Harnessing the plurality of actor frames in social-ecological systems:

the case of ecological sanitation in Bolivia

Drs. MA Madelon Eelderink, Joost Vervoort PhD, drs. Demian Snel, Fabio de Castro PhD

Correspoding autor: Drs. MA Madelon Eelderink

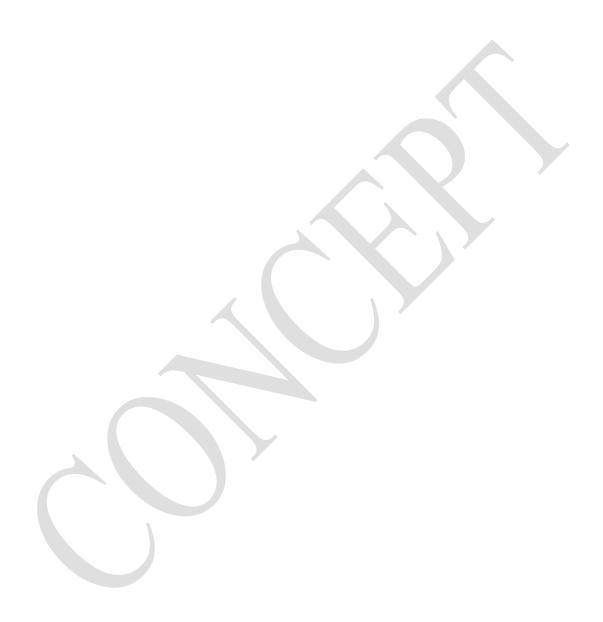
Abstract

This paper uses a case study on ecological sanitation as a basis for lessons on identifying and harnessing the plurality of actor frames in social-ecological systems, thereby moving beyond the advocacy positions often taken by implementing NGOs. This study aimed to explore how perspectives between the implementing agencies of an ecological sanitation project in rural Bolivia and the owners of a Urine Diverting Dry Toilet (UDDT) relate to each other and how this influenced the outcome of the project. The study found that the very different perspectives between stakeholders -the implementing agencies, having ideallistic views, versus the beneficiaries, having more practical views- did not negatively influence the outcome of the project. However, opportunities for social learning were missed. Building on this case, we discuss the value of recognizing and harnessing the plurality of actor frames in development projects led by grassroots NGOs. We provide key elements and an example methodology for social

learning in the context of multiple interpretative frames in development projects.

Key words

Ecological sanitation, interpretative frames, social-ecological systems, plurality, social learning



Introduction

Despite major improvements in the past years, the lack of adequate access to sanitation is still a massive problem world-wide. Unicef (2014) states that the MDG sanitation target of 75% is unlikely to be reached. Open defecation is practiced by a shocking one billion people in 2012 and another 1,5 billion people did not have an improved sanitation facility in that year (Unicef 2014). The rapid population growth does not make it any easier to address this problem.

In the last decades, NGO-driven projects have become a popular strategy to foster rural development in marginalized areas (Banks and Hulme 2012). Funded by international agencies, local organizations have taken on the implemention of a broad range of initiatives addressing economic, social and heath improvement in local communities. In contrast to former top-down procedures carried out by state agencies, NGO-led projects emphasize local participation in project design and implementation, focussing on revealing all stakeholders (often different) views and mutual comprehension of those views (Tembo 2003). Often, however, improvements from rural development projects are cut short due to limited accountability to the complexity and uncertainty of the physical and social world, and clash in cultural preferences between implementing actors and proposed beneficiaries (e.g. Meuleman 2011: 35; Ostrom 2009; Ostrom 2010; Risal 2014).

