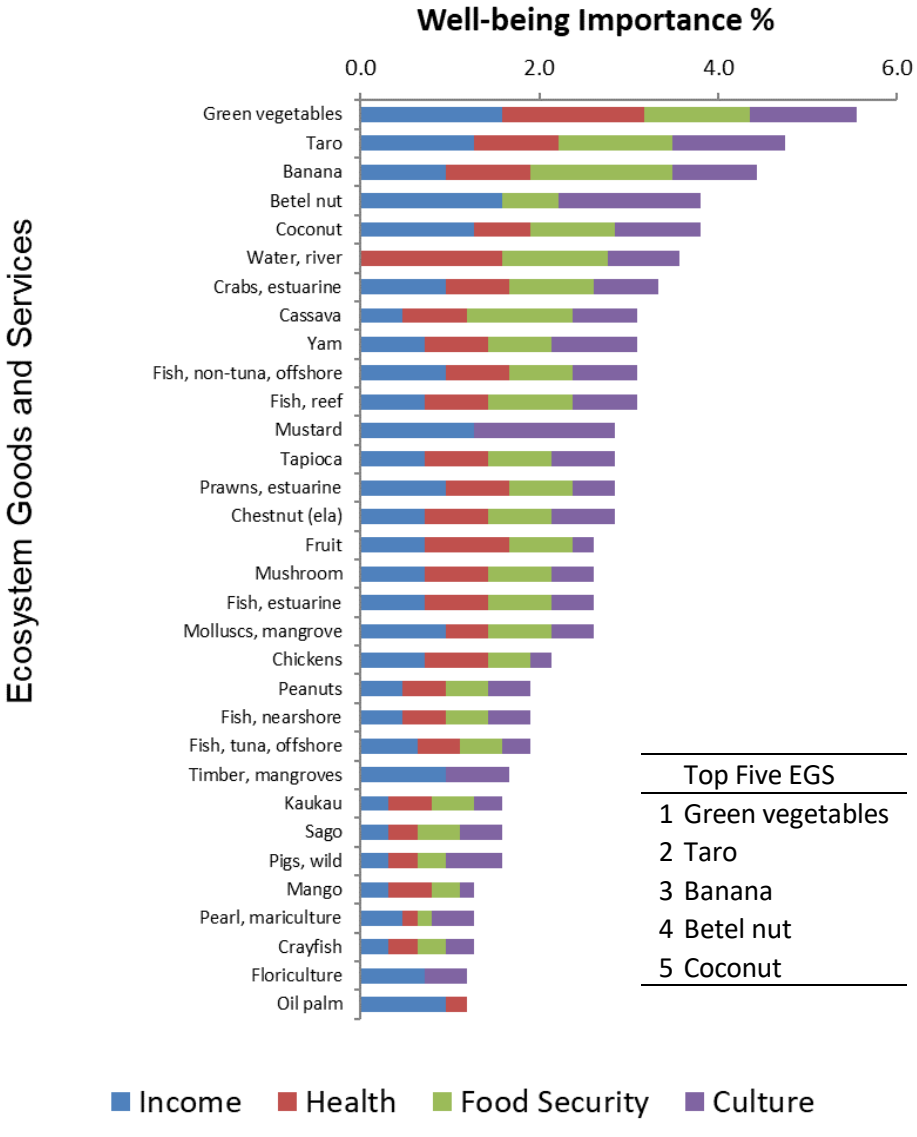


Figure 34 EGS importance from Huhu LLG villages, Milne Bay, PNG

EGS Habitats Well-being Importance

The values can also be totalled by habitat to show their relative importance.

