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# THE BAREFOOT ECOLOGIST'S TOOLBOX

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C H A P T E R T H R E E

HOW TO INITIATE AND  
CONDUCT A PROGRAM  
OF SPAWNING POTENTIAL  
SURVEYS

## Introduction

In this chapter we move from theory to the practicality of using the Spawning Potential Surveys (SPS) approach with fishing communities to change fisheries management.

The SPS process begins in a country or region by establishing programs of community science to assess the status of local fish stocks, to develop management prescriptions, and, equally importantly, to develop teams of partnering local change champions within communities, government and NGOs. As discussed in the previous chapter local champions are a critical part of managing social change, they are the ones who will pick up on the innovative ideas and knowledge you provide, and lead the broad shift in social norms required (Kotter, 1996; Wenger et al., 2002; Rogers, 2003), in a way that will be impossible for you as the innovating expert from outside their community.

There are too many fishing communities in any country or region, to think that change can be achieved by providing individualized training and community science programs for every fishing community. Rather, our aim with the initial programs of community science, besides assessing stocks and developing the scientific base for developing management policies, is to establish an initial 'beachhead' or base in the community, from which we can go onto build broader nationwide processes of change (phase 1 in figure 1). Through the medium of establishing and conducting the community science programs all collaborating partners get the same in-depth training and experience with overfishing, its solutions, data collection, analysis, stock assessment and fisheries management. Our theory of change (figure 1) being that the knowledge, capacities and champions created through our community-science programs will be diffused through communities of practice formed by fishers, supply chains, government agencies and NGOs (Wenger et al., 2002), and subsequently more broadly through governmental processes, social and mass media to establish new societal norms (Rogers, 2003).

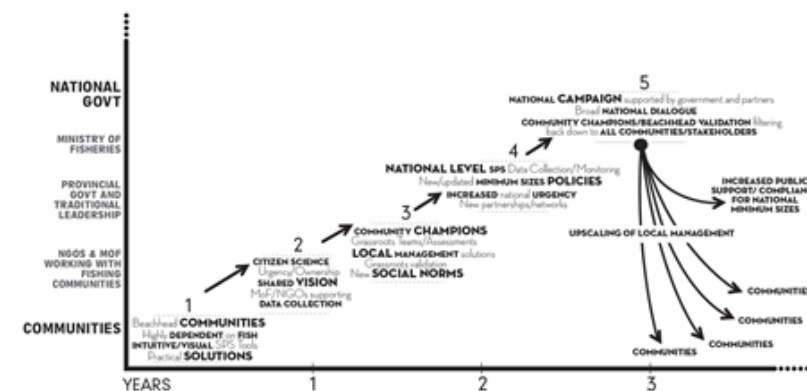


Figure 1. An illustration of the theory of change which the Spawning Potential Surveys methodology is based upon. The y-axis is indicative of levels of society and the x-axis indicates the time-scale over which our Fijian project progressed. The Spawning Potential Surveys process is initiated with a few beachhead communities (1) conducting programs of data gathering community science (2). Engagement in the community science programs develops a team of change champions (3) to support national adoption of the management policies developed on the basis of the data gathered by the community science programs (4). Finally, with national government adoption an on-going program of national implementation can be planned and implemented (5).

## Scoping Out Beach Head Communities

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Resources are always limited for this type of work, so we want to maximize the benefit derived through our partnerships with the first few beachhead communities. In each place I begin with an initial scoping trip to an area of interest, travelling with my potential local NGO or government partners.

Being a fisheries biologist, I like to look over local fishing grounds to get some idea of how extensive (or not) they are, the types of boats and gears being used, at the catches being landed onto beaches, or sold into markets. This is to get some idea of the species mix, types of fishing, likely fishing pressure and the extent to which fishing communities have their own fishing grounds, or are in conflict with others over access to fishing grounds. Generally fishing communities in areas with very heavy fishing pressure, complex mixes of fishing gear and communities competing aggressively for access, are not going to be easy to begin an SPS process with. Understandably, their concerns are going to be more focused on attaining their daily catch, than on long term sustainability. At the other extreme communities in lightly fished areas may not have seen much change in the quality of their resources and might also have little interest.

Through the scoping trip I meet with all my prospective project partners; NGO staff, community representatives and government officials. Generally, it has been my NGO partners who have introduced me to people they have developed relationships with through previous projects. With a series of small meetings (2-5 people) I present and discuss a condensed version of the communication materials described in the next chapter. This gives prospective partners an idea of what any project would involve, and gives me an opportunity to gauge how receptive (or otherwise) they are to the messaging. To ascertain the level of recognition, awareness of, and concern for symptoms of local overfishing.

