A Revolution Whose Time Has Come? The Win-Win of Quantitative Participatory Approaches and Methods

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Abstract This article explores the potential presented by quantitative participatory methods (QPMs) and approaches for agricultural monitoring and evaluation and impact assessment. Pioneering examples indicate that QPMs can be 'win-win', with gains to farmers through their own analysis, action and voice, and to scientists and other non-farming professionals through the accuracy, relevance, scope and timeliness of the information and insights they generate. To realise their potential requires professional, academic, institutional and personal commitment and change.

1 Introduction

The Agricultural Learning and Impacts Network (ALINe) seeks to pilot approaches to farmer feedback that put farmers' views at the centre of measurement and create real incentives to responsiveness. Much of the problem is said to be weak monitoring and evaluation and impact assessment (M&E and IA) in agriculture. This article sets out to give sources and review experience with quantitative participatory methods (QPMs) (aka participatory numbers or participatory statistics) and to assess their relevance and potential. It concludes by pointing to ways forward.

The basic issue is orientation. If M&E and IA are weak, for whom are they weak?[1] Are they weak for 'us', professionals concerned with agricultural development, or weak for 'them', the farmers and pastoralists, many of them marginal and resource-poor, whose interests are meant to be served? Whose M&E and IA is it? Undertaken for whom? With what costs to whom? And for whose benefit? Some M&E and IA has been extractive through methods of investigation like questionnaires which can take farmers' time without direct benefits for them. In other cases they have relied on expensive monitoring and measurement. The question is whether QPMs can present win-win participatory solutions in which M&E and IA can bring gains to both farmers and outsiders.

2 What have we learnt?

Much has been learnt about QPMs that is relevant to answering that question, but much of it is inadequately recognised by professional establishments. We have learnt that:

1 '*They can do it*'. Farmers and pastoralists have far greater capabilities than most professionals have supposed. This has become increasingly evident and recognised during the past three decades. Not least this has been through the Farmer Participatory Research (FPR) of the late 1980s and early 90s (see for example Biggs 1988; Farrington and Martin 1988; Sumberg and Okali 1989; Ashby 1990), farmer field schools and integrated pest management (Dilts 2001; Pontius *et al.* 2002), and most notably participatory seed breeding (Maurya *et al.* 1988; Witcombe *et al.* 1996; Stirling and Witcombe 2004; Witcombe *et al.* 2005). These have repeatedly shown farmers to have capabilities far beyond those earlier supposed by agricultural and other professionals, as with the extraordinary spread and power of Participatory Geographic Information Systems (PLA 2006; Mbile 2006).

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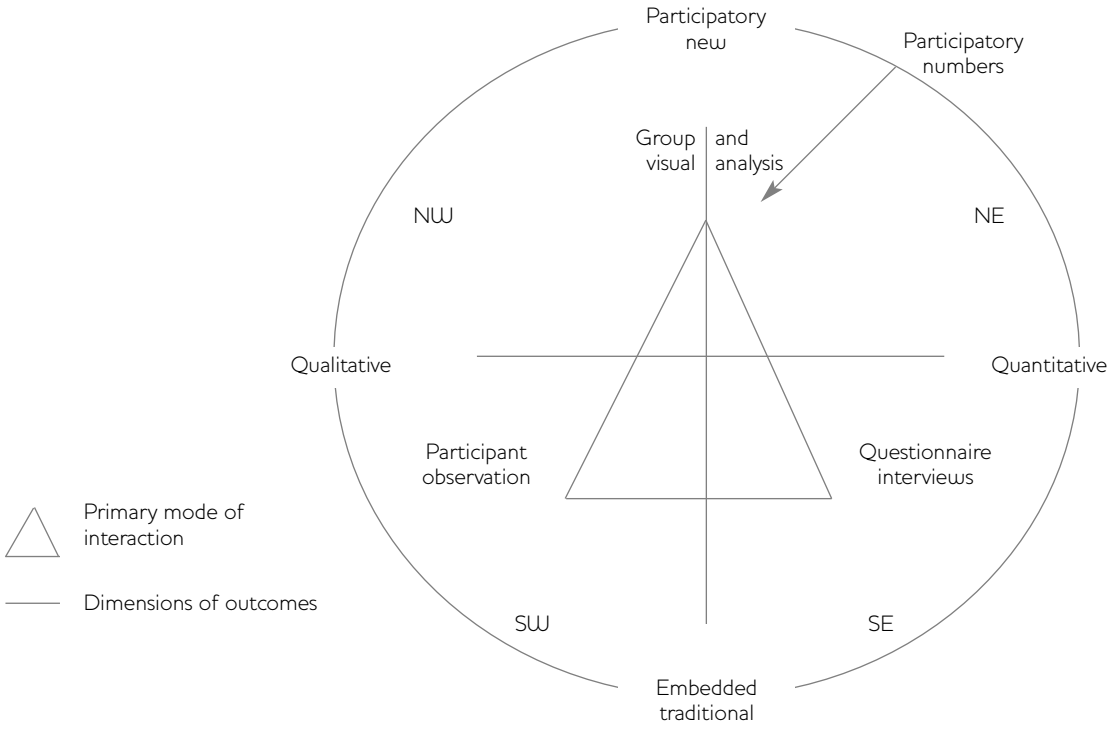
Figure 1 Dimensions of methodology and outcome