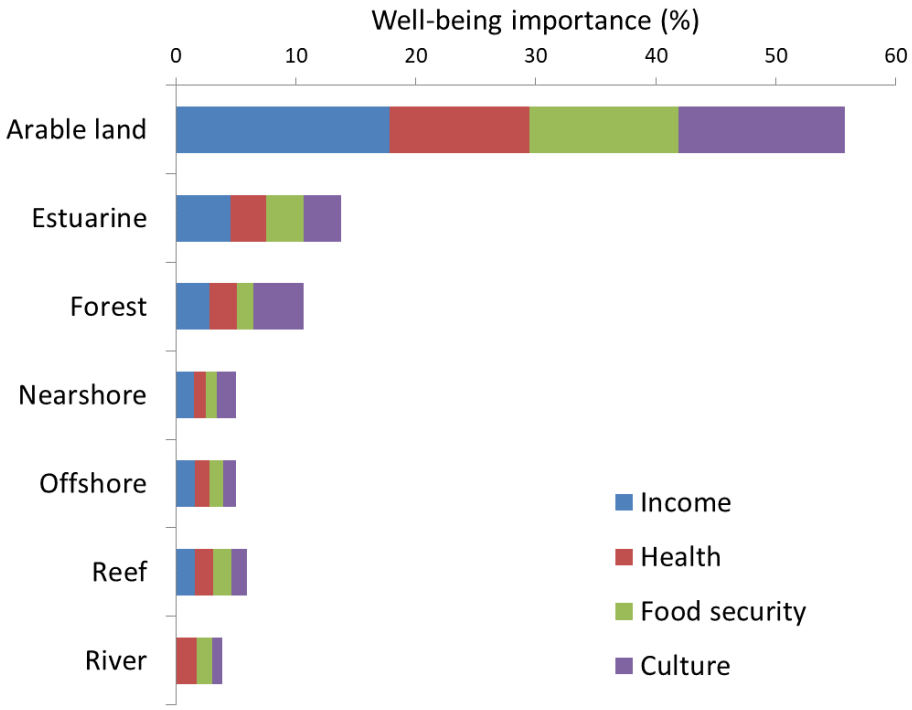


Figure 35 EGS habitats well-being importance – this Huhu LLG example shows the importance of gardens (i.e. arable land) to community wellbeing.

EGS Habitats Relative Wellbeing Importance

If you have estimates of the area of the different habitats for the focus community, you can also present a relative value for habitat (e.g. per km2).

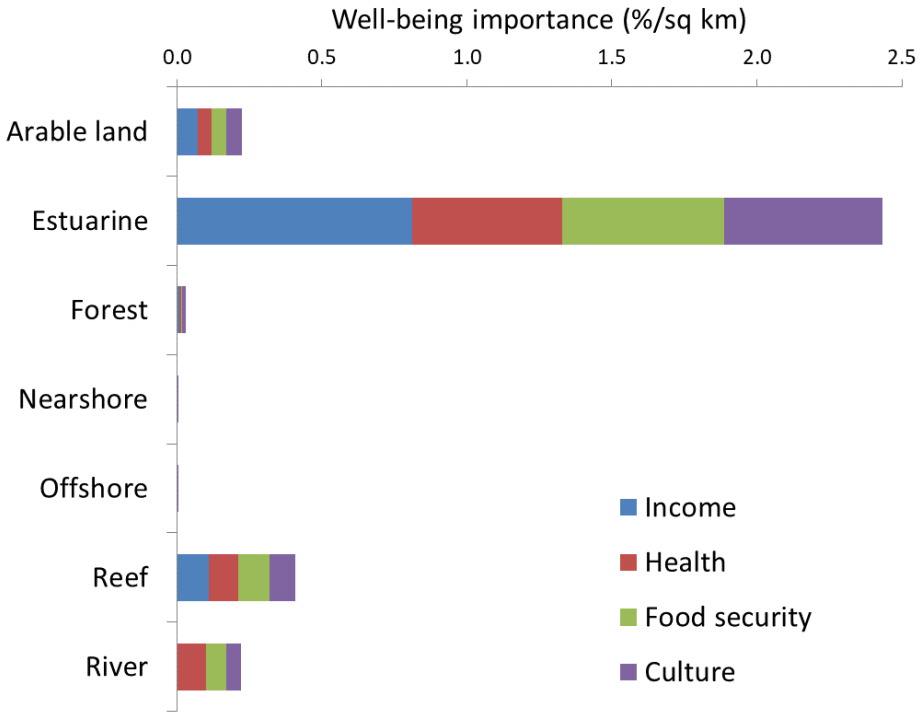


Figure 36 An example from Huhu LLG and is a typical indicator of the relatively high importance of estuaries for wellbeing for coastal communities, because their area is small but the overall value of EGS derived from this habitat is high

Output 2: EGS Potential Impacts

The second part of ADWIM is an estimate of future impacts on EGS. This is done using scientific knowledge or expertise to estimate the impact of each pressure on each EGS as a percentage of the overall status of that EGS.

This diagram shows an example of the EGS Impact outputs for Huhu LLG in PNG.

