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**O.K., the Data's Lousy, But  
It's All We've Got (Being a  
Critique of Conventional  
Methods)**

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*This Gatekeeper Series is produced by the International Institute for Environment and Development to highlight key topics in the field of sustainable agriculture. Each paper reviews a selected issue of contemporary importance and draws preliminary conclusions of relevance to development activities. References are provided to important sources and background material.*

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# O.K., THE DATA'S LOUSY, BUT IT'S ALL WE'VE GOT (BEING A CRITIQUE OF CONVENTIONAL METHODS)

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Gerard J. Gill

Almost ten years ago Chambers' damning indictment of 'survey slavery' did enormous service in focusing attention on this form of addiction and encouraging the subsequent development of participatory learning methods (Chambers 1983). However, although our previous unswerving allegiance to large-scale customized surveys has at last been seriously challenged, and although as a result these have lost considerable ground in Third World rural research, participatory methods are still a very long way from the point where they may be regarded as 'conventional'.

This can be said for two reasons. First, although the large-scale *customized* survey has to a large extent been discredited, this is not the principal way in which outsiders purport to learn about the rural poor and the environments they occupy. A more important source is the vast body of official published statistics existing in all developing countries. This is certainly true in policy analysis, which is the primary practical reason why outsiders should want to know about the rural poor: namely as a prelude to effective action to alleviate their poverty and any adverse environmental consequences flowing from it.

Such statistics are often generated as by-products of other government activities (such as land registration or tax collection). Obviously by definition such data-generating exercises are not customized. Alternatively, official statistics may be collected in order to provide information about a variety of issues in which a government is interested (such as land holding size, input use, output levels, population size, land use, and trends in all of these). Here collection is routine and aims at providing general information, rather generating data designed to test previously formulated hypotheses, as a truly customized scientific data collection exercise would do. Nevertheless this latter body of official statistics is based on large-scale surveys - for example sample censuses of agriculture or household expenditure surveys - and as such is subject to the same criticisms Chambers levelled at the large-scale customized survey. Chambers' critique notwithstanding, such *official* surveys seem as popular as ever with executives at national statistical bureaux and with the donor agencies which support their efforts.

The second reason that participatory methods cannot be described as conventional is that questionnaires are still the basic - often the only - data gathering instruments used in socio-economic research.<sup>1</sup> Although the large scale customized survey may have lost favour, the

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1. Strictly speaking the term "questionnaire" applies only to forms that are filled in by the respondent, as in the case of Britain's decennial population census. Where an enumerator is employed to ask the questions and fill in the answers - as with rural surveys in Third World countries - the form is actually a "schedule". However usage has by now sanctioned the use of "questionnaire" for both types of form, so this term is used here to avoid confusion.

basic instrument on which it depended is still employed at practically all levels, from the macro sample census down to the postgraduate student's small-sample dissertation research.

The quotation used as a title for this monograph is taken from an international economic expert recently speaking off the record.<sup>2</sup> The implication that official statistics are the only means through which one can learn about the rural poor and their interaction with the environments they inhabit (the topic under discussion when the statement was made) is one that would be challenged by those convinced of the logic and power of the participatory approach. However to address this particular issue in the present forum would be preaching to the converted. What will be done instead is first to illustrate just how lousy the data actually are and, more importantly, what fundamental mistakes can be made when policy decisions are based on their analysis. The second objective is to take a rather close look at the questionnaire and to suggest that its employment in rural areas of developing countries is quite inappropriate, and is a primary reason for the pestiferous nature of the data it purports to generate. It is my conviction that while those who have adopted the participatory approach to rural research in developing countries are prepared to ditch the large-scale socio-economic survey, some are still reluctant to part company with the questionnaire.

This monograph will focus primarily on the sustainable use of natural resources in developing countries. It will concentrate especially on socio-economic aspects of the topic and it will be based largely on the experience of Nepal. There is, however, little reason to believe that Nepal is in any way unique with respect to the topics under discussion.

## Official Statistics

Official statistics exercise a powerful attraction - and not just among economists - for a number of compelling reasons. First, they are readily available: sometimes the raw data are even available in machine-readable format. Second, they are relatively cheap and painless to acquire and use, since no data collection exercise is required. Third, they usually have a very wide coverage compared to all but the most expensive and time-consuming customized surveys and are therefore particularly well suited to macro level analysis. Finally, since they are both published *and* government statistics, their use has implicit official sanction.

