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JCU Lessons Learned for Pacific R2R Sustainable Development Post Graduate Programme

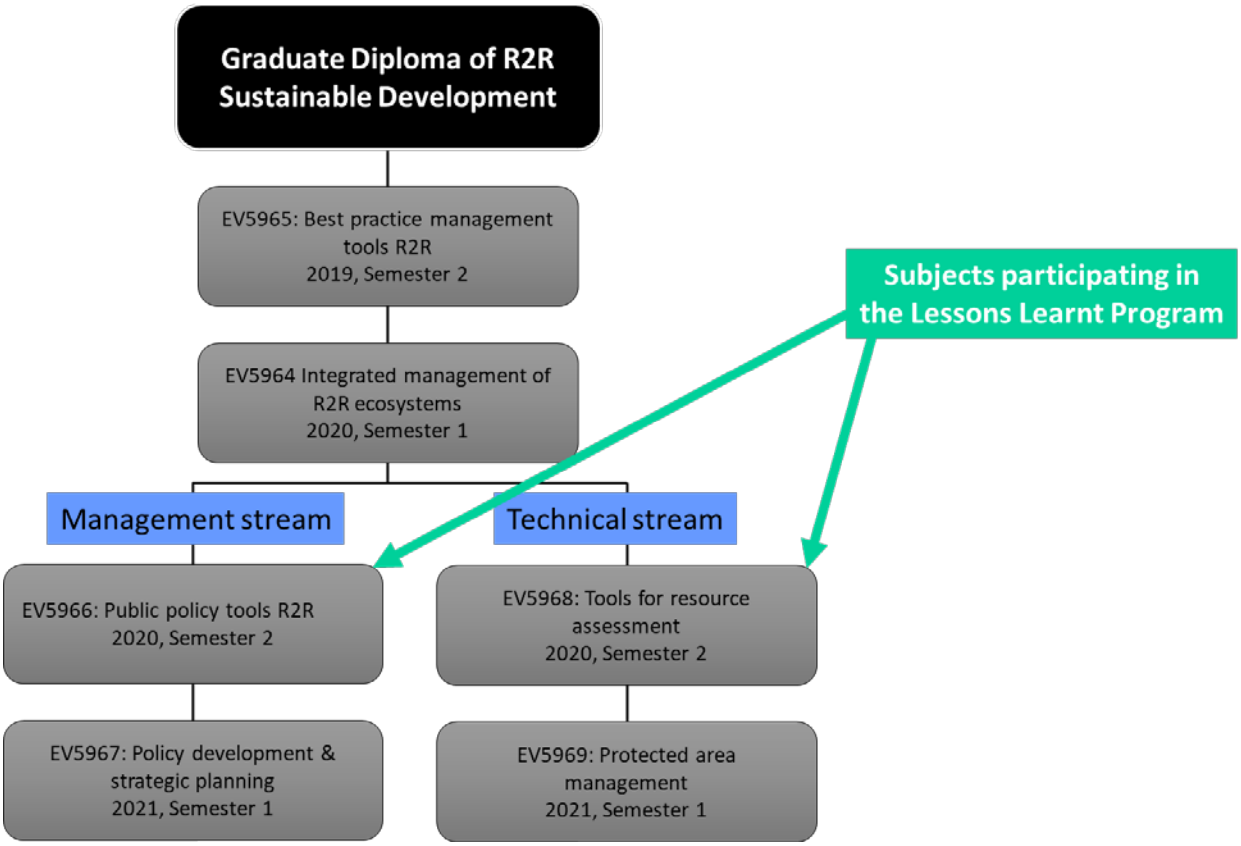
Lessons Learnt for Pacific R2R Sustainable Development Post Graduate Programme

Introduction - What is lessons learnt?

The most valuable outcome for the students in the two subjects will be the 'Lessons Learnt' in the R2R program.

Subjects involved in lessons learnt

Two subjects in Pacific R2R Sustainable Development Post Graduate Programme are participating in the Lessons Learnt Program (see image below). Both subjects [**EV5966 Public Policy tools** (Management stream) and **EV5968 Tools for resource assessment** (Technical stream)] have embedded the lessons learnt into the theory content as well as in the assessment, with all students completing the Lessons learnt template incorporated into their assessment. The best way to illustrate that students have learnt and understood the 'lessons learnt' is for students to illustrate that they have learnt!