The graph below shows the importance of local EGS (Output 1) side-by-side with the estimates of potential impact by 2030 and 2050 (as a percentage of the overall status of that EGS), differentiated by each pressure. Although there are some positive impacts on most EGS from temperature increase in the short term, most of the impacts are negative.

You can see from this example, again for Huhu LLG, that the greatest and most relevant impacts relate to the estuarine crabs and reef fish EGS, caused by projected overexploitation and the effects of temperature increase.

However, most agricultural EGS are not predicted to be greatly affected (e.g. garden staples), and some EGS may even provide options for livelihood diversification because they will be relatively less impacted by future changes (e.g. sago & kaukau).

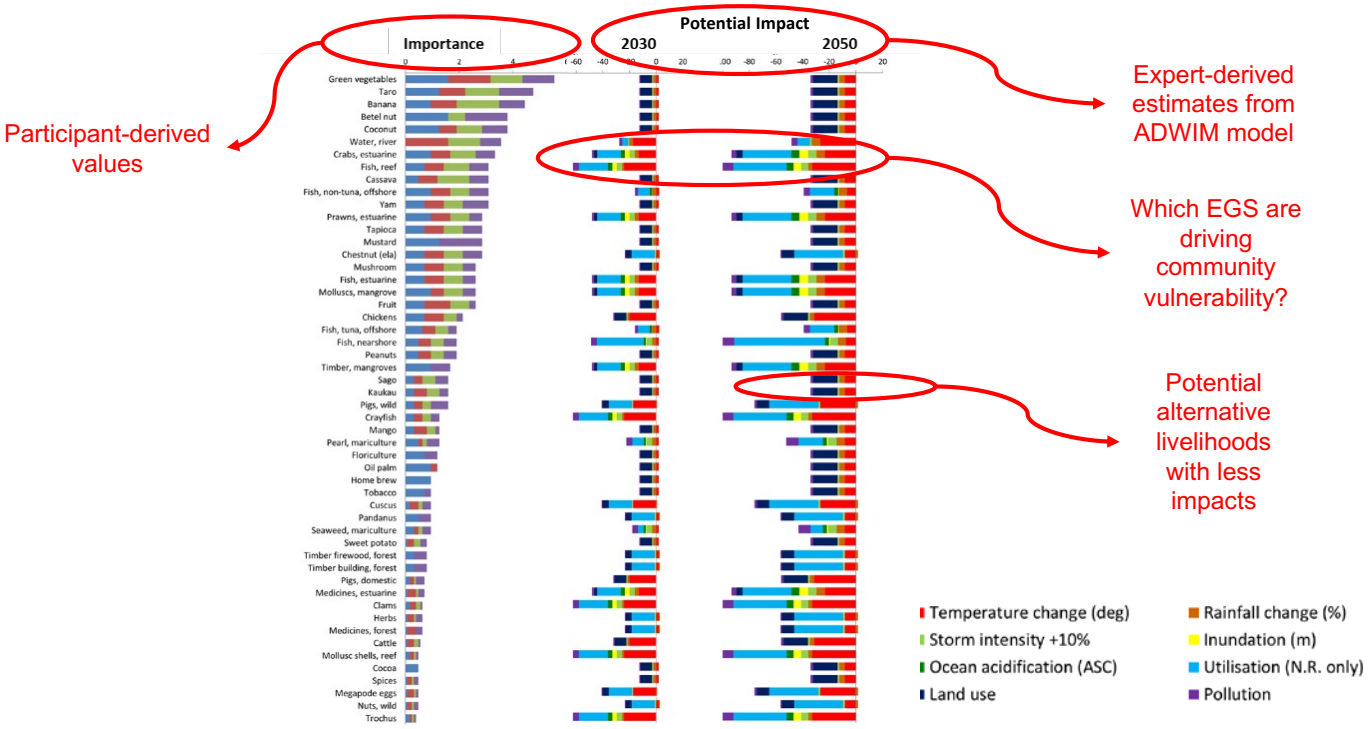


Figure 37 EGS importance and potential impacts Huhu LGG, Milne Bay Province, PNG

Output 3: Overall wellbeing impact

The third output from ADWIM is a combination of the EGS importance and impact outputs – an estimate of the overall potential impact on community well-being.