Cultural values and normative preferences are particularly relevant in the case of ecological sanitation (ecosan), an alternative to conventional sanitation which recycles human urine and feces are as organic manure (e.g. Esrey et al. 1998: 14; 2001: 43-9; Esrey 2000: 37-9; Fogelberg et al. 2010: 4). Ecosan has become a popular solution proposed by practitioners to tackle multiple problems faced by the rural poor. Ecosan is advocated to have potential in contributing to combat problems in the realm of physical health (e.g. Esrey et al. 1998:5; 2001: 33-4; Corrales 2006: 1821), in particular preventing health issues related to hygiene such as diarrhea (e.g. Breslin 2002: 219; Diaz 2009: 4; Esrey 2000: 37-8; 2001: 43-9). Ecosan also tackles problems within the natural environment (e.g. Fogelberg et al. 2010:8; Langergraber and Muellegger 2005:435); in particular water and food scarcity (e.g. Esrey et al. 2001: 55; Werner et al. 2003: 23) and soil degradation (Breslin 2002: 219, Fogelberg et al. 2010: 4). Literature is also abundant in describing advantages in the economy realm by improving agricultural productivity and creating business opportunities (e.g. Fogelberg et al. 2010; Grambauer et al. 2010; Sim et al. 2010); for example selling organic manure, emptying the ecological toilets and/or picking up the manure (e.g. Sim 2010: 28; Van der Wel 2010: 21). It increases empowerment by for example facilitating authentic user choice (Sawyer 2003: 4), stakeholder mobilization (e.g. Esrey et al. 1998:62; Wegelin-Schuringa 2000: 168) and several capacity building programs (e.g. Incade 2011b; Oswald and Hoffmann 2007: 7.

However, literature also reveals that ecosan is a socio-cultural sensitive system reluctant to improper maintenance, with adverse effects in the realm of health (e.g. Esrey et al. 1998: 49-50; Corrales et al. 2006: 1824-6) and sustainable uptake of the system in the community (Oswald and Hoffmann 2007). Hence, the success rate of an ecosan technique is not only dependent on the type of technique implemented; success cases of cultural acceptability mostly refer to good education and mobilization of

stakeholders (Esrey et al. 2001: 22-62). Community participation is therefore important for the successful acceptation of the new ecosan system in a community (e.g. Esrey et al. 1998: 62).

The integrated, multi-dimensional nature of the ecosan approach fits well in a social-ecological systems framework where environmental and social outcomes are integrated (Berkes 2003; Folke et al. 2010). As a holistic, interdisciplinary social-ecological systems approach (e.g. Langergraber and Muellegger 2005: 435; Werner et al. 2003: 27), ecosan has a few distinctive features and focal issues when compared to other health programs:

- 1. it embraces a multi-dimensional goal: as an integrated system, health improvement goals are expected to be achieved in combination with ecological and economic benefits.
- human feces can be a sensitive issue to some people who may restrain from this activity
 for cultural reasons, as for instance in India or Guinee, where the handling of faces is
 regarded to be impure, or in Islamic communities, where a latrine may never be facing
 Mecca according to its religion.
- 3. expected benefits contrast with high health- and environmental risks of contamination. Whereas a fundamental aim of ecological sanitation is to improve health status, a bad managed toilet could become a serious health hazard (Esrey et al. 2001: 64). Successful knowledge transfer and local commitment to properly manage ecosan systems are fundamental for an effective implementation. Therefore, in addition to technical, economical, and social factors, cultural factors and individual preferences play key role in the outcome of this initiative.

The complex social and technological dimensions of ecosan leads to the use of a large range of different indicators for outcomes worldwide by various actors. Performance is often measured by the number of ecological toilets in use. However, the focus on the level of project uptake by the community does not account for different perceptions regarding the initiatives. While implementing agencies claim to have 'the solution' for communities, the question is how the beneficiaries regard this strategy as suitable for their socio-cultural and ecological context. A multi-actor based evaluation of ecosan is necessary in order to reveal the motivations for actors to adopt or reject ecological toilets in order to assess the sustainability of these projects.