Besides evaluating the capacities of the local partners to sustain a community-based process through to implementation the main factors being scoped are:

### In Denial About Overfishing?

Our interest here is to connect with local partners who would welcome our initiative. We have no interest at this point

in spending limited resources on communities that are initially resistant. The communities I have scoped have been very aware of the symptoms of local overfishing i.e. lower catch rates, longer fishing trips, smaller fish, changing species. In this context, when asked if they are willing to partner our initiative, they eagerly agree, commonly asking us to make haste 'before all the fish are gone', warning that we will have to help them work more broadly with other communities in their region and nationally. Something we have every intention of endeavoring to do.

The second factor we select for is:

### Some Control over Fishing Grounds

Do the communities retain some level of control over their fishing grounds and can they self-manage their fishing grounds to some degree? This control is never complete, and best results occur when communities are supported by national legislation. In the long term the intended aim is to support the revision and / or effective implementation of national legislation to support community-based initiatives, but in the short to medium term local voluntary management initiatives can be an important way to facilitate dialogue around fisheries reform and build momentum and pressure for regional and national reform. Communities with some level of control over their own fishing grounds will be more confident of being the main beneficiaries of any short term sacrifices they make to improve local fisheries management and make the most committed partners for this project.

### Permission & Endorsements

Having reached agreement on the communities to become the beachhead for our project, we then seek to formalize this agreement and obtain endorsement for the project from as broad a coalition of stake holders as possible.

For example, in Fiji endorsements were sort from and given by:

**COMMUNITY FISHERS** who are the main stakeholders and will be primarily impacted by our survey methodology and any

management reform that follows. To this point our discussions may have been aimed more at the community leadership, although where possible we also try and give introductory talks to broader groups of fishers through our scoping process. In any case at this point of our procedure we provide some short briefings with the fishers of our selected beach head communities and begin introducing our ideas to them, ending by formally asking that they support our carrying out an extended SPS project with them, informing them that the quality and quantity of data to be collected will depend on their willingness to cooperate with the data collectors / monitors.

The **DISTRICT NATURAL RESOURCE MANAGEMENT COMMITTEE**, who may already have some monitoring happening and can also assist in site and workshop participants selection. This committee will keep the district council updated and advocate to the district council for management reforms based on the results of the survey.

The **DISTRICT COUNCIL** which in Fiji is the paramount district level decision making body. While the local fishing grounds or iQoliqoli are effectively controlled on the ground by the locally living clans, the state retains legal ownership and control under the constitution so the district councils need to endorse local management initiatives we hope will take place as a consequence of our SPS project.

**VILLAGE CHIEFS AND HEADMEN** in the surrounding district or region. Through the scoping process the chiefs and headmen of the selected communities has already been consulted and is in strong support by this time, here we mean the broader traditional leadership beyond our beach head communities. In some sense this broader consultation is purely out of courtesy and respect for the district paramount chief, but undoubtedly they will have a deep understanding of the history, and current relationships between villages in the district, they may also have some plans of their own in terms of conservation or development that could indirectly impinge on our project, positively or negatively. Giving them the courtesy of being consulted, and paying them due respect may be a way of cultivating a powerful ally and advisor for your process, or at least avoiding making powerful enemies.

**PROVINCIAL OFFICE AND RELEVANT COMMITTEES AND MANAGEMENT SUPPORT TEAMS**, in Fiji the provincial office provides entry to all villages and communities, they may have records of similar or relevant initiatives that have taken place in the district or associated village(s) and such background information of the target site is always good to have in cognition before, during and post projects.

**FISHERIES DEPARTMENT AND EXTENSION OFFICERS** may be able to assist the workshops and data collection programs with their technical expertise and knowledge of local species identification, and especially knowledge of local names. More importantly in the medium and long term your project will only be successful if these agency staff embrace and adopt the methodologies being introduced through the beach head program of community science. So the aim here is not only to inform them of the project and seek their blessing, but to get them to commit to embedding some of their staff in the project.

**DIVISIONAL COMMISSIONER'S OFFICE**, in Fiji this office regulates the middlemen who buy fish from the fishers and on-sell them in the markets and will have a strong influence on the effectiveness of implementing coastal fisheries management reform.

Not every country has these same organizational levels as Fiji, but this exhaustive list gives an idea of how thoroughly the social fabric around the beach head community should be consulted. This societal fabric will provide the framework, or ecology, which we hope is going to pick up on what the beach head community learns through its project, and we hope will amplify it more broadly not just at the regional level but beyond up to the national level.