Source Chambers (2008).

2 *Farmers and pastoralists can quantify*. We now know that when facilitated in a participatory mode in groups and with methods that are visual and tangible, farmers, pastoralists and others, whether literate or not, can count, measure, estimate, rank, score, value, and compare, and so generate numbers. The NE quadrant in Figure 1 has been largely overlooked because of the embedded training and practices of questionnaires, reinforced by the enduring and erroneous stereotype of 'participatory' as only qualitative as if confined to the NW quadrant. In much farmer participatory research farmers weigh, measure, estimate and value. By the mid 1990s there were already many examples where participatory methods had produced numbers and statistics through methods that variously used or combined listing, card sorting, ordinal ranking (Bayer 1988), pairwise ranking, matrix scoring (Drinkwater 1993; Freudenberger 1995; Manoharan *et al.* 1993), pile sorting (proportional piling) (Watson 1994; Eldridge 2001; Catley *et al.* 2008) and aggregating from focus groups (Swift and Umar 1991; ActionAid 1992). These methods were also used with individual farmers as in a Save the Children Fund study of farmers' adaptations to drought in Malawi, Zambia and Zimbabwe (Eldridge 1995, 1998). Such methods were used in field activities of the Participatory Research and Gender Analysis network of the Consultative Group for International Agricultural Research (CGIAR) (PRGA 2002). More recently these methods have been evolved and combined in many ways. Innovations include cardinal ranking positioning cards on a rope scale (Kagugube *et al*. 2007). Across disciplines and sectors there are now many descriptions, guides, source books and analyses (see e.g. Shah *et al*. 1999; World Bank 1999; Jayakaran 2002, 2007; Mukherjee 2002, 2009; Mayoux 2005; International HIV/AIDS Alliance 2006) and several analyses (see for example Barahona and Levy 2003, 2007; Mayoux and Chambers 2005; Chambers 2008).

3 *Participatory numbers can be analysed like other statistics*. The classic works on this are by statisticians at the Centre for Statistical Services, Reading University, who have facilitated participatory numbers from various methods, and have devised *ad hoc* sequences for specific purposes (Burn 2000; Barahona and Levy 2003, 2007; Barahona 2005; Levy 2003, 2005, 2007).

4 *QPMs can quantify the qualitative*. QPMs can quantify almost any qualitative dimension open to human judgement, for example aspects of wellbeing (White and Pettit 2004). In a large-scale programme in a social movement in Bangladesh, aggregation from annual focus groups can quantify dimensions of social change (Jupp and Ali 2010). Common examples in agriculture are matrix scoring of comparisons of the many qualities farmers express as significant in varieties of the same crop, as with finger millet in Zambia (Drinkwater 1993) (taste in beer, meal quality, resistance to bird damage, etc.) and bananas in Tamil Nadu (Manoharan *et al.* 1993) (marketability, disease resistance, etc.). For their part pastoralists have used matrix scoring for comparing service providers (see Table 1) (Catley *et al.* 2008: 53).