Literature on participatory approaches for development interventions emphasizes the importance of stakeholder inclusion in order to lay bare each stakeholder's normative preferences and induce a process of social learning as a facilitating factor for the early detection of risks of conflicts or other societal problems, for project development and –implementation and enhancing sustainability (Ducrot et al. 2014; Grin et al. 1996, 1997, 1998; Grin and Loeber 2007; Hayward 2007; Kristjanson et al. 2014; Miller and Shinn 2005; Moret et al. 2007; Moret-Hartman et al. 2007, 2008; Pahl-Wostl 2004). According to Moret-Hartman and others (2008), policy failures are likely to occur if stakeholders's diverse perspectives are not mutually understood, or if a policy measure violates stakeholders' normative preferences (e.g. Moret-Hartman et al 2008: 162). Development practitioners are often unreflexive about power dynamics among

actors and the way their own role in participatory development processes can delegitimize other actors' interpretative frames (Cook and Kothari 2007). Grassroots NGOs often work from an advocacy position, and from an assumption that efforts should be made to convince potential beneficiaries of the NGO's perspective and objectives (Risley 2011; Tembo 2003), or, if they are more sensitive to actors' interests, at least to harmonize the goals of all actors involved before action is taken. However, as it will be argued in this paper, for the sustainability of such projects, total harmonization between implementors' and stakeholders'views is not necessarily a prerequisite. Furthermore, too much consensus within a group of stakeholders might lead to a tunnelvision (Hermans 2011).

This paper uses lessons from an ecological sanitation project in Bolivia to propose the value of harnessing a plurality in interpretative frames. The case study shows how different, relatively independent interpretative frames between implementors and other actors did not prove to be an obstacle to an ecosan project's success according to these actors. On the other hand, opportunities for social learning were missed (Kristjanson et al. 2014). Based on the case study, we propose development process elements that can help identify and harness plurality in interpretative frames. The study focuses on six dimensions of change: physical health, surrounding environment, household economy, political empowerment, use and maintenance and social wellbeing. These categories have been defined according to the literature overview on the subject complemented by observations during fieldwork. After a brief description of the study area and methodology, we move to describing the contrasting perceptions between the implementing agencies and the beneficiaries, in order to link it to the reasons behind the project performance as perceived by both groups. We then highlight missed opportunities for social learning. The article ends by taking lessons from the case study to provide building blocks for a method to make plurality of interpretative frames explicit and harness its benefits.

Rural poverty and popular participation in Bolivia

Bolivia's long history of political reforms and the rise of democracy and popular participation have formed the country in the way institutions build upon the local context and lay knowledge in project development and implementation. Since the eighties, Bolivia's society faced some major changes among which the new spaces for participation that emerged after democracy was restored in 1982, a process that accelerated after Gonzalo Sánchez de Lozada established the Law of Popular Participation (Crabtree and Whitehead 2008: 106-7). The latter soon became 'a key instrument in helping build popular power at the local level' (Albó 2008: 27). This form of social capital –measured by memberships in agrarian syndicates or other associations- is claimed to inclease household welfare and to reduce poverty (Grootaert and Narayan 2004). In addition, the economic crisis affecting Latin American governments and subsequent increases in international funding contributed to the rapid expansion of the number of NGOs working with communities in Bolivia during the 1980s and 1990s (Arellano-Lopez and Petras 2008: 557-8, 562), building upon this "Law of Popular Participation" (Crabtree and Whitehead 2008: 107; Incade 2011a; Neuburger 2010: 92). Neuburger (2010: 92) argues that 'the shift of political decision-making powers to

the lower administrative levels is essential for the realization of planning practices adapted to their particular regional and local contexts.' However, in Latin American countries such as Bolivia, corruption, patronage, clientelism and strategic behavior lie in wait for deteriorating popular participation in development programs (Van Lindert and Verkoren 2010: 1).