Unfortunately, as the opening quotation implies, in developing countries official statistics are often most unsatisfactory. They are characterized by unreliability, gaps, over-aggregation, inaccuracies, mutual inconsistencies and lack of timely reporting. These problems are especially marked in the realm of natural resource management, since the relevant variables are often unusually hard to quantify (sometimes even hard to define), the geographical areas in question frequently remote, and the necessary data correspondingly difficult to collect and verify.

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2. This is an actual quote, and the speaker, a full professor of economics at a reputable US university, is reasonably well known. However it would be unfair to single him out for identification, as his views are representative of a fairly wide cross section of development experts.

Economists are trained to deal in numbers. So what does a trained economist do when the numbers that exist exhibit the above inadequacies and there is neither the time nor the resources needed to conduct a purpose-designed study? Unfortunately too many of us do what the above-quoted international expert does: use them regardless. It may seem obvious, but in view of what has just been said it is perhaps worth stating the obvious: wrong data are worse than no data. Analysis based upon them gives a spurious impression of accuracy where none is justified, and this in turn lends an unwarranted weight and cogency to policies based upon it. This would not happen if we frankly acknowledged our ignorance. If policy formulation is empirically based, wrong data can lead to wrong decisions.

The following example from Nepal will illustrate how serious the dangers really are:

*“Continued population pressure on land resources in the hills and mountains has resulted in expansion of farming onto marginal cultivable land, with ensuing environmental degradation - soil erosion, losses of soil fertility, a deterioration of forests and forest covers” (NARC-ADB, 1991:15).*

This is the received wisdom about the Nepalese hills: cultivated area has been expanding, is expanding and will continue to expand in the foreseeable future. But what is the basis of such statements? First, census figures support the assumption that the population of the hills is increasing.<sup>3</sup> Since the increasing number of mouths has to be fed, and since productivity is not generally rising, increased production has to come from area expansion. Right? And since all the best areas are obviously already cultivated, the rest of the quotation follows. The assumption of expanding cultivated area is backed up by official statistics, which purport to show a steadily rising trend in this variable. This is the set of statistics that now will be critically examined.

Statistics on cultivated area in Nepal derive from two principal sources, the decennial National Agricultural Census and the ongoing Cadastral Survey. Nowhere is the mutual inconsistency of official statistics demonstrated more clearly than when one compares these two sets of figures. This is done in Table 1. Note that in the hill districts of every one of the country's five Development Regions the Cadastral Survey figures are at least double, and can be as much as eight times as high as, those of the Agricultural Census, and how over the surveyed hill districts as a whole, the cadastral figures are almost four times as high as the Census estimates.

Balogun (1989) has presented a detailed and persuasive analysis of the figures for the Western Development Region in which he concluded that the apparent trend of increasing cultivated area in the hills is actually the result of combining these two mutually inconsistent sets of statistics. He found that when a district's Cadastral Survey is completed

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3. The question of whether the figures support the assumption or derive from it is one that will not be addressed here. Perhaps it is worth observing, nonetheless, that internal migration could in fact reduce the population of particular regions of a country even within the context of overall population growth. It is also worth pointing out that acceptance of the official view on hill population growth is not self-serving as far as the present argument is concerned: my case would be stronger still were this assumption rejected, or even questioned.

this figure is substituted for the previously-used Census figure in the official estimates, a process which can produce huge jumps in estimated cultivated area at district level.

<b>Table 1: Estimates of Total Cultivated Area in Hill Districts of Nepal's five Development Regions*</b>			
Development Region	National Agricultural Census (hectares)	Cadastral Survey (hectares)	Ratio of Census Figure to Cadastral Figure
Eastern	231,444	766,637	1 : 3.3
Central	308,658	669,365	1 : 2.2
Western	210,813	980,891	1 : 4.7
Midwestern	51,581	439,632	1 : 8.5
Far Western	28,003	205,297	1 : 7.3
<b>TOTAL</b>	<b>830,499</b>	<b>3,061,822</b>	<b>1 : 3.7</b>
* Includes only those 69% of the country's hill districts which have been cadastrally surveyed so far. The data for this table were collected and compiled from the Agricultural Census and Cadastral Survey reports by Ms Devika Tamang.			

Figure 1 goes beyond the Western Development Region analysed by Balogun and includes one hill district from each of the country's five such Regions and illustrates the orders of magnitude that can be involved. For each district this graph shows: (a) the official figure on cultivated area based on the most recent Agricultural Census; (b) the revised figure for that district whenever the Cadastral Survey figure is substituted, and (c) the resulting quantum leap in the official estimate. The figure for Khotang District may be somewhat extreme (although it is certainly not a statistical 'outlier'), with the estimate of cultivated area leaping from 7,955 to 157,187 hectares in a single year! (Note the totally spurious level of precision: calculated to the nearest hectare, no less!) This extreme case has been chosen deliberately, for even here, even with an almost 2,000% increase in estimated cultivated area in a single year, the revised figure was rolled into the official estimates without a word of explanation or warning.