## Action Research Inquiry Model

The process that follows can be framed as an Action Research Inquiry model (figure 2) and follows a cyclical process involving data collection and reflection that builds knowledge and action outcomes through a sequence of steps (Gordon 2000). This approach aligns well with the objectives of the workshop, including identifying barriers, developing action plans, and moving towards action. It also builds on the existing skills and knowledge of the workshop participants, which is an important part of adult learning (Clover et al. 1998). Future workshops can decide on and organize the additional steps, including the evaluation of outcomes to that date and the appropriate course of actions in response.

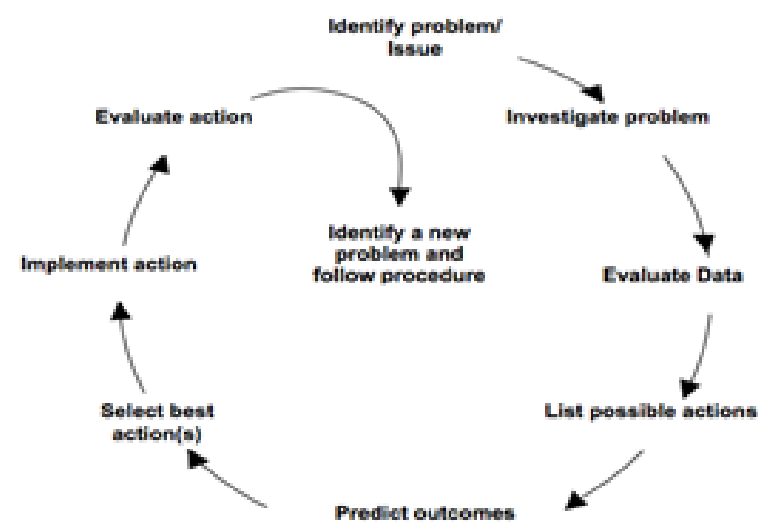


Figure 2. The Action Research inquiry model follows a cyclical process that works towards building knowledge and action-based outcomes through sequential steps (See below). The model incorporates data collection and reflection on results and has been used in research as scaffolding for inquiry (Gordon 2000).

## Initiating Spawning Potential Surveys Training Workshop

After the scoping exercise has been completed and the decision made as to which communities and regions will be worked with in any new country, the next step is to organize training workshops with which to teach the basic concepts and techniques so that community science programs can be initiated to collect data and initiate community discussions. In Fiji our training workshops were always held over at least two days, in central high-status chiefly villages, which conferred status on the meetings, and people from six to ten surrounding

communities would be invited to attend.

In the context of establishing the community-based catch monitoring programs the main purpose of these workshops is to provide the basic context and training in data gathering, needed to equip the community members who go onto collect the data. In the context of our broader aim of engineering a process of social change, the purpose of these workshops is to initiate and empower a community dialogue about overfishing and how it can be prevented. For this purpose the fish measuring skills provide a very hands-on way, community members can see the extent of local overfishing for themselves.

To facilitate the workshops, we have developed communication materials which are available through the biospherics.com.au website and discussed in detail in the next chapter. The materials are highly visual with minimal text intended to move beyond sharing information to facilitating discussion. Commonly copious amounts of scientific information are presented with the aim of raising awareness. Believing dialogue is essential to creating ownership and support for solutions, we minimize the material, aiming to contextualize the issues for local audiences with simple illustrations. We envisage our material as facilitation, rather than awareness raising tools.

The communication materials build understanding of the overfishing issue, its symptoms and causes. As per Kotter's principals they create a sense of urgency and build consensus and a guiding coalition with a shared vision of solving the problem by reforming management. The community science program being an initial step towards that goal.

In the initiating training workshops, it is essential to take time to explain things, and for participants to mentally process the material. Generally, fishers are not accustomed to receiving information in the lecture format. Take note of the information about adult education that is reviewed briefly in the previous chapter. It is necessary to allow meeting breaks, and plan break-out groups and physical activities, for reflection, the asking of questions, and informal discussion amongst workshop participants. These processes of internal, self-reflection comprise a crucial part of adult education, and are necessary to allow fishers to rest, and prepare to absorb more



information than they are accustomed to. Practical experience and storytelling are their more normal stock and trade, so one shouldn't under-estimate how exhausting these workshop and new concepts are.

Believing that repetition is necessary for people to fully absorb and process content we use the same material repeatedly. In an extended form as we initiate data collection programs with communities, and in gradually shorter formats as we report progressive results back to them and begin fostering dialogues about reforming management.