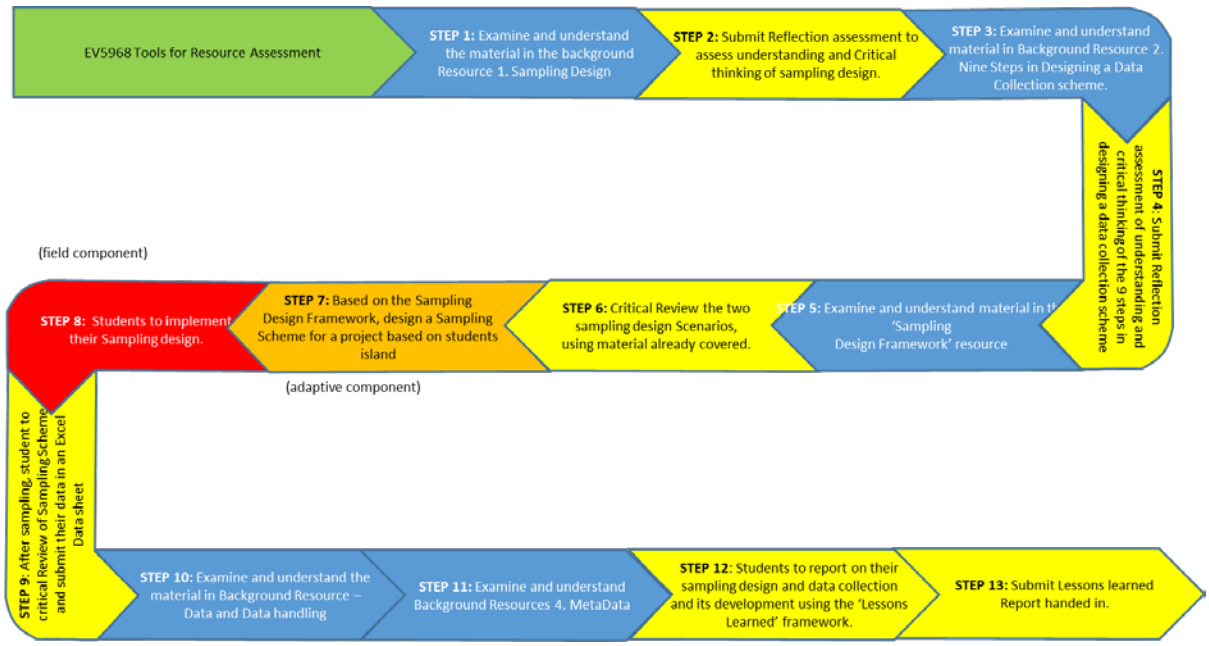
The lessons learnt assessment

During the subjects, (EV5966 Public Policy Tools R2R and EV5968 Tools for Resource Assessment) students are guided through the theoretical aspects of sampling design or policy tools. Throughout this process, students were asked to complete pieces of assessment to illustrate their understanding of the content matter. The final pieces of assessment students will present their work from a *Lessons Learned* perspective. Depending on the content of the subject, students will write up their final assignment using the *Lessons Learned* template at end of this document.

Features of the 'Lesson Learnt' assessment:

- Lesson learnt template can be used in a wide range of habitats e.g. terrestrial and marine flora and fauna,
- Logical methodologies used to sample area representatively,
- It is an intuitive, logical plan for sampling, that can be used for short and long term monitoring, using evidence-based decision making protocols,
- Easy to incorporate participation by, primary stakeholders, public, government agencies etc.
- Allow students sharing practical experience and lessons learned to promote sustainable natural resources management. Lessons learned include key challenges and or successful practices, approaches strategies, lessons and methodologies

Below is the step-by-step guide for Lessons learnt assessment in EV5968 Tools for Resource Assessment.



How ‘Lessons Learnt’ be applied in the workforce

The Lessons Learned template is versatile. It can be used for many purposes. For instance, it could be used:

- By management for assessing areas for biological diversity, sustainable forest management, land degradation etc.
- To establish indicator species monitoring program, ecosystem assessment, species recovery plan and species management plan,
- To increase knowledge of sampled areas,
- To allow consistent comparisons among various sites, islands, etc.
- As a basis for monitoring plans for areas over time, both to capture and disseminate learning and adaptively manage for continued success.
- Promote sustainable natural resource management

Summary

The ‘Lessons Learnt’ sampling template has a number of positive advantages. It allows areas to representatively sample and if sampling design used in other areas allow for direct comparisons.

9 steps in designing a Data Collection Scheme

Step 1. Define your question

The question you intend to answer is paramount

- Science is a question-driven pursuit
- Biology is about understanding the natural world

We strive to obtain understanding by answering specific questions

- Consequently, our data collection schemes should be aimed to address these questions as efficiently as possible

Data analysis that is not based on a clear question is pointless

- After all, our quantitative analysis is only a tool to help us uncover and understand biological processes of interest.

Step 2. Determine which and how many variables you need in order to answer your question

Your variables (e.g. species) need to:

- not be too uncommon
    - need to occur in your sampling units regularly enough to provide useful data
- be biologically meaningful
- not be redundant
    - contain little information not explained by other variables
        - redundant variables contain little information that is relevant to the question
        - e.g. variables that don't vary between sampling units add no useful information, just make patterns more noisy.

Step 3. Decide what attribute you are going to measure

Attributes are determined by your question.
Are you going to measure/record?:

- length
- weight
- number
- presence/absence
- colour
- a ranking of activity
- etc.

Step 4. Decide on your unit of measure

This is largely a matter of common sense, for example:

- should you measure the height of a tree in metres or millimetres?

but it may be more complex, for example:

- should you count all the individuals
- use a log scale
- estimate a ranking
- only record presence/absence.