Again, this example is from Huhu LLG in PNG. It shows that a moderate impact by 2030 becomes a significant impact on overall community wellbeing by 2050. This analysis indicates that temperate increases, over-utilisation and land-use changes are likely to be the primary pressures that will cause this impact, unless adaptation and mitigation strategies are introduced to address these pressures.

Remember that this is for the 'Business as Usual' situation for drivers and pressures, and does not include future adaptation actions. Remember that this can sometimes be confronting to local stakeholders when they see this information.

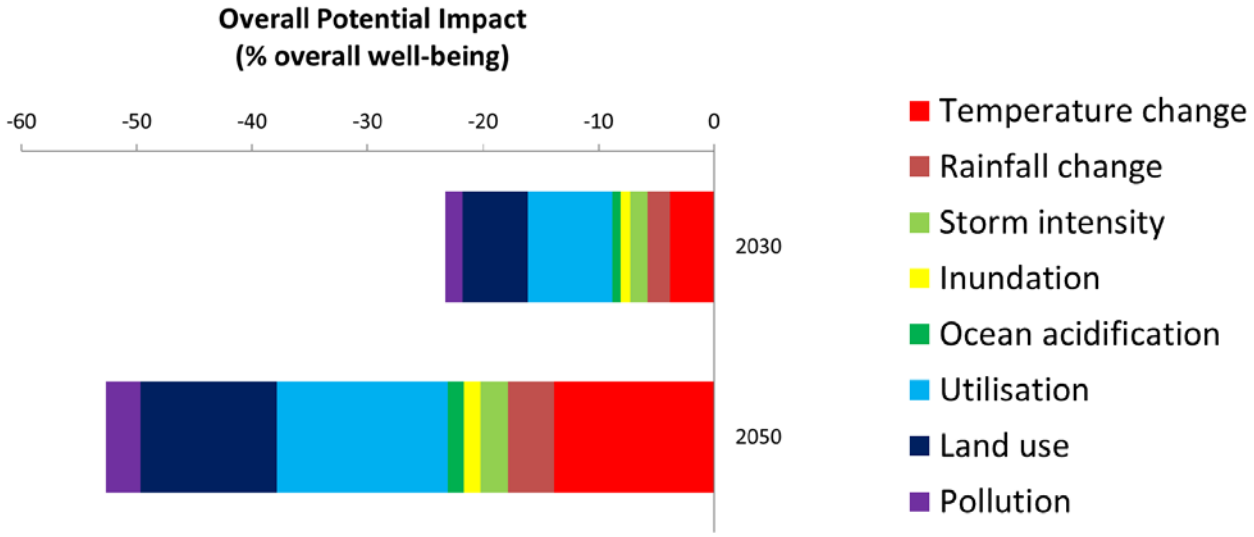
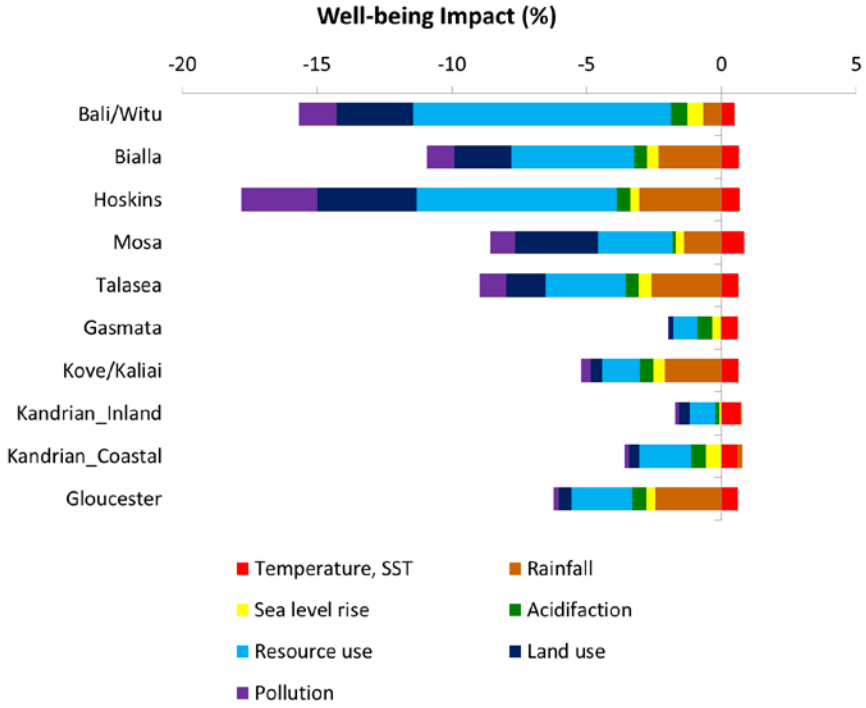


Figure 38 EGS Overall Wellbeing Potential Impact, Huhu LLG villages, Milne Bay, PNG



Comparing locations

If you are assessing several communities in the same region, then the overall well-being impact can provide relative impact information to help identify priority locations for action.