When examined in such a disaggregated form, the figures are, of course, literally unbelievable. However, because the Cadastral Survey is proceeding only slowly - with just one or two hill districts being completed each year - the resulting jumps in the estimates at district level are lost in the overall regional or national figures. This in turn produces the apparently steadily increasing - and 'statistically significant' - trend in area under cultivation that was mentioned earlier. It is not a real trend, of course, but a spurious one caused by the progressive substitution of high estimates for low ones. The census figures can be assumed to be understatements because farmers have every incentive to under-report in order to minimize their land taxes. The cadastral figures are over-statements because the Survey represents an opportunity for 'land grabbing': individuals competing to register public land, commons and other lands to which they have no real claim.<sup>4</sup>

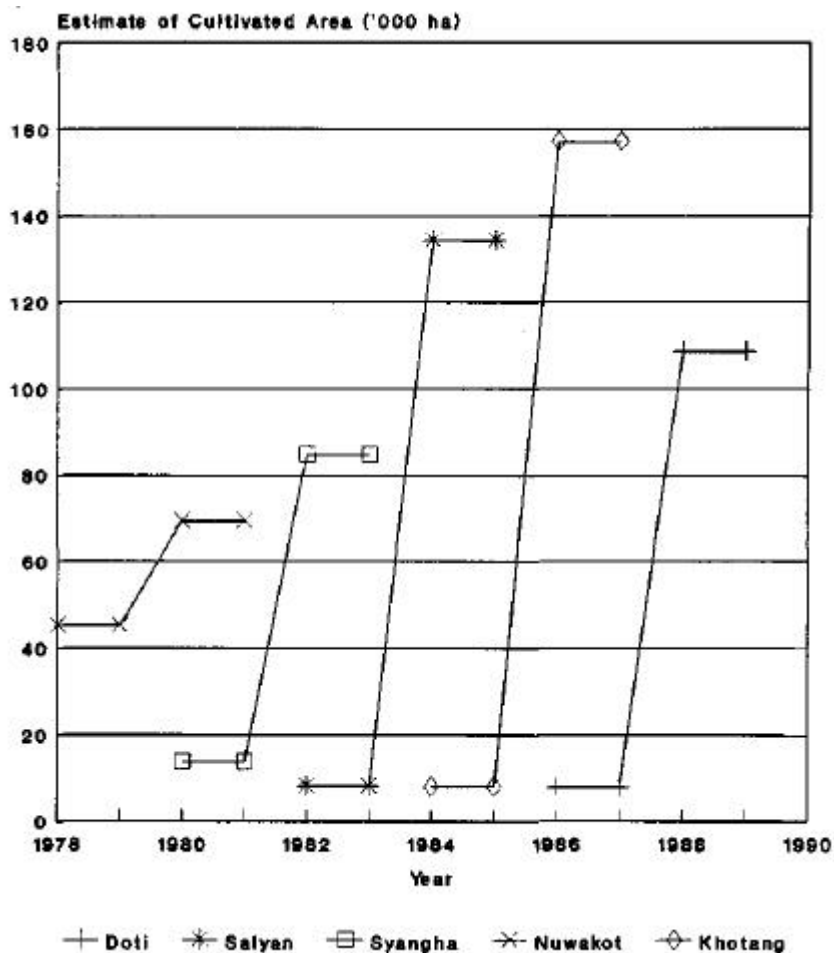
Carson, a soil scientist with extensive and prolonged field experience in the hills of Nepal,

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4. Many informed observers report that the Cadastral Survey is actually a major cause of deforestation, as people cut down public or communal forests and put the land under the plough in order to be able to claim private ownership.

argues (on the basis of participatory methods backed up by rigorous pedology) that cultivated areas in the hills, far from increasing, are actually declining, as a result of loss of organic matter, growing soil acidification and the build-up of aluminium toxicity on the land (Carson 1992). This, he argues, is forcing farmers either to abandon cultivation altogether, or to put the land under increasingly long fallows. Outside of the flattest valley bottoms, hill agriculture in Nepal is basically terraced agriculture. In his extensive travels throughout the Nepalese hills, he found thousands of examples of abandoned terraces against only a few dozen new ones he observed being constructed.