Step 5. Decide on the scale/size of the sampling unit

Your sampling unit needs to be appropriate to:

- the size of organisms you are studying
  - there is little point in counting trees in 1 metre square quadrats
  - trying to count fish in 50 metre wide transects is unlikely to work
- the question you are asking
  - you are likely to gain little understanding of the photosynthetic rate of a seagrass bed by looking at a single leaf from one plant.

Step 6. Ensure your sampling is representative

Need to ensure representation in three ways:

- if you are collecting replicates they need to ***represent*** the factor level you are trying to collect information on
- the spatial and temporal extent of your study needs to be appropriate to address the question asked
  - Again, you are unlikely to gain understanding of the photosynthetic rate of a seagrass bed be looking at a single leaf from one plant
- The number of study areas of each type needs to be sufficient to address the question you are asking.

Step 7. Avoid confoundment with other factors

Need to ensure that your sampling scheme will provide unambiguous answers:

- for example if you were investigating the relationship between sand dollar size and the depth of the anoxic layer (darker area in sediment with no oxygen) you would have to be careful of a number of potential sources of confoundment
  - The depth of the anoxic layer probably changes up the beach, but so might things like:
  - period of inundation, grain size, nutrient availability, predation intensity, fresh water inflow, etc.

This means it might be very unclear which factor was actually responsible for any change in size.

Step 8. Collect useful explanatory variables

When you collect your data, you need to measure any **explanatory variables** or **covariates** that may later help you to understand and explain any patterns you uncover in your analysis

For example:

- temperature
- salinity
- wind velocity
- season
- activity of other organisms
- activity of humans.

Step 9. Critically review the success of your sampling scheme

Once you have completed your sampling regime critically, review it to assess its real strengths and weaknesses.

- This step is critical because only rarely can even a well-designed sampling scheme be conducted exactly as planned, so there will usually be a number of issues that only become clear once sampling is commenced.
    - For instance, you might have a water quality sampling design that is very spatially representative but when you get to one site you can't access the water.
    - Similarly, it might become clear that, despite you best efforts true representation is impossible for some other reason (e.g. too time consuming, equipment failure).
- This critical review step is vital because issues need to b recorded, their consequences assessed and this information used to assist in developing a final report that provides accurate and useful information to decision-makers.
- Moreover, just as in the legal and healthcare realms, the practitioner conducting the data collection has a Duty of Candour, to provide data and data interpretations that honestly represent the real situation as well as possible.

Lessons learnt – Sampling design template
Assessment 5

Assessment 5. Report on your sampling design/data collection, and its development. (20%)

Report on your sampling design/data collection, and its development, using the standard '*Lessons Leaned*' framework (see below) (maximum 3,380 words excluding references).

1. **TITLE**
   In the Lessons Learned title, please identify the key thematic issue(s) addressed by the lesson described in this brief. Please use the lessons learned framework for guidance.

2. **PROJECT TITLE –** *Insert project title.*
   [The title should be brief but informative, allowing the reader to clearly identify the topic (Max. 20 words).]

3. **PROJECT DESCRIPTION**
   Briefly summarize the project's objectives, expected outcomes and timeframe (from Project Document or elsewhere). If lessons pertain to a specific project output, please describe that output and list of activities as well.
   [This *brief summary* should
   (i) explain the context/purpose of the lesson described,
   (ii) explain the problem you faced,
   (iii) explain what you did - your methods,
   (iv) describe the outcomes, including the challenges faced,
   (v) explain the lessons that you learned from this.
   The idea is to capture the essence of each of these in a simple sentence or two (Max. 300 words).]

4. **PURPOSE AND SIGNIFICANCE OF THE LESSONS LEARNED**
   Describe what you are trying to achieve by sharing this specific lessons learned and describe why it is significant.
   [This is where you explain your purpose in detail. However, you still need to be concise and get your message across as succinctly as possible (Max. 800 words).]

5. **BACKGROUND TO THE LESSONS LEARNED**
   Provide a description of;
   (i) the initial problem,
   (ii) the concept or approach to solving the problems/ or proposed interventions(s) – this should include: a hypothesis, or research framework/inquiries; description of the technologies used – methodologies, infrastructure employed to resolve the problem; and the 'expected' results.
   [Once again, although it is vital that you provide sufficient detail on each of these issues and that they are covered comprehensively, it is still important to be concise so that your message comes across clearly (Max. 800 words).]

6. **RESULTS AND LEARNING FROM EXPERIENCE**
   Summarize the 'actual' results of the intervention on the project and key stakeholders. Were there any deviations from expected results? And why? What were the inhibiting factors? What were the facilitating factors? What conclusions can you draw from the implementation experiences?
   [This is the focus of the report – if this is well done it will provide a useful resource for you and others in the future - so requires thoughtful and careful treatment (Max. 1,000 words).]

7. **REPLICATION**

What implementation challenges should others expect to encounter when trying to replicate this? Highlight specific factors or conditions needed for others to replicate or benefit from this lesson.

[Please be concise and concentrate on the few most important points (Max. 400 words).]

8. REFERENCES

How can someone interested in using or adapting this lesson get more information? Please provide relevant website(s), documentation and contact information.

[No limit here, but please remember to be selective, making sure that the references you provide are valid, accurate and useful.]