Figure 39 is an example for West New Britain in PNG.

It shows that the highly populated LLGs of Bali-Witu and Hoskins are likely to be the most impacted LLGs by 2030, caused by pressures related to human population growth, primary resource use, pollution and land-use change.

Figure 39 Comparing wellbeing impact in several locations

Undertaking an EGS well-being importance assessment

This section provides an introduction to the EGS wellbeing importance assessment part of ADWIM.

In the video below Tim Skewes and Nicky Grigg explain the process of estimating EGS values. After the video, you'll find a detailed explanation of each of the steps.

Watch video here: https://youtu.be/hoJBmvAUsXM

Pre-workshop

STEP 1 – DECIDE YOUR FOCUS COMMUNITY

Your focus community will usually be a combination of:

- The area (village, local government area, provincial government area, etc.); and
- The social groups within the community (e.g. everyone, women, youth, people with disabilities, etc.)

STEP 2 – FORMULATE AN INITIAL EGS LIST

Having a reasonably comprehensive but concise list of EGS before carrying out community elicitation is important, otherwise it might take too long to carry out the participatory process:

Consider the EGS that are utilised by the focus community within your geographical area over the past 3 years. Use any information you have at hand, or interview people with knowledge of the area.

Aim for a list of 30 or fewer EGS that include the most important EGS. In the ADWIM EGS valuing tool, there is a list of all the previous EGS CSIRO has collated from other areas of Melanesia. You can use this as a basis to formulate your initial EGS list.

STEP 3 – PLAN THE WORKSHOP

Planning for and carrying out the elicitation process will require some careful preparation.

Decide on the elicitation approach you are going to take to compile the EGS list and values.

It's important to be aware that there are knowledge brokering skills that you will need to facilitate workshops or focus groups and to elicit knowledge from local stakeholders. These may include interpersonal and communication skills, active listening skills, strategic thinking, openness, dealing with ambiguity and integration.

You may wish to use an external facilitator if it is a particularly contested situation or if it is difficult for you to maintain a high level of independence.

To set up a successful elicitation process, it is important to be aware of issues such as effective sample size and bias. If too few people are engaged, the results may not represent a wide enough range of views, and be biased.

STEP 4 – PREPARE EGS ELICITATION MATERIALS

The material you will need to carry out the elicitation process are:

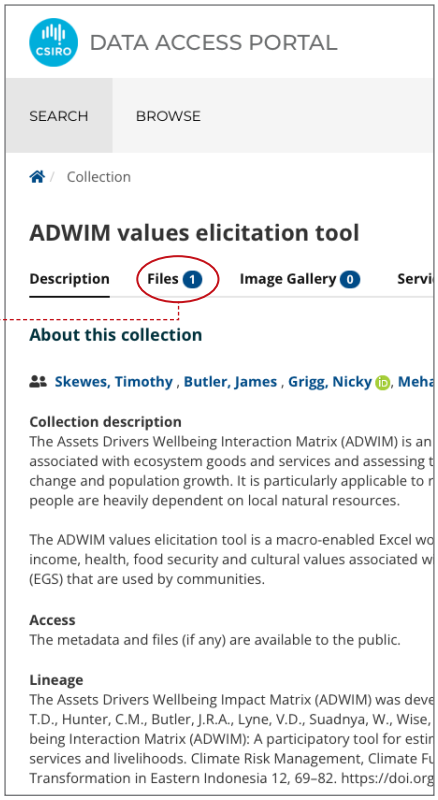
- A presentation to explain to participants the background and EGS scoring process.
- Print outs of the EGS scoring sheets for participants to fill in by hand.
- The ADWIM Tool Excel file and the Instruction Manual **[Files]**.

