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SUMMING UP: A GUIDE TO ETHNOCARTOGRAPHIC PROJECTS

The preceding pages have attempted to lay out the process we followed to devise and fine-tune a particular methodology for participatory mapping. Our first two efforts, in Honduras and Panama, were exploratory and did not follow an explicit work plan. Upon completion, we had the sense that both projects had been relatively successful. The underlying concept was powerful, but the execution of the two projects — especially the second — had been incomplete or marred, exposing a number of weak spots and deficiencies. This prompted us to reconstruct what had happened in detail, inspecting each stage and analyzing the context in which it unfolded. We sorted out the bad from the good, strengthened promising elements that had fallen short, and fine-tuned the methodology as much as we were able. Chapters 1 through 8 relate how we checked and cross-checked our field experience as we mapped out the mapping process for ourselves.

In 1996, an opportunity arose in the Izozog region of Bolivia to apply the lessons we had learned. Chapter 9 shows how the methodology, reformulated through our earlier analysis, proved itself in action. We now had in hand a procedure that was flexible and open and could be altered to fit the local realities of the people who would use it. Just how flexible and wide-ranging it can be is suggested by the task we would take on two years later, in very different circumstances, in the West African Republic of Cameroon, and then again in 1999 among the Tirio Indians in southwestern Suriname. As these various projects have unfolded, we have kept up our close observation and critical evaluation, and as a consequence our understanding of participatory mapping continues to evolve. We have learned from what went unexpectedly awry as well as what went surprisingly well, and we have identified pitfalls to be avoided and opportunities to be seized and amplified. The result is a much clearer sense of what works and what does not, what the critical components of successful projects are, and how to go about constructing a methodology that functions effectively and efficiently. The "discussion" sections of previous chapters and the whole of Chapter 10 track that evolution and the consequences of the mapping process.

In this chapter, we summarize the essential lessons of this ongoing process of reflection, experimentation, and retooling. The steps of the methodology are laid out in its most effective form, as we currently understand it. In describing this sequence, we add, at various points in the narrative, a number of observations that spotlight issues of critical importance in the implementation of com-

munity mapping projects. Since the number of case studies is still limited, we expect this methodology to continue to evolve as it is put into practice in new settings with new participants.

Since we do not consider the process closed, others wishing to use this general structure as a guide for their own participatory mapping projects should feel free to alter the nature of the component parts to fit their own needs. The structure is relatively straightforward, consisting of initial ground preparation before moving into three workshops interspersed with two fieldwork periods, to be followed by production of the final maps. How this plays out in practice will vary in accordance with local realities. Even the structure itself may be modified — truncated or expanded — to fit special circumstances. Each project has its own specific configuration of objectives, social organization, population density, territorial size, and financial and human resources. Accommodation of these factors, always different, into a functional whole will demand on-the-spot adjustments.

Many indigenous peoples have thought about mapping their territories, for one reason or another, and some have even attempted to do so. What they have generally lacked is a coherent methodology for the work, along with adequate technical and financial resources to carry it out. As a result, what they have produced is weak, more "folkloric" than "scientific," and of limited utility. The process described here provides a structure in which a group can move in orderly fashion through a series of steps that result in maps that combine the best of folkloric and scientific traditions. Because they reflect local knowledge and have the rigor of cartographic science, they are valuable tools that serve a variety of purposes. Most certainly there are other ways to skin this particular cat, but the strategy we have followed works, and is the one we understand most completely.

1.0 SETTING UP THE PROJECT

If done correctly, this is the most time-consuming phase of the entire sequence. Before any of the actual work is launched, all elements of the project team must be assembled, funds must be raised, and the preparatory work must be carried out on several fronts simultaneously. This may take as long as six months to accomplish. The degree to which care is taken here is crucial to the smooth functioning of the project as a whole.