**Figure 1: Changes in Official Estimates of Cultivated Areas in Five Hill Districts**



But if cultivated area is not expanding - perhaps even shrinking - how are the extra mouths fed? The most likely answer is the one suggested by Tamang (1992) - migration, either permanent or seasonal. Seasonal migration is almost always overlooked in Census data, but

it plays a crucial role in many livelihood systems, including those of hill farmers throughout Asia. Tamang, investigating indigenous perceptions and systems of soil fertility management, conducted a transect study across a stretch of about 400 km of the Nepalese hills. Her findings support those of Carson, showing that hill farmers, far from extending into marginal areas, are compelled by increasing need for, and decreasing supplies of, organic fertilizer to pull back from such lands, reducing cultivated areas, intensifying nutrient application on the better or more accessible lands, and relying increasingly upon earnings from seasonal migration to make up the difference between local food production and nutritional needs.<sup>5</sup> Other researchers with prolonged field experience in Nepal's hill agriculture also report extensive slack-season out-migration of men and older boys from hill villages, and although little hard information is available about trends, these observers are convinced they are positive.

As far as the thesis that cultivation is expanding into increasingly marginal lands is concerned, this migration has two important and mutually reinforcing implications. First, the work of clearing new land for cultivation, and/or constructing new terraces can only be done in the slack season, yet off-season migration removes the bulk of the labour force that could otherwise be expected to do this heavy physical work. Those left behind are the old, the sick and children, none of whom can do such work, and the women who have a multitude of other things to do. Second, the migrants use part of their earnings to purchase supplies of basic foodstuffs in the Tarai (where food is relatively cheap), bring these and other goods home with them on their return. Thus, assuming that informed observers are correct in believing that migration trends are positive, hill families are not increasingly but decreasingly dependent upon local production for food, and so do not need to extend their cultivated area in order to survive.

The above argument certainly does not dispute that there are severe problems with hill soils in Nepal, but it does suggest that there is considerable confusion as to the nature of the problem, and that many past policy initiatives based on official statistics may have been designed around an entirely wrong set of perceptions.

## Questionnaires and Data Collection

In his critique of 'survey slavery', Chambers argued that conventional socio-economic surveys are characterized by over-long questionnaires and under-budgeted field work, under-training and under-supervision of field staff, insufficient time for analysis and increasing pressure from sponsors and donors for results, so that when the time comes to produce the report:

*"Exhausted researchers ... stare at print-outs and tables. Under pressure for 'findings', they take figures as facts. They have neither time nor inclination to reflect that these are aggregates of what has emerged from fallible programming of fallible punching of fallible*

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5. Tamang, like Carson, used participatory methods to reach her conclusions. Her findings were based on a combination of transects and spells of residence in both accessible and remote villages, during which she conducted semi-structured interviews during the farmers' (including women farmers') free time. This is usually in the evenings (when the typical survey enumerator would long since have departed the scene).



*coding of responses which are what investigators wrote down as their interpretation of their instructions as to how they were to write down what they believed respondents said to them, which was only what respondents were prepared to say to them in reply to the investigators' rendering of their understanding of a question and the respondent's understanding of the way they asked it; always assuming that an interview took place at all and that the answers were not more congenially compiled under a tree or in a teashop or bar, without the tiresome complication of a respondent"* (Chambers, 1983, p.53-4).

Other researchers have since added to the list of such statistical atrocities. I would add that in more than twenty years experience in various parts of East Africa and South Asia in both conducting economic research (much of it, it is freely and humbly admitted, based on questionnaire surveys), and in administering socio-economic research award programmes, the same type of problem has repeatedly emerged. There is no reason to believe that such problems are limited to economic studies, but economics happens to be a field in which there is a reasonably widely-accepted body of theory against which to evaluate the findings of empirical research.<sup>6</sup> The results of such cross-checking have been disappointing to say the least. Findings are often mutually inconsistent. Coefficients that should, according to theory, be negative are positive, or negative when theory suggests they should be positive. More frequently the same coefficient can vary between significantly negative, through non-significant to significantly positive when there is no theoretical explanation of such differences. It would be a brave researcher indeed who would reject an accepted body of theory on findings such as these!<sup>7</sup>

Chambers' devastating attack on 'survey slavery' is reminiscent of an earlier, and equally seminal, assault on accepted wisdom about development, E. F. Schumacher's critique of inappropriate technology transfer (Schumacher 1973). The "appropriate technology" debate has been around for more than twenty years and has, at least in theory, gained widespread acceptance. The basic premise is well-known: technologies designed in the developed countries to suit their conditions should not be unthinkingly imported into developing countries where conditions are entirely different. I believe that the same arguments may be applied to the questionnaire, which, like capital-intensive methods of production, evolved in developed countries with developed country conditions in view.