TOOL: Please access the ADWIM tool through CSIRO's data access portal: https://doi.org/10.25919/fpgq-6p71

STEP 5 – SET THE NUMBER OF GROUPS

Decide on the number of groups or individuals you would like to engage with. Usually, in a workshop setting, we would suggest 4 or 5 groups of people. If interviewing individuals, you may need to have 6 or more.

In the ADWIM EGS valuing tool, put the number of groups in the **relevant box** on the Instruction sheet.



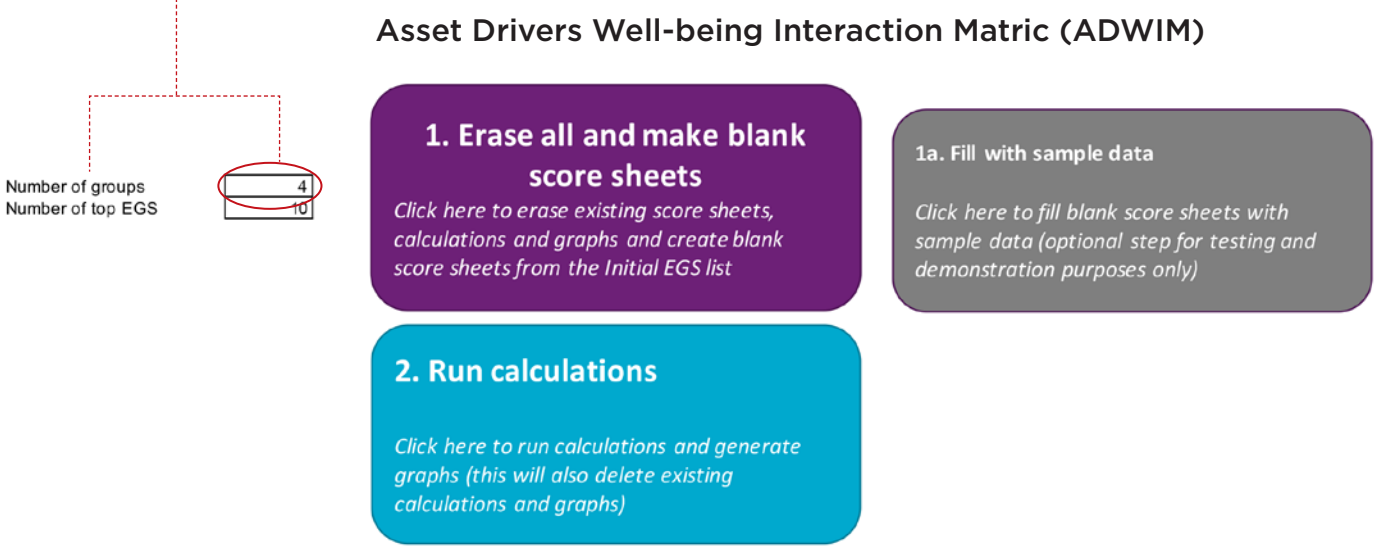


Figure 40 Image of the ADWIM tool

During the workshop

Before you elicit scores from participants (in a workshop or interview situation), you can use a graphic such as this one below to explain how well-being importance for each EGS is estimated.