1.1 Selection of a lead institution:
While the project is a collaborative effort among several organizations and communities, there must be a lead institution that gives direction to the work and provides a structure for making decisions both large and small. Projects of this sort involve a relatively complex logistical schedule over a period of approxi-

mately six months, including all of the ground preparation work. In the initial phase, there is a need to set up appointments with government institutions, locate cartographers and put them under contract, make arrangements to visit communities and discuss the project with indigenous leaders, and lay out a schedule for the entire project. Once the mapping proper begins with the sequence of workshops and fieldwork periods, everything must flow without interruption for approximately three months. The lead institution will be responsible for organizing travel to and from the field, making arrangements for workshop sites, obtaining cartographic materials in timely fashion, and contracting for final production of the maps. For all these reasons, selection of a strong, capable lead institution is critical to project success.

1.2 Development of a project work plan:
The work plan should be developed collaboratively, with full participation of representatives from communities whose lands are to be mapped. Often the lead organization will be the primary force behind project design, but the process should still be as collaborative as possible. Because there are so many details involving the communities, on the one hand, and the technical aspects of cartography on the other, all sides must be consulted and brought into the planning process. The work plan includes descriptions of the management structure of the project, the various subteams (administrative, technical, community), work in the communities, and the sequence the project will follow to produce the maps. It also includes a detailed budget.

1.3 Fund-raising:
While it would be ideal to have all of the money in hand before the idea of mapping is proposed in the communities, this is generally difficult if not impossible, for input from indigenous leadership is essential in drafting a proposal to obtain outside funding. In any case, sufficient financing to carry the project through to completion must be guaranteed before the mapping itself begins. If the work plan has been developed and the communities are ready to move, but funding is still lacking, there is often a strong desire to begin anyway. This should be resisted. The project schedule is fast and demanding, and there is no time to devote to fund-raising once the project has gotten under way. A financial shortfall while things are moving will halt activities in midstream and cause all manner of difficulties.

Project budgeting:
Project expenses include salaries of project staff for the duration of the project, travel (to and from workshops, internal travel in the communities, field visits by Coordinators and technicians), rental of facilities for workshops, materials, technical support, and production of the final maps. Researchers[65] receive a daily honorarium that covers expenses for the period (about three months) when the project keeps them from supporting their families; average honorariums were between $6 and $8 per day in all of the three projects. Project Coordinators, who are generally indigenous leaders from the region being mapped, are paid slightly more.

65 As noted in footnote 3 on page 8, in the later stages of the evolution of the methodology we settled on the term "Researcher" instead of "Surveyor," which was used in the earlier projects. We have therefore used Researcher in this final chapter.

1.4 Ground preparation in the communities:
During the months leading up to the mapping proper, project leaders and tribal authorities make a systematic sweep through the communities included in the project. These visits provide an opportunity to discuss the objectives and importance of the mapping and explain the methodology to be employed. At this time, each community's leaders should begin the process of selecting a Researcher who will gather cartographic data in their region. Discussion of the project in the communities will assure that everyone is ready to carry out the activities in the work plan and is committed to the objectives of the project. Failure to do this will invariably give rise to delays in the work schedule (while communities have the project explained to them) and even foot dragging (because communities have not been adequately informed and are offended).

1.5 Ground preparation with government agencies:
The project team visits government agencies with some influence over indigenous peoples and their lands, and more specifically with the institution (or institutions) charged with mapping national territory. Because of the potentially incendiary nature of mapping indigenous lands, people in key areas of the government need to be informed about the project. On the most basic level, permission to proceed with the project, without official obstacles, has to be sought; beyond this, technical collaboration from government mapping agencies can be solicited. Government mapping agencies — which, in Latin America, are often run by the military — have in their possession crucial cartographic information that will be critical for the mapping work; and they can also supply cartographers for the project.

Work with local cartographers: Competent cartographers can be found in most countries, and every effort should be made to use local human resources. There are several reasons for this. First, local technicians understand the political context better than outsiders; they invariably have connections that can provide access to cartographic materials and equipment; and they often have some familiarity with the region being mapped and the indigenous people involved. All of these dimensions are important, if not critical, for the smooth functioning of the project. Beyond this, during the course of the project they will learn how to use the methodology for participatory mapping. With this experience under their belts, they will be in position to carry out further mapping projects either with the same indigenous groups (as occurred in Suriname) or with other groups in other parts of the country (as occurred in Cameroon).