5 *QPM numbers are often better[2] than those generated in other ways*. The word *alternative* as in *alternative statistics* (Archer and Newman 2003) applied to such numbers should not give the impression that they are soft or second best. On the contrary they are usually more accurate and relevant than those from questionnaires and censuses, sometimes spectacularly so. *Ad hoc* inventive design can lead to tables with a credible rigour and accuracy inaccessible by other means (see e.g. Levy 2003 and 2005 for finding out who benefited from the Malawi Starter Pack programme). The rigour of trustworthiness and relevance manifests through design, critical participatory facilitation, and observation of group-visual synergy – participants committed to 'getting it right' and triangulation with visual crosschecking and progressive interactive approximation (Chambers 1997: 154–61). Evidence of the accuracy and power of participatory numbers has been accumulating over the past two decades (see Gill 1991 for a remarkable early example). Summaries, overviews and critical analyses (e.g. Abeyasekera 2001; Burn 2000; Barahona and Levy 2003, 2007; Chambers 2008 chapter 6; Mayoux and Chambers 2005) present evidence from many domains. A remarkable case was the credible identification of a census undercount of the order of 36 per cent found in the rural population of Malawi through participatory census mapping triangulated with a one-page questionnaire (Barahona and Levy 2003).

6 *To evolve fitting participatory methodologies requires participatory attitudes and behaviour and takes time*. Participatory *methods*, like mapping or matrix scoring, require appropriate behaviour and attitudes, but are versatile and fairly straightforward; they do not require extensive trials. In contrast, to evolve a *methodology* that combines methods and approaches to fit a context and purpose can take time, skill, inventiveness, patience and progressive piloting. To develop the methodology used in Malawi for impact assessment of the 'starter pack' with farmers' indicators of sustainability (of which there came to be 15) (Cromwell *et al.* 2001) took a team three weeks of continuous and intensive participatory fieldwork and trials (pers. comm. Fiona Chambers). The impact assessment methods and processes used with pastoralists in East Africa to generate relevant statistics and insights were developed over a matter of years (Catley 2009; Catley *et al.* 2008).

7 *Farmers will only participate well if they see benefits*. In the days of farming systems research in the 1970s and early 1980s, many attempts to induce farmers to keep numerical records of their farming activities appeared successful for a short time, but this reflected politeness and prudence more than perceived gains, and rarely if ever lasted. For sustained participation, farmers must feel that in some way or some combination of ways such as in farming practices and benefits, or socially or through learning and enjoyment, they are getting something out of it.

8 *Many factors have stood in the way of recognising the above*. The references to published sources from the 1990s and earlier given above make the point that many of the QPM breakthroughs have been with us for decades. However, they have not entered the mainstream. The obstacles to recognising participatory numbers, farmers' abilities, and their incentives, have been professional, institutional and personal. Traditional mindsets and methods are reproduced by educational and training systems; paradoxically, academics and trainers can be the last to learn and change. To this there are outstanding exceptions as we will see. But the glass is largely empty, so the space left and the potential are big.

Table 1 **Comparison of service providers. Matrix scoring by pastoralists**

Indicator	Median score for animal health service provider				
	Government veterinary service	Drug dealers (black market)	Traditional medicine	CAHWs	Others
'Service is near to us' (*W*=0.69***)	11	0	0	15	0
'Service always has medicines available' (*W*=0.94***)	2	8	4	14	1
'The quality of medicines is good' (*W*=0.66***)	7	4	4	12	0
'Our animals usually recover if we use this service' (*W*=0.73***)	1	5	4	19	2
'We get good advice from the service provider' (*W*=0.62***)	1	7	7	12	4
'This service can treat all our animal health problems' (*W*=0.69***)	5	4	9	11	0
'This service is affordable' (*W*=0.76***)	0	6	4	18	2
'We trust this service provider' (*W*=0.62***)	0	7	4	16	2
'The community supports this service' (*W*=0.54**)	0	3	7	15	0
Increase in service usage (*W*=0.62***)	3	0	3	20	2

CAHWs: Community Animal Health Workers

Source Admassu *et al.* (2005) reproduced in Catley *et al.* (2008: 53), https://wikis.uit.tufts.edu/confluence/display/FIC/Participatory+Impact+Assessment (accessed 3 September 2010). Reproduced with kind permission by Andrew Catley.