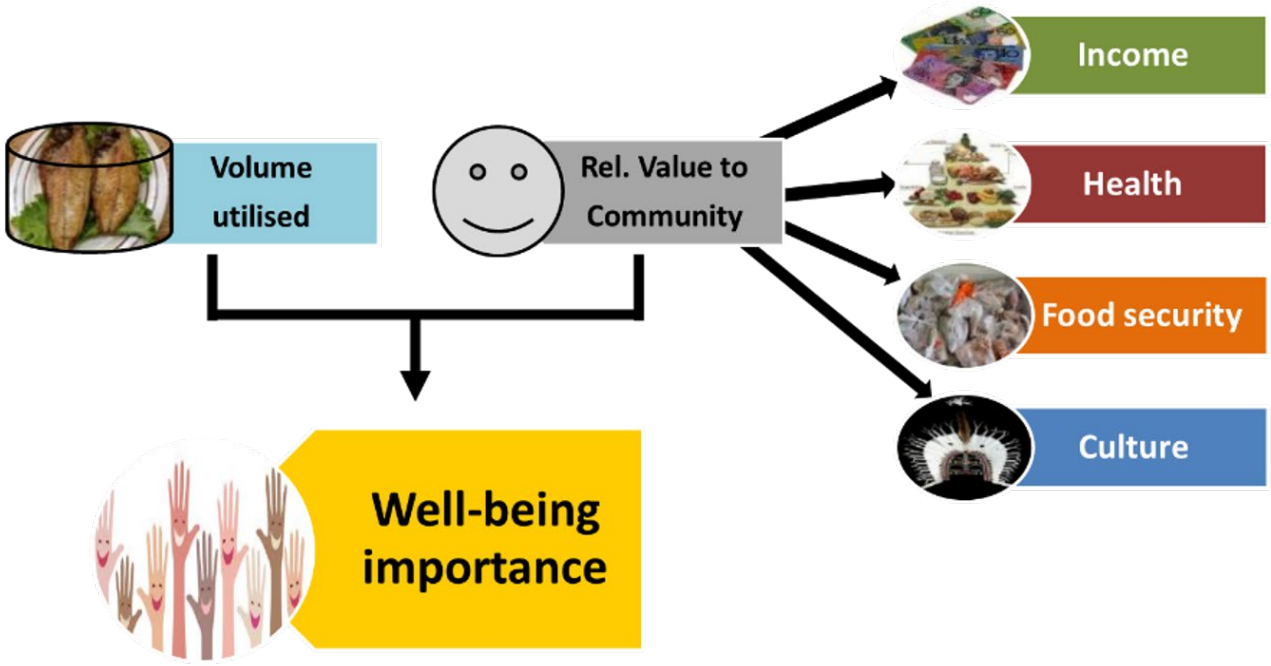


Figure 41 A graphic to explain the process of estimating EGS well-being importance

It is also important to explain to stakeholders that only ecosystem goods and services harvested from local ecosystems are to be considered, not those imported from elsewhere or purchased from others.

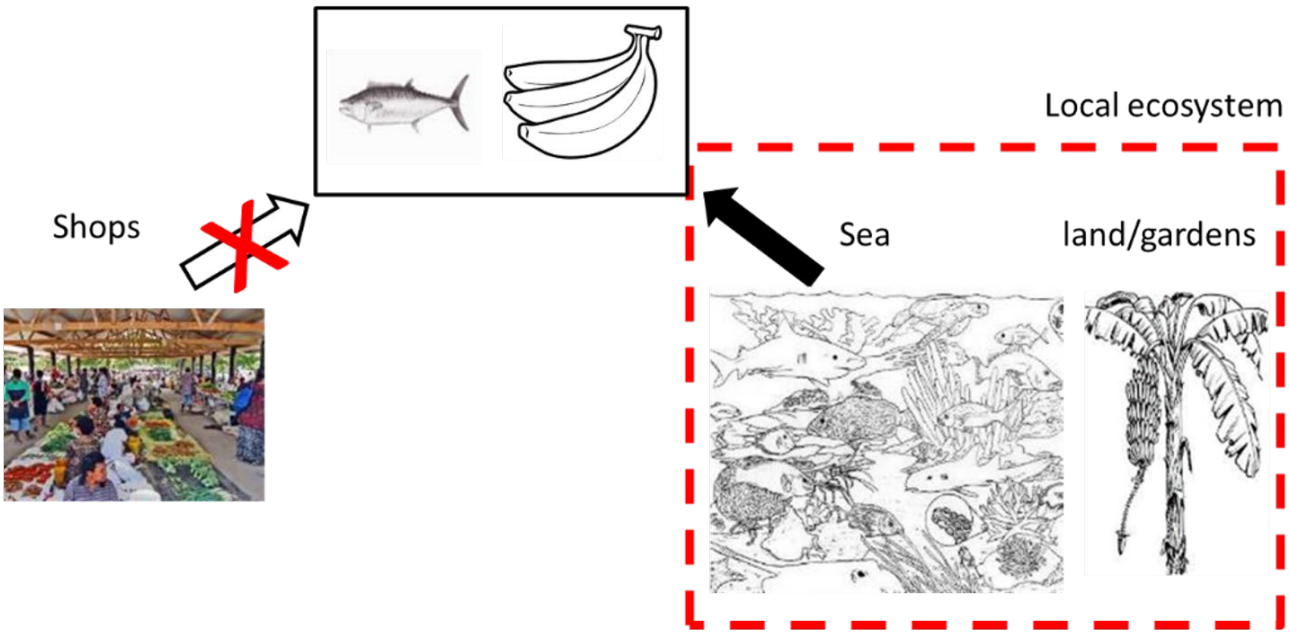


Figure 42 EGS from your land and sea, not what you buy at the shop

Estimate EGA volume

Next, focus on EGS volume. Using printed scoring sheets, ask the participants to:

1. Check the EGS list and add any missing EGS, with its supporting habitat. Ask them to focus on important and emerging EGS – but remember, you do not want too many EGS in the list as it becomes more time consuming to carry out the valuation process.
2. Decide which EGS on the list have the most VOLUME utilised by the focus community, and score them with a "5".
   - **Note**: Volume can be in any suitable measure – *e.g. tons, or baskets etc* – the final outputs are very robust to this kind of detail – the relativities are the most important.
3. Go back to the top of the EGS list and score the VOLUME of each EGS relative to the most utilised EGS from 0 (none) to 5 (same). Most will be less, but it is fine to have two or three EGS that are all scored 5.

This process has to be **closely facilitated**. You have to make sure that the score represents the VOLUME of the EGS only, and not include other factors like high income or cultural importance.

You have to **reassure respondents** that their favourite EGS will not be ignored.

Also, remember to:

- Score average VOLUME over the last three years, which accounts for variation.
- All cells in the VOLUME column require an entry, even if they are zeros.
- Use fractions if you want (i.e. 2.2, 1.6, 3.1 etc).

Consulting with the community

Estimate EGS value

Next, ask respondents to score the relative VALUE of each of the EGS:

1. Score the VALUE of each of the EGS as its relative VALUE to each of the four constituents of wellbeing: income, health, food security and culture.
2. Starting with income, ask them to look at the EGS list and decide which ones have the most relative VALUE for income, and score them as '5'.
3. Go back to the top of the list and score all the other EGS relative to the EGS with the greatest relative VALUE for income from 0 (none) to 5 (same). Most will be less, but it is fine to have two or three scored at 5.
   - **It's important that the relative value of each EGS is scored - that is, assuming you had the same quantity of all the EGS.** *e.g. 1 tonne, 1 basket, etc.*
   - **Score average VALUE over the last three years (to account for variation).**
   - **You can use fractions if you want**. *i.e. if you have split decisions within an elicitation group*

Repeat the estimate EGS value step for the other three constituents of well-being: health, food security and culture.

Enter and analyse the data

Once you have collected all the information, it can be entered into the ADWIM Excel spreadsheets during the workshop (or overnight) and be ready to use in later sessions.

Entering EGS data

Present results

Presenting the outputs back to stakeholders during the workshop is a good idea, enabling them to review and potentially modify the results based on group feedback.

	Habitat	Initial EGS	Volume (0 to 5)	Value (0 to 5)			
				Income	Health	Food security	Culture
1	Arable	Banana	4	3	1	4	4
2	Arable	Betel nut	1	5	4	3	3
3	Arable	Breadfruit	1	5	4	4	1
4	Arable	Cassava	0	1	0	4	1
5	Arable	Cattle	2	3	2	2	2
6	Arable	Chickens	3	2	1	3	2
7	Arable	Cocoa	2	1	2	3	3
8	Arable	Coconut	3	1	1	1	2
9	Arable	Coffee	2	4	4	4	3
10	Arable	Green vegetables	3	3	5	2	4
11	Arable	Pigs domestic	4	4	5	3	3
12	Arable	Yam	1	2	3	2	3
13	Estuarine	Crabs	1	3	2	1	4
14	Estuarine	Fish, estuarine	3	4	2	3	3
15	Estuarine	Prawns	3	3	3	0	1
16	Estuarine	Timber	1	4	2	0	3
17	Forest	Cuscus	5	4	4	0	4
18	Forest	Forest birds	5	4	5	3	2
19	Forest	Medicines	1	2	2	4	2

Figure 43 An EGS scoring sheet with the data entered

References and additional resources

If you would like to watch a YouTube video on this module, please see https://www.youtube.com/watch?v=OxyxMDg50gQ

Resources

TOOL: If you would like to download the **ADWIM values elicitation tool** go to: https://doi.org/10.25919/fpgq-6p71

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Acknowledgements

This module was developed by:

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Nicky Grigg (CSIRO): a research scientist who works in interdisciplinary teams on a diverse range of projects concerned with global change and social-ecological systems.

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