1.6 Putting together a technical (cartographic) team:
A team of two to three cartographers and some draftsmen — depending upon the magnitude of the project — are selected for their technical skills, their attention to detail, their interest in working with indigenous people, and their interpersonal skills. Firsthand knowledge of the region being mapped is useful but not necessary.[66] Local cartographic talent — as opposed to imported technicians — should be sought so that capacity for mapping of this type can be created in the country. As mentioned in 1.5, government technicians, if possible, should be recruited for the

66 *In Honduras and Panama, the lead cartographer had firsthand knowledge of the region being mapped. In Bolivia, neither of the two cartographers knew the region. In Suriname, the cartographers were familiar with the government base maps of the region but had never been to the field. In Cameroon, the lead cartographer knew the region but the cartographers from the National Cartographic Institute did not.*

team; this brings technical expertise (which may otherwise be scarce in the country) and lends credibility to the project and the maps when they are produced.

1.7 Assembling cartographic materials: The technical team begins its job by gathering all available cartographic materials pertaining to the region being mapped. These include government base maps, aerial photographs, satellite imagery, and any other relevant maps. The team evaluates the quality of these materials and the extent to which they cover the region, and takes steps to fill in any gaps. Simultaneously, they assemble equipment and materials such as drafting tables, lamps, computers, stereoscopes, pencils, pens, and paper for use in the second workshop.

1.8 Organizing a community team: The community team consists of village Researchers and Coordinators who supervise their work. The number of Researchers in relation to the number of villages can vary; we have found that a one-to-one ratio is ideal. The Researchers are natives of the communities being mapped and are selected by community leaders. Yet the project team should have some control over the process since village leaders often do not fully understand the attributes the Researchers should possess to be effective, and favoritism and nepotism sometimes play a role in selection.

The ideal Researcher: Researchers should have the following characteristics: (1) be respected members of the community; (2) be literate, since considerable writing is involved; (3) be familiar with the bush; and (4) be dedicated to the well-being of their community. Age is also a critical factor. Those who are too young — despite knowing the bush and being literate —generally do not command the respect of elders and find it difficult to gather information in the community; and those who are too old often have poor eyesight (few wear glasses) and may have rusty literacy skills that make it difficult to record information properly. In Cameroon this issue was skirted by the decision to select two Researchers for some communities: one literate but with limited bush experience, the other illiterate but with extensive bush experience. This functioned nicely in Cameroon because the people selected worked well as a team. The tendency of some communities to simply select the chief's son, even though he lacks the needed qualities, should be avoided.

The matter of gender: In the five projects we discuss in this monograph, none of the Researchers were women. Village leaders were charged with choosing the Researchers, and in each case they chose only men. Travel among communities was involved in Honduras, Panama, and Bolivia, and to a certain, more limited extent in Cameroon and Suriname, and this was deemed too dangerous for women. It was also argued in the first three countries that women did not know the bush well because they seldom ventured far from the community. In Cameroon women were more thoroughly involved in subsistence activities and strayed with greater frequency from their villages; yet none were chosen as Researchers.

While outsiders should not impose their own choice of Researchers, it is both legitimate and important to bring up and discuss the matter of gender while the selection process is under way. Women in many cultures are in charge of key subsistence activities and will consequently be the most appropriate choice for gathering data about those activities. If the area being mapped is close to the village, women may have better knowledge of it than men.

2.0 THE FIRST WORKSHOP

For the first time the entire team is brought together in one place, face to face, to receive orientation regarding the objectives and methodology of the mapping process. The workshop can be held in the field, in one of the villages, or at a facility in a large population center; four of the five projects cited in this monograph held this phase in the field, in the project area (the exception was Cameroon, where it took place at the provincial capital facilities of the lead organization, the Mount Cameroon Project). Indigenous leaders, Researchers (who have already been selected by their communities), Coordinators, and members of the technical unit are all present. Aside from the project team, the presence of indigenous leaders is important since the presentations and discussions will give them a comprehensive introduction to the mapping work so that they can defend the project if the need arises down the line. Five days to a week should be set aside for the workshop, to allow for ample airing of what is involved and to give the project team a chance to begin building a relationship of trust and respect.