Sanitation, hygiene and health in Bolivia

When the prices of export commodities in Latin America declined steadily by the end of the 1970s and at the same time international financial institutions imposed harsh repayment conditions over accumulated debt, a severe financial burden arose that affected Bolivia heavily. As a consequence, health care expenditures plummeted the most in Bolivia, compared to other Latin American countries. The return of cholera, for the first time during the twentieth century in Latin America, accompanied the lack of access to basic sanitation and health care (Arellano López and Petras 1994: 557–8); by 2010, still over half the 3.3 million people living in rural Bolivia practices open defecation and another 19% has an unimproved sanitation facility (WHO/Unicef 2012). Also other hygiene related diseases plagued Bolivia, such as parasitological and respiratory infections and diarrhea, often resulting in child death due to dehydration, especially among children below five years of age. Despite of improved figures over the past two decades, the country still suffers the second highest under-five mortality rate in Latin- and South America with 51 deaths per 1000 live births in 2009 (WHO 2009). Rural sanitation has therefore, along with reasons of severe soil degradation (Altieri 2000, Kessler and Stroosnijder 2006: 235), become a popular initiative proposed by NGOs in numerous communities in Bolivia.

Ecological sanitation is one of such an initiative. A Urine Diverting Dry System (UDDT) is a double vault ecological sanitation system that is protected from flooding as it is built above the ground and there is no flush and sewer system involved. The system is based on dehydration of feces, transforming into compost which can be used as a soil conditioner in husbandry. Since the introduction of ecosan in Guatemala in 1978, many thousands of units have been built in Central America, such as El Salvador (Esrey et al 1998, 2001; Winblad and Simpson-Hébert 2004: 44-5), Mexico (Winblad and Simpson-Hébert 2004: 28) and Guatemala itself (Esrey et al 1998, 2001). The system is also gaining momentum in South American countries such as Peru (Oswald and Hoffmann 2007), Argentina (Peralta, E. 2006) and since the last decade in Bolivia as well (e.g. Fogelberg et al. 2011, Incade 2011b).

Study area and methodology

San Pedro district is such a rural community where an ecological sanitation project was implemented, for the following reasons:

- The high infant mortality rate in San pedro of 64/1000 live births in early 2000s was caused by hygiene-related disease and malnutrition, such as diarrhoea and respiratory problems (Incade 2007, Fortemu 2006).
- 2. With approximately 3 thousand habitants, the village has no garbage collection system and

- sewage, and nearly all houses have an unhygienic pit latrine near their house.
- 3. The villagers face annual flooding during the rainy season which directly affect their health security by washing out the feces from pit latrines over the streets and in their homes.

The project initiated when the local NGO Incade noted there was a demand and potential for ecological sanitation from the side of the community. Therefore, meetings were organized to explain the system and to give the community the opportunity to participate. The project became incorporated in the municipalities' POA (*Plan Operativo Annual*), a five year development plan of the municipality. Stakeholders within this project (executed in 2005/2006) were the 56 participating families, Incade, the municipality of San Pedro and Water for People (locally called *Agua para el Pueblo*). Water for People financed 60%, the municipality 31% and the beneficiary families 9% (each family paid 200 Bolivian Bolivianos for their UDDT and was additionally responsible for the purchase of materials for- and construction of its upper part: the walls and roof). Incade executed the project in three phases, listed in Table 1.

INSERT TABLE 1 HERE

Our analysis focuses on how motivations to participate and perceptions of change derived from the UDDT project vary between implementing agencies and local beneficiaries, and how the level of overlap or contrast influences the performance of its implementation. Data are based on several sources. Interviews were conducted with the practitioners of the implementing agency (n=8) and all beneficiaries of a UDDT (n=46). In particular, benefitiaries who made full use of their UDDT – including defecation and husbandry – were selected for a photo-elicitation exercise (n=16) – each participant was asked to make five pictures that represented changes in their lives since the adoption of the UDDT, and the pictures were used to guide an interview. Additionally, transect walks with selected beneficiaries (n=16) were carried out where information on use and maintenance of the system and gender roles were collected. Also, seasonal agricultural diagrams were drawn (n=10) in order to understand their agricultural cycles. Interviews with informants who had a stake in the project but did not belong to the implementing agency or beneficiary groups, such as bricklayers, helped to gather background information on UDDT-related activities in the village (n=6). Finally, informal conversations with non-beneficiaries in the village (n=34) helped to reveal their reasons for their lack of participation in the project. Non-parametric statistical analysis was used to compare results on perceptions from the implementing agency and beneficiaries.