Table 2 reviews the differences between developed and developing countries with respect to the conditions under which the questionnaire survey is designed and deployed. The identified differences in the two "environments" are arranged in roughly ascending order of seriousness as far as the problems of applying the questionnaire survey to natural resource management issues are concerned. These differences and their effects are worth examining in some detail.

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6. This is an interesting, but necessary, role reversal, since it is the function of empirical research to test theoretical constructs, not the other way round!

7. A colleague once informed me that in a similar situation, where the coefficients were "all over the place", he ran an analysis of variance on a randomly selected subset of the data, using the enumerators' identification numbers as the independent variable. He was alarmed, if not totally surprised, to find that the values of the F statistics were consistently so high as to be "off the end of the scale"! He did not, for some reason, try to publish his findings.

**Table 2: Questionnaire Surveys in Developed and Developing Countries: Divergences in Environment and Design**

Developed Country	Developing Country
1. Questionnaire generally designed by specialist with appropriate training	1. Questionnaire often designed by persons with no specialist training in questionnaire design
2. Questionnaire written in language in which it will be administered	3. Questionnaire normally written in another language and translated, either beforehand or during the interview
4. Respondents normally familiar with the general purpose of surveys	2. Respondents unfamiliar with rationale behind surveys; often apprehensive as to use of data
5. Restricted scope, simple issues addressed, short questions; usually "opinion type" surveys	3. Complex issues; information often sensitive; long questionnaires; wide scope; need for many "open-minded" questions
6. Built-in reliability checks	4. Often little scope to check reliability of findings
7. Repeat surveys routine if trend information required	5. One-shot, cross-sectional; trend estimation very difficult
8. Respondents tend either to give a flat refusal or else co-operate fully	6. "Conspiracy of courtesy": tendency to give answers respondent thinks are wanted
9. Little if any systematic gender bias	7. Enumerators usually men; often severe problems in interviewing women respondents
10. Literate respondents	8. Respondents either non-literate or unrepresentative
11. Enumerators from roughly the same socio-economic background as respondents	9. Enumerators often from very different socio-economic background from respondents
12. Respondents can understand what enumerator is writing; can correct errors	10. Non-literate respondents cannot correct any mistakes or misunderstandings

## 1. Design

The people who design questionnaire surveys in developing countries often do not have specific training in questionnaire design, and therefore their questionnaires tend to be inefficient data-gathering instruments. This is not an insoluble problem, as proper training of survey designers would solve it. It is one of the few on Table 2 which is capable of relatively easy solution.

## 2. Language

If foreigners are involved in questionnaire design, translation is usually unavoidable. Even if only nationals are involved, the problem remains if the sample includes more than one language group. Not only is multi-lingualism relatively common in developing countries, but the larger the sample and the wider its geographical coverage (and hence the more potentially useful the survey from a policy analysis viewpoint), the more likely is this difficulty to arise. Translation is always a potential source of misunderstanding and misinterpretation. At best -i.e. when the process is rigorous and painstaking - it imposes time delays and additional cost. At worst, when rigour is not adhered to, it leads to differences in meaning between the various versions of the questionnaire. A further complicating factor is that some developing country languages are non-written, so that transliteration imposes still further complications, and these interact with translation problems.

## 3. Familiarity with Surveys

Surveys are by now well-known in developed countries and press reports make it clear that information on even very sensitive issues like voting intentions is released only in highly aggregated forms. This is certainly not the case in the rural areas of developing countries. The population of such areas may have become used to (and often tired of) enumerators and their questionnaires, but after the nth survey they are often still no closer to knowing what it is all about than they were when they met their first such researcher.

## 4. Scope

In developed countries the most successful, and the most frequent, use of questionnaires is in 'opinion' surveys, such as opinion polls and much of market research. Many people find it flattering to be asked their opinions, and so co-operation tends to be good. In developing countries the situation can be very different. When complex issues are involved, a great deal of information is required if the study is to be sufficiently comprehensive to be useful. Chambers (1983) has noted the additional difficulties that arise when a multi-disciplinary team is required and all team members have their own questions. The result is usually a long and cumbersome questionnaire, many of whose questions are sensitive and difficult to ask. Even without the sensitivity issue, sheer length alone will cause respondent fatigue and a tailing off of interest and therefore quality. When deployed for this type of purpose, a data-gathering tool which already represents an inappropriate technology is made even worse by using it for purposes far beyond its original scope.