3 Applications in participatory M&E and IA

Much early participatory M&E and IA was mainly qualitative (see e.g. Estrella and Gaventa 1997; Estrella *et al.* 2000). Guijt (1998) is an early example of participatory M&E generating numbers – with pocket charts, ranking, and some other participatory quantification. Since then innovations in the 2000s have increasingly introduced quantitative elements. Instances have proliferated in fields other than agriculture. To take one example, in Bangladesh as recorded in *Measuring Empowerment? Ask Them* (Jupp and Ali 2010), a social movement with some half a million members has shown that focus groups facilitated by themselves can produce statistics for their annual assessments of social change, with 132 of their own indicators identified through a participatory process.

In agriculture, two developments illustrate innovation and show what can be done. First, participatory epidemiology (PE) in East Africa (Catley 2009; Abebe *et al.* 2009) has a history which goes back to participatory rural appraisal (PRA) in the early 1990s (*RRA Notes* 1994; Conroy 2005). Participatory impact assessment (PIA) (Catley *et al.* 2008) draws heavily on PE. PRA methods, especially matrix scoring and proportional piling, have been facilitated with pastoralists to generate statistics. Typically these use small stones separated into proportional piles or allocated to the cells of matrices drawn on earth or sand. The approach and methods of PE are included as a section in Thrusfield's (2005) well-known[3] textbook *Veterinary Epidemiology*. Retrospective baselines are established through before-and-after proportional piling (Abebe *et al.* 2009: 297); and where numbers are sensitive, as with numbers of livestock, or difficult to assess as with other dimensions of wealth, comparisons are made with a nominal baseline represented physically by counters or

Table 2 **Influence matrix**

Development indicators	Interventions/activities Anti-erosive measures	Nature reserve	Irrigation scheme	Donkey cart	Pumps	Lamb fattening	Health centre	Grain bank	Tree nursery	Microcredit group	School	Passive
Improvement or impoverishment of living standard												
Agricultural yields	4	1	3	4	2	3	0	3	3	2	0	+ 29
Family incomes	3	2a	3	4	0	4	0	3	0	1	-1	+ 23 / - 1
Health of children	0	0	2b	4	4	0	4	0	0	2	0	+ 16
Access to or exclusion from resources												
to fire wood	0	0	0	4	0	0	0	0	4	0	0	+ 8
to drinking water	0	0	0	0	4	0	0	0	0	0	0	+ 4
to markets	0	0	0	4	0	0	0	0	0	0	0	+ 5
to fertile lands	4	4	2	4	1	2	0	0	4	0	0	+ 25
Expansion or diminishing of knowledge												
School enrolment	0	0	1	0	0	0	0	0	0	0	4	+ 5
About land use systems	4	4	2	4	1	3	0	3	4	0	0	+ 29
Participation on or exclusion from rights and power												
Peaceful living with herders	-4	- 4c	0d	0	0	0	0	0	- 4	0	0	- 9
Avoided migration	5	- 2	4	5	1	0	2	1	1	1	0	23/ -2
Active	+ 20 - 4	+ 11 - 6	+ 17	+ 33	+ 13	+ 12	+ 6	+ 10	+ 16 - 4	+ 6	+ 4 - 1	

0 = no influence; 1 = slight influence; 2 = medium influence; 3 = strong influence; 4 = very strong influence.
a = the berries on wild bushes are sold with good prices in the market; b = the influence is caused by vitamins in vegetables grown under irrigation; c = the herders invade the nature reserve with their animals; d = herders stress that irrigation is OK as long as farmers do not use too much water from the river.
Source Adapted from Neubert (2010: 8–9).

Box 1 Farmers' empowerment through participatory numbers: an afternoon in Eritrea

Six of us visited a village. We had all been trained in PRA behaviours and knew to keep quiet. One of us was from the Land Commission. The Government was proposing land consolidation, to bring scattered fields together. We met the village leader in his hut. After a discussion we asked him what would be a good land policy for his village. He replied:

Whatever the Government says is right.

Outside, a woman farmer invited us for tea. The village head and another farmer came with us. We had a long informal discussion about crops. All of us remained silent except for the facilitator/interviewer. He asked if they could draw a map of the village land, showing agroecological zones. With chalk and enthusiasm they drew a large map on the mud floor. This showed six zones. Then they were asked to count out 100 maize grains and draw a matrix of agroecological zones down the side and their main crops across the top. With much debate, and changes in the scores, they placed the seeds in the matrix, scoring for 'importance', a composite score for the crop and zone, showing the complexity of their farming system and how farmers needed land in several zones.