2.1 General explanation of maps and mapping:
Because most indigenous peoples have never had more than minimal exposure to maps, a first step is to discuss what maps are and how they are used. Examples can be used from other regions, then applied to the area where the mapping is being done. Thematic maps showing vegetation, climate, political districts, protected areas, population distribution, and so forth are good examples of the different uses of maps. This will lead into a discussion of possible uses of the maps that are going to be produced.

The project as a training exercise: It is extremely important that the mapping be considered as an opportunity to teach the indigenous participants as much about maps and mapping as possible. It is generally the case that before the project begins they have little or no exposure to maps. The cartographers must take time to explain what maps are and how they have been and might be used so that indigenous people can learn how to read, interpret, construct, and use their own maps. This requires a two-way dialogue that allows knowledge to flow both ways, in an atmosphere that engenders open and easy communication.

These skills will prove invaluable as the indigenous people later negotiate land claims, define their territory, deal with outside threats, and involve themselves in planning activities. The participatory mapping process provides them with knowledge that, at the very least, puts them on the same level as government officials and conservationists with whom they need to deal. Indeed, it often confers an advantage since few government officials outside of employees in the mapping institutes have been trained in cartography. Of course, the reasons for transferring mapping skills are self-evident: what purpose do maps serve if those who possess them don't know how to read them?

2.2 Data-gathering strategies:
Project leaders discuss three strategies for gathering data in the communities. These are (a) drawing sketch maps of the physical features and land use patterns of the region, (b) administering a questionnaire on land use, and (c) writing down supplementary information in notebooks. The questionnaire is developed in the workshop, as is the symbolism for the map. The Researchers practice drawing maps of areas they know well, from memory, and these are hung on the wall and critiqued by the group.

2.3 Assignment of data-gathering responsibilities:
Cartographers work with Researchers to divide up the region into zones that will be the responsibility of each of the Researchers. Note will be made of areas of overlap, with an eye toward collaboration among Researchers and cross-checking the information that is gathered.

Size and complexity of the area being mapped: The methodology used must be designed so that the project is logistically and cartographically manageable. The primary considerations are the number of communities in the project area, their proximity to each other, and the size of the communities (in our work, communities were small, generally with fewer than 1,000 people). Size of the territory in which the communities are found is important but secondary to the number of communities. However, if the territory is too large and communities are distant from each other, travel can be difficult and cause disruptive delays in the project schedule.

Ideally, there should be one Researcher per community. If some communities are near each other and closely related (usually by kinship), some of the Researchers may handle two or even three communities. More than 20 to 25 Researchers in the process becomes unwieldy on the cartographic end. The technical staff can be beefed up with more cartographers, of course, but this increases logistical demands and makes coordination of the project a greater challenge. As a general rule, the maximum number of communities will be about 30. If the number is greater, the project can be carried out in stages.

3.0 THE FIRST FIELDWORK PERIOD

During this phase, the Researchers gather data on physical features and land use of the zones they are covering. The time spent doing this depends to some extent on the size and complexity of the region; we have found that a period of up to a month is advisable, no matter what the area's size is, to encourage discussion in the communities. During this time, the technical team will backstop in the field and make preparations for the second workshop.

3.1 Entering the community:
Researchers meet with village authorities and discuss the mapping project: its purpose and objectives, expected benefits, field methodology, and what is expected of the community. Village meetings should follow to bring everyone into the project and enlist support for the data collection. Although the project team has — ideally — visited the community to discuss the project, the Researchers are fresh out of the first workshop and, hopefully, have a very clear vision of how things are being run. At this point, villagers should be ready to get down to business and begin compiling information for the maps.

In Cameroon, most of the project team — including the cartographers — entered the communities several days after the Researchers had arrived. A joint "inauguration" ceremony was held to formally present the mapping project to community leaders. This was very effective, for it gave an official stamp to the process and ensured that everything was clear from the beginning.

3.2 Gathering information:
Researchers and village authorities devise a village-specific methodology to gather information for the questionnaire, the map, and the notebook. Data-gathering systems differ from indigenous group to indigenous group, so they should be set up on the spot. Researchers get in touch with villagers who know the bush well — hunters, medicine men, elders — and begin to work with them systematically. Most of this information is in the heads of local people; only a limited number of field visits have to be made. During this period, a number of villagers should review the data to see if there is consistency. Researchers should visit each other to compare notes and reinforce each other's work.