## 5. Reliability Checks

The purposes for which questionnaire surveys are most commonly used in developed countries lend themselves to automatic post-survey reliability checks. Pre-poll surveys of voting intentions, for example, can obviously be checked against the actual election when it takes place. This has led to successive methodological refinements that have made such surveys generally reliable indicators. Similarly, in the case of market research, the survey findings must face the acid test of how accurately they have predicted changes in consumer behaviour after product modification (etc) arising from the study. This contrasts painfully with the developing country situation so graphically depicted by Chambers (1983) in his analysis of 'survey slavery'.

## 6. Trends

In developed countries where trend estimates are required - as in the case of opinion polls about voting intentions - a short, simple questionnaire is used and the survey repeated regularly (weekly, fortnightly, monthly). Trends and patterns can then be computed with some degree of confidence. With socio-economic surveys in the rural areas of developing countries, however, questionnaires tend to be large, large-scale, expensive, and one-shot. Whatever their merits with respect to collecting cross-sectional data, such surveys are particularly ill-suited to capturing trends. Unfortunately, an understanding of trends is basic if the researcher is interested in sustainability issues, since one is so often dealing with processes, like soil erosion, pasture degradation, forest depletion, groundwater nitrification, and so forth.

## 7. "The Conspiracy of Courtesy"

In sharp contrast to the generally brash and direct societies of the West the rural populations of developing countries tend often to be warm and welcoming towards strangers. The stranger is easily looked on as a guest and the duties of a host are regarded as sacrosanct. Not understanding the real purpose of the survey, the respondent, where not apprehensive about the use that will be made of the information, tries to please his or her guest by giving what is assumed to be the required answer. Very often the ill-trained enumerator makes this all too easy by prompting with suggested answers.

## 8. Gender Bias

Gender bias is certainly a significant socio-economic feature of industrialized society, but it does not tend to manifest itself in forms that adversely affect the reliability of questionnaire surveys. In developing countries, however - particularly those of South Asia, where varying degrees of female exclusion are commonplace - it can be a major problem. Male enumerators are often simply unable to interview women, while the number of potential women enumerators tends to be relatively small. This in turn means that the findings of such surveys are unusually open to male bias.

## 9. Literacy

Important as the above difficulties are, literacy is the real crux of the problem. It is a problem in its own right and also lies at the root of the two remaining issues listed in Table 2. The literacy barrier is the most important reason why questionnaire surveys represent an inappropriate technology for the study of socio-economic issues in natural resource economics in developing countries. Where the respondent is non-literate, the questionnaire itself is, and will always remain, a barrier. The likely consequences of this barrier are described below (see “Feedback”).

## 10. Enumerator-Respondent Differences

This is the opposite side of the “literacy” coin: while the respondent is usually not literate the enumerator obviously *has to be* in order to use the questionnaire. Even if there were no class differences to begin with, this distinction by itself, in the eyes of conventional wisdom, places the enumerator in a higher socio-economic class than that of most respondents, with all the communication barriers that this can entail.

## 11. Feedback

If, for a moment, we try to put ourselves in the shoes of the respondent (although, of course, many of them will have none), we can perhaps see one of the major drawbacks of the questionnaire survey. A stranger arrives in the village and asks if he can ask a few questions. The respondent, out of courtesy, agrees to be interviewed. Little effort is made to develop *rappport* or even to explain fully the purpose of the exercise (the enumerator has a tough quota to fulfil, but the respondent does not know that). The stranger then produces a little board, and clipped to it, a wad of paper covered in what to the respondent are unintelligible hieroglyphics. He then proceeds to ask questions and write down the answers - more hieroglyphics. The respondent has no idea of what is being written down, whether his or her words have been understood or interpreted correctly. The enumerator, being simply a data-gatherer, has no way of knowing - and no responsibility to know - whether the answers being given are correct or whether they make sense within the broader framework of the survey. The interview complete, the enumerator departs and is probably never seen again.

Before leaving this aspect of the topic, one important qualification should be added. The above problems show a powerful tendency to intensify with scale. At one extreme, the post-graduate student, for example, having a high professional stake in the reliability of the study, having personally designed the questionnaire, trained the enumerators and closely supervised their work in the field, is likely to be able to compensate for many of the inherent defects of questionnaires listed above. The same can be said of many well-supervised micro-level studies. At the other extreme, however, where the survey is large-scale and multi-disciplinary, where there is a lengthy ‘chain of command’ between the person who conceived the survey in the first place and the respondent at the other end, the drawbacks of this technique are likely to manifest themselves in their most devastating form. Unfortunately policy analysis, particularly in the field of natural resource management, needs macro- much more than micro-level data.