Interestingly, these materials turn out to be equally useful across all levels of society, and I use the same basic presentation and materials to brief local government official, the staff of partnering NGO and Ministry of Fisheries, policy makers, traditional leaders and politicians. Just in a shortened speeded-up format, and without the time-out to chew beetle-nut. The repetition of the same material provides the opportunity for the messaging to become familiar and sink in with individuals, while taking it to as broad-as-possible cross-section of the society, getting everyone onto the same page, so that the societal dialogue about overfishing can be richer, broader and more far-reaching.

## Selecting Community Participants

The process of setting up the training workshop starts with selecting the right mix of stakeholders, decision makers and doers to attend. Obviously in making up a list of invitees for any function some balance must be achieved between on the one hand inviting everyone and having an unworkable massive group that cannot be catered for, and inviting so few people that many of the people needed are left out. The attendees should include community policy and opinion makers, those we hope will develop into being champions of change, willing to challenge old perceptions and work towards achieving fisheries reform, as well those who will become our frontline data collectors. Many of the participants in the initial training workshops should have begun to be identified, or have begun identifying themselves, during the initial scoping exercises.

In Fiji the number of representatives recommended from each of the 6-10 fishing villages invited to each training was a minimum of 5 participants; a couple of whom would become their community's data collectors while the remainder, we hoped, might become change champions and opinion leaders for their community.

The criteria for selecting the individuals from each community are:

1. Older experienced fishers, who can help validate the content of the training by affirming that they have witnessed;
  - a. degraded fish stocks
  - b. change in maximum sizes
  - c. change of targeted/ common food fish due to fishing

It is not important that the older fishers be still actively fishing, their experience of change over time and status will be invaluable in any case, and in many cases it is the retired fishers who think and speak more independently of any vested interest. Some cultures have, or had, traditional fishing chiefs or leaders. Their inclusion can maintain and conserve links with traditional structures and identities. Positioning a potential reform process within that traditional context can be empowering for the process of reform, and revitalizing for the role of traditional fishing practices and lore.

2. Current leading fishers, who are acknowledged as such by their communities, and could become powerful champions in their community if they are persuaded by what they learn.

3. Influential persons (man or woman), not necessarily involved in fishing but in community leadership, who have credibility with their community, and can lend leadership as the project facilitates dialogue about fisheries reform.

Chief /village headman depending on their availability, these two leadership positions are crucial to village decision making, and representation to government. They will be responsible for maintaining communications between village and outside governing agencies.

Youth and/ natural resource management committee



representative(s), ideally already part of a group representing the community providing them with a conduit for transmitting their message and to encourage youth involvement and participation.

4. If there are more people from a community interested in engaging then the following criteria are encouraged;

a. Religious leaders who can spread the message during religious services in the village.

b. Educated outsiders with a high level of education who for some reason have been village residents (i.e. head-master or teacher) for some years and so have an understanding of the ways of fisherfolk. Similar to the retired fishers, these types of people may be regarded as having a respected independent point of view.

10. In addition to the community participants key representatives from the outside agencies should also be included, including from the local fisheries agency and the provincial or regional government. Their inclusion in the workshop is not so much with regard to community-based processes, but with a view of developing support for, and engagement with the longer term process of regional and national change, as outlined earlier.

## Community Science - Organizing Data Collection

The initiating workshop concludes by teaching community members how to measure the length of fish, and macroscopically inspect them to determine whether they immature or mature. The aim of this is 1) to provide all workshop participants and their broader communities with their own observational tools with which they can qualitatively test through their own experience the content of the workshop, and 2) establish a local system for collecting data for local stock assessment and the formulation of management advice. For this second purpose it is important to formalize the arrangements for collecting data, allocating the measuring boards, setting targets for measurers and the distribution of blank, and collection of completed, data

sheets. What organizations and which people are going to be responsible for which activities. These are going to vary between each application of SPS depending on the entity initiating and coordinating the process in each place and their level of funding. There is no right or wrong way to go about this, and in most cases to be successful it will need to be developed through an iterative process of trial and error.

## Payment?

In each situation thought will need to be given to remunerating the community members 'volunteering' to collect the data required for the process. To pay, or not pay, data-collectors, that is a vexed question. An idealistic view might expect or think that voluntary community-based projects should collect data freely, and in many community-based science programs that does occur. On the one hand it is hoped that some community members will appreciate the value of the project to the extent of voluntarily helping the project without recompense. On the other hand, most people place some opportunity cost upon volunteering their time, and work less often and / or less effectively if they are not paid for their time.