3.3 Supervision of data gathering:
During the time that the Researchers are in the field, the Coordinators and cartographers should visit them to evaluate their work and provide assistance where needed. Although this is sometimes difficult where communities are isolated and hard to reach, this sort of guidance is extremely important. If Researchers are off-track, they can be set straight right at the start and little time will be wasted.

3.4 Preparing for the second workshop:
While the Researchers are in the field, the technical team sets up its equipment and assembles cartographic material at the locale to be used for the second workshop.

4.0 THE SECOND WORKSHOP

This is when the Researchers and the cartographers begin to work together to transcribe the field data onto new, cartographically accurate maps. Sufficient time — at least three weeks — should be set aside for this stage. The second (and third) workshop are often held in the city.

4.1 Arrival from the field:
As soon as the Researchers arrive, the technical team has them assemble their questionnaires, hand-drawn maps, and notebooks in individual folders. The cartographers, together with the Researchers, evaluate the quality of the data and their completeness, and then add relevant base maps and aerial photographs to the folders.

4.2 Transcribing field data onto new maps:
The Researchers work individually with the technical team to transcribe their information onto newly created maps. They begin with the river systems, filling in creeks and tributaries, then adding swamps, hills, and other land features, making revisions to government base maps where necessary, and giving the physical features names. Finally they begin to plot land use patterns (hunting, fishing, agriculture, gathering, etc.). This work goes back and forth, comparing the data in the questionnaires, the hand-drawn maps, and the notebooks with base maps and aerial photographs.

Open discussion among cartographers and groups of Researchers with overlapping and shared knowledge of subregions should be promoted. In this way, differences of opinion can be resolved and data verified on the spot to minimize the number of questions to be resolved in the final field visit.

4.3 Noting problem areas:
The cartographers note holes in data that cannot be filled, areas that Researchers will have to check on when they revisit their communities. Draft versions of the new maps are prepared, with question marks and notations clearly indicated for Researchers to correct in the field.

4.4 Receiving visitors:
Project staff should invite government officials, NGO representatives, and other interested parties to experience the workshop in action.

4.5 Activities during downtime:
Activities should be structured to keep Researchers occupied when they are not engaged in transcription with the technical team. Tribal authorities can lead some of these activities; videos dealing with conservation, forests, and indigenous peoples are always a welcome diversion; and the cartographers can give the Researchers informal classes and practice sessions dealing with maps and mapping. These activities should be carried over into the third workshop.

5.0 THE SECOND FIELDWORK PERIOD

In this phase, the Researchers return to their communities for verification of the cartographic transcription, filling in gaps, and clearing up confusions. It need not be as long as the first fieldwork period but should allow enough time for villagers and Researchers to ponder the maps thoroughly, analyze them critically, and come to conclusions on fuzzy or disputed matters. Three weeks is usually sufficient.

5.1 Verification of data & filling in holes:
The Researchers return to their communities with the draft maps, questionnaires, notebooks, and census forms to check on details. They show the draft maps to the entire community, then work more closely with the people who were their sources of information during the first fieldwork period. They double-check the spelling of names and the farthest extent of subsistence ranges.

5.2 Group meetings of Researchers:
During the course of the second fieldwork period, neighboring Researchers gather together to discuss their work, compare notes, and generally support each other.

5.3 Support from the technical team:
Several members of the technical team visit the Researchers in their communities during the fieldwork period to help out and evaluate their progress. They help structure the questioning to root out final details, and, if desired, also fix some coordinates with the GPS.

6.0 THE THIRD WORKSHOP

The final workshop is most often held at the same site as the second workshop. This period is dedicated to correcting the maps and putting in the finishing touches so that they achieve their final form. The magnitude of that task will determine the length of the workshop; in normal circumstances, it should last no more than a week to 10 days.

6.1 Final transcription of community data:
The Researchers reunite with the cartographers to correct the draft maps and fill in holes. Question marks are removed, spellings corrected, landmarks verified or moved.