# Questionnaires and Data Analysis

The above examination leads inevitably to the conclusion that questionnaire-based methods represent a barrier to communication between the literate enumerator and the non-literate respondent. These methods play to the former's strengths and the latter's weaknesses, and in so doing frustrate the basic purpose of the exercise by generating 'data' that are frequently inaccurate and misleading. This is extremely ironic, for, from the standpoint of the research team, a perceived strength of the questionnaire is that its output is highly amenable to the very powerful and rigorous techniques of modern statistical analysis. The questionnaire survey facilitates this by: (a) focusing on quantitative (at the expense of qualitative) measurement, (b) generating a relatively large number of individual interviews (in an effort to capture variation), and (c) aiming at standardization of questions across the entire sample of respondents, which in turn leads to concentration on 'closed-ended' questions. Unfortunately, the undoubted rigour and accuracy of modern statistical analysis is nullified by the above-mentioned drawbacks of the questionnaire as a data-gathering instrument in the environment under examination. There is no way in which rigour in analysis can compensate for an unknown and unknowable degree of inaccuracy in the measurement of independent variables. Modern statistical analysis can handle sampling errors, but non-sampling errors of a type arising either from the inherent difficulties summarized on the right hand side of Table 2, or in the operational environment described by Chambers (quoted above), give a totally different picture. Here the well-known computer scientists' aphorism applies: "Garbage in, garbage out".

## Missing the Boat

What has so far been said about questionnaires relates to their inability, in the circumstances just described, to do what they are designed to do. The other side of the coin covers all the useful things which *could* be done using more appropriate methods, but which cannot be confined within the straightjacket of a questionnaire. Just as this instrument plays to the (largely illusory) strengths of the researcher, it also plays to the weaknesses of the rural community. Among the latter's strengths, the following are particularly relevant to an understanding of issues surrounding the sustainable use of natural resources.

### 1. Knowledge

Certainly during the first half of this century, but to a diminishing degree ever since, science and technology have been viewed, even venerated, as the great shining hope of the human race. Traditional outlooks were correspondingly dismissed as 'unscientific' and therefore irrelevant to the modern world. The sense of disillusionment that has subsequently set in has nowhere been more widespread than in the domain of the earth's environment and the sustainable use of its natural resource base. Increasing perception of the unwelcome side-effects of economic development – in such forms as air, soil and water pollution by industrial effluent, the non-sustainable mining of natural resources to provide industrial raw

materials, acid rain, ozone layer depletion, and possible global warming - has seen the blame for environmental degradation come increasingly to be laid at the door of modern science- and technology-based industrialization.<sup>8</sup>

Alongside the development of this healthy scepticism - probably as a corollary of it - there has grown an increasing awareness that 'pre-scientific man' is perhaps not quite the country bumpkin we once took him (or her) for. Even representatives of the 'hard' sciences - even theoretical physicists - are now beginning to query the philosophical underpinnings of classical science and, belatedly, to see the wisdom in ancient sets of values and practices once dismissed as outdated and irrelevant.<sup>9</sup>

Increasingly numerous studies of indigenous technical knowledge, not least in the sphere of sustainable natural resource management, are bringing us towards a belated realization that many unschooled - but far from uneducated - rural people possess an invaluable fund of knowledge about the environments in which they live, and about the management of natural resources on which their livelihoods depend.<sup>10</sup> If they appear to abuse these resources, it is probably poverty rather than ignorance, that drives them to it.

This fund of knowledge, and the resource management systems, modes and mores built upon it, represent invaluable sources of enlightenment for outsiders interested in learning about sustainable methods of natural resource management - if only we can learn how to tap it. The questionnaire survey is decidedly *not* the way to do so.

The questionnaire designer must (the ritual of pretesting notwithstanding) determine in advance what questions will, and, by default, which ones will not, be included in the printed form. Unfortunately those who design these blunt instruments, themselves outsiders, do not normally know in advance all of the questions that should be asked - and even if they did, questions relevant to one community or one farmer might be quite irrelevant to another. The questionnaire also eliminates the possibility of capturing the unique and spontaneous insights which a single informant or group of informants might offer. Perhaps the most serious limitation of the questionnaire as an instrument for tapping into indigenous

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8. See especially Conway and Pretty (1991).