Table 3 Relative importance of main crops by agroecological zone – Adi-ktekla village, Mendefgra, Eritrea

	Maize	Barley	Teff	Wheat	Sorghum	Finger millet	Beans and peas	Total
Gedena	3	3	5					11
Member		15	8	6			6	35
Zagiena		4		4			4	12
Tsebaria					9	5		14
Waleha			7		6		6	19
Huza						4	5	9
Total	**3**	**22**	**20**	**10**	**15**	**9**	**21**	**100**

Method: Listing after mapping then scoring with 100 maize grains on the matrix drawn with chalk.
Analysts: Habtemariqa Weldai, Gebru Zerehun, Aberash T/Maimanot.

When they had finished, and the spread of scores across the crops and zones could be seen by everyone, the same head of the village turned to the official from the Land Commission and said:

Now you can see why your policy will not work.

The map and matrix were later debated in policy circles in Asmara.

stones. Causality and attribution are analysed in similar visual numerical ways with applications such as the matrix scoring of the impact of community animal health workers in Ethiopia (Table 1). Conventional statistical methods have been applied to these data – SPSS Version 11.0, calculations of medians and ranges, the Kendall coefficient of concordance, and the Wilcoxon Signed Ranks test (Abebe *et al.* 2009: 297).

Second, MAPP (Method for Impact Assessment of Programmes and Projects) is a methodology through which 'farmers are evaluating the impacts of development interventions following a logical structure' (Neubert 2010).[4] MAPP has been used by the Swiss Agency for Development and Cooperation (SDC) and GTZ. It builds on PRA tools to enable communities to describe changes they have experienced, rate the

relevance of different development interventions and systematically attribute causes to effects. It was developed by Susanne Neubert [of the German Development Institute] in the late 1990s and has been used by NGOs for self-assessment, in external impact studies and in cross-cutting sectoral impact studies (Bernard Causemann pers. comm.). The tools include a life curve showing overall development trends experienced, trend analysis, cross-checking through transect walks, listing interventions and activities, and an influence matrix, as in Table 2 in which people give positive and negative scores interventions against impacts. Controls are through convening separate groups of benefiting and non-benefiting farmers. The importance of convening groups representing different clusters of interest, such as women and men, farmers and pastoralists, is recognised. MAPP also contributes a straightforward method for distinguishing positive and negative effects.

It would be difficult to overstate the significance of PE and MAPP, or the importance of learning from them and from other similar participatory innovations. Both PE and MAPP involve facilitated group discussions with the use of PRA (participatory rural appraisal) visualisations especially matrix scoring (Drinkwater 1993; Manoharan *et al.* 1993; Jones 1996a, b; Chambers 1997) and collective assessments and judgements, as in Tables 1 and 2. Both use indicators, categories and criteria generated by farmers or pastoralists from their own experience and values. Through their combinations of methods, they present logical, rigorous and credible ways for dealing with some of the persistent problems of evaluation, namely attribution, controls, and unanticipated and otherwise unidentified consequences.

4 Win-wins and ways forward

The evidence is now stronger than ever that participatory approaches and methods can generate good numbers and statistics; that through participatory comparisons almost any dimension that is qualitative can be quantified; and that farmers and pastoralists can gain from participatory analyses that generate numbers, both for their own understanding and action, and through amplifying their voices. The processes of generating participatory numbers can themselves empower, enabling farmers to analyse and present to policymakers the complexity and diversity of their farming systems, as shown in a participatory afternoon with farmers in Eritrea (Box 1).

Such numbers can be powerful and persuasive. As Archer and Newman put it (2003: evaluation no. 16) in a wider context 'Statistics are a very powerful campaigning tool – and can be used to support the demands a group are trying to achieve by demonstrating a particular point of view, or the reality on the ground'. Statistics from report cards (Paul 2002; Kumar and Shah 2004; Jacobs, this *IDS Bulletin*) on the performance of agricultural extension are an obvious and direct application. QPMs have been, or could be, applied in any domain of farmer, fisher, pastoralist or natural resource user interest or activity: resource depletion, degradation or enhancement, yields, non-timber forest products, fishing stocks, market prices, value chains, extension services, and so on. The grounding of QPMs in people's lived experience and reality can empower them and at the same time inform projects, programmes and policymakers. In short, QPMs can be win-wins from which most or all stakeholders can gain.[5]

The survey of agricultural M&E (Lindstrom 2009) revealed a paradox: accountability to 'beneficiaries' and their empowerment were considered the two weakest functions of current agricultural M&E; yet developing new M&E models and tools was rated the lowest but one in importance of eight different approaches to improving M&E in agriculture. QPMs can be used to develop new forms of participatory M&E to tackle the two weaknesses by empowering primary stakeholders (farmers, pastoralists, etc.) both through their learning and their use of statistics in lobbying and holding others to account. Why then are QPMs and approaches still so little recognised and so rare? Among other explanations, two stand out.