The SPS program will involve cutting open and collecting data for 10s – 100s of fish per sampling session, undertaken over weeks, months and years, under make-shift conditions at sea on boats, or in ports and fish markets. Completely un-remunerated volunteering will rarely go that far. Paying at least the value of the opportunity cost can very effectively increase the rate at which data can be gathered and may be the only effective way of gathering data. In the projects I have conducted so far, some form of payment has generally ended up being necessary to complete the data gathering; variously channelled through NGO, government agency or community supported roles allocated by community leadership and funded by the community themselves.

## Report-Back Meetings -Moving Towards Change

Data-sheets filled out by observers in the communities and fish markets, should be collected regularly by the SPS co-ordinator and entered into the database so that the data can be checked,

corrected and analyzed. The process of progressively working up and correcting problems arising with the data should provide the basis for an on-going series of frequent report-back meetings with the participating partners, starting within 2-3 months of the initiating workshop, and continuing at a maximum of 6-monthly intervals throughout the process of data-collection and analysis. With these report-back meetings the supporting communities should be shown the data collected to date and preliminary analyses of size of maturity, size of capture, likely levels of SPR etc. People like to see developing results from their own data. Do not wait for the final perfect analysis at the end. Explain that the analyses are a work-in progress and start preparing them early for what will be a final result later on.

The process of report-back helpfully stimulates community discussion of the assessment results. Discussing emerging assessments results through successive community meetings allows a general understanding of their implications to solidify and become general, inevitably leading into discussion amongst members about potential management solutions and how they might be trialed.

### **A Time for Data Collection and a Time for Action**

The data collection and analysis process will not be permanent, rather it will continue for the time period required to collect enough data to complete reasonable quality assessments of the main species in the fishery. A period which could take from several months under best possible case, out to several years. Depending on the ease or difficulty of sampling good numbers (>1000) from catches that are representative of the adult stock. Once that has been achieved a basic diagnosis on the status of the fishery will be possible, and some initial management advice will be developed to support a broader dialogue about reforming management in the community and nationally. The process of implementing change will take longer. So, the program of data collection will eventually come to an end, having provided the informational and organizational basis needed to empower an ongoing process of reform, which will continue well beyond the initiating program of community science. In the world of fish, change also occurs relatively slowly, particularly the size composition of stocks; even if fishing pressure changes rapidly,

it will take several years and in some cases decades for those effects to fully grow through the population and be detected by LBSPR assessment. Rather, than struggling to maintain permanent data collection programs, as is normally assumed for stock assessment modelling, in many of the settings the SPS approach is likely to be applied, it will be better simply to initiate the process of change with a data collection program pre-planned to be discontinued. To inform government policy in the future, about the change in stock status subsequent additional data collection programs providing snapshot LBSPR assessments can be repeated periodically, every 3 – 10 years, depending on institutional capacity and resources, as well as the longevity of the fish.

In the final stage of the SPS process the focus needs to pivot from being primarily focussed on working with communities, while keeping government agencies informed. As SPS results are analysed and converted into the scientific basis for the reform of management policy, the communities will begin advocating for management reform and ask for the support of government agencies. At that, stage the focus of the SPS partners will need to pivot to working with government agencies to reform their management policies and capacity to implement, and keeping community partners informed. This pivot needs to be managed carefully so that community members understand what is occurring and are not left thinking they have been deserted by partners they were previously seeing and talking with more regularly.

### **Final Report Back meeting**

In managing the pivot from focusing on community science to national policy reform it will be useful to conduct final report back meetings with communities to formally finish the programs of community-based science, and inform them of the SPS project's pivot to focus on implementing reform. These meetings should:

A. Provide an overview of the SPS project's original objectives, its completed timeline and achievements, and use this to celebrate, thank and acknowledge the participation of partners. Use this to provide the context for the pivot in project

emphasis which will occur.

B. Present final results of data collection and assessment for community's priority species.

C. Review the community's dialogue about preferred forms of management,

D. Provide results of the analyses completed to inform discussion of the community's preferred management policies.

E. Strategize on implementing management trials for priority species at local and district council meeting and building broader community support for management reform.

F. Strategize on achieving regional and national management reform to support community initiatives, place this within the SPS project's planned pivot and plans for local change champions to continue working on the issues, together with others beyond the community. Develop mechanisms by which communities can continue to be informed of their progress.

G. Conclude with some sort of informal celebration of the community project's achievement, focusing on the continuation of the work outside the community.

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