9. Capra, himself a prominent theoretical physicist, has provided a stunning critique of the mechanistic world-view of classical science. He notes how twentieth century physics, resting on its two great theoretical pillars, quantum theory (which explores the sub-atomic world) and relativity theory (the realm of speeds approaching that of light) "now overcomes this fragmentation and leads us back to the ideal of unity expressed in the early Greek and Eastern philosophies" (1984, p.10).

10. See, for example: Harwood (1979); Farrington and Martin (1988); Chambers et al. (1989); also the various publications of the Centre for Indigenous Knowledge in Agriculture and Rural Development (CIKARD) at Iowa State University. CIKARD's Indigenous Knowledge Documentation Unit has accessed hundreds of published and unpublished reports from individuals and institutions worldwide.

knowledge is that it concentrates on *What?*<sup>11</sup> at the expense of *Why?*<sup>12</sup>. The underlying implication of this approach is that if the researcher knows *What*, then *Why* is either irrelevant, or can be deduced with perfect confidence from answers to the *What* questions.

This is particularly true of questionnaires dominated by ‘closed-ended’ questions (the most familiar type in economic research, especially large-sample macro-economic research). Typically, the only follow-up allowed is limited to such crude formats as: *“If the answer to Question 6 is ‘YES’, ask Questions 7 to 11; otherwise go to Question 12.”* But since all of these questions have had to be decided in advance, the type and level of knowledge that can – even assuming accurate answers – be tapped by them is both pre-determined and severely restricted. Even with ‘open ended’ questions – even with those that ask ‘why?’, the answers are not normally allowed to generate follow-up questions, i.e. new questions shaped by the answers to previous ones. If they do, we are moving away from the questionnaire approach towards the ‘semi-structured’ interview, a technique that is characteristic of participatory, rather than top-down, methods of attempting to learn about – and therefore from – rural people.

## 2. Memory

There is an important price – usually unrecognised and almost never acknowledged – that those of us who have been to school have had to pay for our education. That price is memory. Our literacy enables us to write things down and look things up, and as a direct result our memories, like any other underused faculty, tend to atrophy. Most of us would regard this as a small price to pay for access to the vast fund of knowledge that exists in recorded sources – as indeed it is – but it is a price nevertheless, and those who have not paid it have at least something to set on the credit side of the ledger. Literate outsiders, not appreciating this, are often astounded by the degree of accuracy and comprehensiveness with which non-literate people can remember things. Where there are no written records of events and processes, this ‘memory bank’, like the ‘knowledge bank’ mentioned earlier is invaluable. It is particularly important when we wish to examine trends. But again, access to this memory bank is dependent upon the outsider’s possessing the willingness, ability, creativity, humility and sensitivity required to tap it. What price the questionnaire in these circumstances?

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11. This is especially true of those that attempt to quantify. Some typical examples: What is your landholding? How many family members? How many goats? What is your level of formal education? How much of your land is irrigated? How many trees do you own? Many such questions seek highly sensitive information and invite “second guessing” on the part of the respondent and correspondingly evasive or misleading responses.

12. (i.e. those seeking explanations of observed or reported facts, processes, etc). For example: “Would you please explain why you plough in that direction?” or “I don’t understand this relationship, could you please explain further?” or “If I understood you correctly ...”, etc. Such questions are based on the presupposition that if the respondent does something then there is probably a good reason for it, and therefore good reason to try to understand this rationale. Obviously it would be extremely difficult to confine such questions within the straightjacket of a normal enumerator-administered questionnaire.



### 3. Courtesy

This quality of many Third World rural societies was mentioned earlier as a factor that paradoxically makes for inaccuracy and distortion in conventional data collection. The reverse side of the coin is, of course, that this willingness to share information with outsiders can be made productive instead of counter-productive if certain conditions are met. Above all, courtesy must be met with courtesy and respect with respect. To say this is not to argue that the researcher should abandon normal, healthy scientific scepticism when interviewing villagers. With the best will in the world, distortions can creep in, for whatever reason, when language is used to communicate ideas. But sensitivity, politeness, even humility, are essential when giving expression to such scepticism.

Finally I would like to anticipate the possible protest that, in listing the above features of Third World rural communities as strengths, I am in effect painting an idealized or romanticized picture. Far from it. Such people are no better and no worse than the rest of us; they have their strengths and their weaknesses, their saints and sinners, their geniuses and their dullards, just like any other cross-section of humanity. However, they do also have the singular advantage of living in a particular place (as often their families have lived for generations), earning a living from a frequently hostile and unforgiving environment, faced with the ever-present prospect of paying the price of failure in a way that few of us with formal qualifications and professional salaries are ever called upon to do.

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