The first is the sense that 'we know how to do it'. This is manifest in the current promotion of randomised controlled trials as a gold standard for rigour and cost-effectiveness and in the persistent preference for questionnaires as a means of obtaining numerical data. Part of the longer term way forward here is to test the relative cost-effectiveness of RCTs and questionnaires[6] on the one hand, and participatory approaches on the other, in a suitable spread of contexts. Cost here would

include finance, transaction costs, human resources, and farmers' and pastoralists' time, and effectiveness would be in terms of benefits through farmers' and pastoralists' learning, action and voice, and through the timeliness, relevance, scope and quality of the influence of the process and findings on professional learning and change, including capacity development, programmes, projects and policies. Likely and good outcomes from such tests would be support for methodological diversity (Van Mele *et al.* 2005; Van Mele and Braun 2005) and pluralism, and the ability to make better informed choices of methods.

The second explanation is inertia. Thus Andy Catley (2009: 254): 'In common with many other participatory approaches and methods, the issues facing PE are still largely institutional, not methodological'. Many universities, with notable exceptions in Ethiopia, continue to teach, train and condition students in the embedded methods of established convention, and to launch them on their careers with restricted vision and skills. Part of the long-term solution here is long-term commitment and campaigns, as was pioneered by the PE programme, for direct hands-on field learning by academics, government staff and others, so that they can add to their understanding and repertoire of approaches and methods.

The transformations we need for the potential of QPMs to be recognised and realised in practice are professional, academic and institutional. They are also personal. As with all revolutions, the key is committed champions who see what needs to happen and who makes it happen. QPMs have until recently had few champions with the conviction, continuity and clout to assure their development, introduction, use and spread. But the widespread frustration and dissatisfaction with current methods and approaches, and growing recognition of the rigour and win-win character of QPMs, provide a seedbed for change.

Given the many innovations and applications of the past two decades, only a very few of which have been described above, the time for the win-wins of participatory numbers and statistics should surely now have come. For this to happen, many more professionals need to be inspired and emboldened to dare to adopt and adapt them, to experience their win-win qualities, to become champions and innovators, and to share their learning. The many millions of small and resource-poor farmers of our world deserve no less.

Notes

1 There can be at least 40 of these who? and whose? questions. They can be asked of many development activities. They point to dimensions of power, ethics and practical utility. See Rambaldi *et al.* (2006).
2 This assumes similar quality of facilitation and implementation in the approaches being compared. There is a wealth of evidence to support this rather modest assertion. See for example Chambers (1997: ch. 7 and 2008: ch. 6), and Barahona and Levy (2003, 2007). The rigour of triangulation, successive approximation and emergence in observed group-visual synergy (Chambers 1997: 158–61) is still almost entirely unrecognised in the mainstreams of orthodox professionalism. The issue is paradigmatic, between dominant neo-Newtonian practices and participatory and adaptive pluralism which accommodates and expresses complexity and emergence (Chambers 2010).
3 I am not familiar with the work but am citing Andy Catley (2009).
4 Methodological issues are discussed in Susanne Neubert *Methodischer Fachbericht zum ersten Wirkungsbericht der DEZA 2008* [*Methodical Technical Report for the First Impact Report of DEZA 2008*], DIE/GDI Bonn at www.die-gdi.de/CMS-Homepage/openwebcms3.nsf (accessed 17 June 2010), pers. comm. Bernard Causemann.
5 Depending on context, losers might include some in value chains, or some who gain from extortion or corruption.
6 Comparing PRA tools and processes with questionnaires is not a new subject. There is already much evidence. A literature review and assessment would be a first step, see e.g. Mukherjee (1995) and Chambers (1997: 122–5, 141–5, 15–5).

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