6.2 Drafting detailed community maps:
The technical team completes the final versions of community maps showing the details of resource use. These might be at a scale of 1:100,000 to 1:25,000.

6.3 Construction of a regional map:
A regional map of the territory covered in the project (at, perhaps, 1:500,000 or 1:250,000) is pieced together, like a jigsaw puzzle, from the community maps. This map shows the broad outlines of land use, but lacks the specific fine-grained detail of the community maps. Time and/or logistical constraints may require construction of the regional map to occur after the third workshop.

6.4 Discussion of map details:
Everyone on the team should discuss map features, including not simply size and scale but also symbolism, the legend, colors, and methods of depicting different kinds of information. Having community elders visit during this final workshop can clarify remaining ambiguities and cement the process of the community taking ownership of the final product.

Drawing lines around territories: We are often reminded that maps are representations of reality, not reality itself. Yet maps represent reality in a very special way, and the placement of lines on paper tends to fix territorial boundaries in the real world. Before they become involved in mapping, indigenous peoples often have a fluid sense of where the boundaries of the territory they occupy are; they operate with an outer perimeter that shifts through time or according to seasonal variations. It is frequently the case that several communities utilize common space for subsistence activities. Just how to render situations of this sort cartographically is a difficult and sometimes delicate matter. Placing sharp definitions where none existed before can cause confusions of various sorts.

In the Mosquitia, lines on the map that appeared to define community boundaries stirred up disputes, with some communities arguing that overlapping subsistence areas be sealed off from neighboring communities. In Bolivia, this issue was discussed at length during the course of the project. It was decided that because of the complex patterns of interaction among the different communities of the region, no lines should be drawn to show community boundaries. Beyond this, the outer limits of the entire territory were not sharply delineated, but rather expressed as a soft transition to a lighter shade of green. Community leaders wanted to leave open the possibility for future territorial expansion.

7.0 PRODUCTION OF THE FINAL MAPS

This takes place after the Researchers have returned to their communities. At this point, the maps are in the hands of the technical team and the institute or printer that will do the actual printing. If possible, this should be done through a government mapping agency, to lend credibility to the maps.

Printing the maps: Some might assume that with the field data in hand and the draft maps done, the purely "technical" matter of making final prints of the maps would be a snap. This is not necessarily the case. It is our experience that this is often a tangled and difficult step in the process. First, local printing facilities should be used, if they exist. When present, they are sometimes scarce and difficult to locate, and not of the best quality. If printing must be done outside the country, a strategy must be developed to supervise the process by having the cartographers and, if possible, representatives of the communities on hand.

In Cameroon, no printing facilities were found and the raw data for the maps were sent to London. The project team lost control of the process, and more than two years later the maps had not yet been produced. Great care must be taken to avoid similar situations.

7.1 Community oversight and quality control: While the cartographers take charge of this phase of the project, community input remains vital. It is important to not take the printing phase for granted, as if it will occur smoothly, with little intervention. On the contrary, close attention should be paid to ensure that the information given by the communities is reproduced fully and accurately. Indigenous leaders and some of the Researchers should be present to ensure that the maps are being faithfully rendered and that the map is printed without delay.

Because these maps will be used for years in the communities — especially in schools and village gathering halls — they should be printed on strong, durable paper and be of high quality; the most durable maps are those laminated in plastic. Every effort should be made to produce a superior product not only so that people will want to hang it on their walls but because the credibility of the maps as negotiating tools will also depend on their quality.

Map ownership: One of the main attractions of participatory mapping for indigenous peoples is the chance to make their own maps of their territory, on their own terms and according to their own criteria. The indigenous people become the owners of the maps. This point should be clear to all parties involved. In Panama, this was not the case, and the lack of clarity over ownership of the maps caused immeasurable damage before things were set straight. To avoid difficulties of this sort, it is essential to establish ownership rights to the maps before the mapping work begins. This must be explicit, agreed upon by all parties involved, and, if possible, expressed in writing. The final maps should carry the promise to fruition by having the fact of indigenous ownership printed on them; some form of copyright, if feasible, is preferable.