Results

Perceptions and underlying interests differed between the implementing agencies group (IA) and the owners/beneficiaries group, but in contrast to expectations based on the literature, this did not negatively influence the outcome of the project. Both groups were enthusiastic about the project, but there were

differences in the scales each group focused on when describing the the changes that the project helped create: the IA mentioned the success of the project in the context of regional to global scale changes based on idealistic views that were in accordance with the NGO's vision, whereas the owners mentioned household changes that led to positive impacts related to their personal interests (Table 2).

INSERT TABLE 2 HERE

First, the implementing agency highly valued community health and talked in terms of reducing diarrhea as a threathening disease especially for infants, whereas the beneficiaries were more interested in their personal health and that of their nuclear family, reporting personal hygiene, as in 'feeling clean' as an important value rather than the reduction of diarrhea. Some owners were happily stating that their kids were stronger and healtier because with the organic manure they grow bigger and higher quality food for family consumption, but none of the implementing agencies mentioned these changes.

A second clear distinction concerned perceptions on environmental changes. The implementing agencies highly vallued changes in the natural environment whereas the beneficiaries were mainly keen on their cleaner physical environment. As such, flooding is by both groups seen as a major problem in San Pedro, but the implementing agencies see ecological sanitation as a solution to this problem as flooding cannot take along excrements from pit latrines anymore and constitute a hazard to the natural environment (and subsequently human health), whereas the owners see the solution in a cleaner house and toilet. Moreover, 15 out of 16 owners made one or more pictures of their kitchen garden; 63% and 50% of all owners reported an improved health and - growth of husbandry products respectively (i.e. plants, fruit or vegetables), but from the economic perspective of more food and income or the joy of seeing beautiful plants in their garden, rather than through the glasses of natural environment on a bigger scale. The implementing agencies were silent about plant growth, two of them saw healthier plants. On soil condition both groups expressed similar importance. However, looking at the variables 'plant health improves' and 'plant growth improves' just discussed, its proximate cause has been an improved soil condition which increases its importance to the owners.

However, not only the soil condition in general influences a farmer's decision to use his organic manure for cultivation:

"[...] after five years the soil needs phosphor, potassium and nitrogen. [...] I prefer to buy specific chemical fertilizer of which I know that it contains phosphor, potassium, or nitrogen. The compost from my ecological latrine, I have no idea what it contains. One day they made samples of it, took it to Cochabamba for analysis, but I don't know the results¹." (Owner: Roberto).

An incentive for farmers to use the compost would be to know what the compost contains and to perceive it useful for what the soil needs at a particular point in the year and for a particular harvest. Excreta

¹ This was part of a study conducted by James McKinley (2012).

outputs differ however regarding which absorbent compound is used, the nutritional intake of the family, climate and lifestyle (Esrey et al. 2001: 45, 51), which makes it difficult to generalize the outcome of the sample analysis in Cochabamba.

The IA saw saving water as an improvement towards the natural environment:

"With the ecological latrine we save the consumption of water. We know that the water... that in the future there is a jeopardy that there will be no groundwater anymore. Therefore I think it is important to know how to take care of this." (IA representative)

whereas it was seen as a financial benefit by some owners as water is costly:

"With our ecological latrine we don't waste water anymore [...]. We monthly pay water to a private company, and it is expensive you know." (owner: Rafael)

This is another example of the same change (saving water) with different underlying interests: i.e. saving nature to the IA versus economic advantage to the owners.

Changes in the economy category were only observed by the owners; apart from one of the IA representatives reporting an economic change, the IA did not touch the category at all. For example, none of the IA representatives observed differences in trade in compost or harvest whereas 38% of the owners see and/or use the opportunities to either sell their compost or harvest from their kitchen gardens for extra income. An owner states:

"[...] I have hope, right. This compost works for the plants. [...] Last year my tamarind tree was drying out [...] it was without leaves, [...] without fruit. I threw the compost around the roots of the tree, and it recovered, it's like a new plant. [...]. It gives fruit, I prepare juice of it and then I sell it. I also sell the fruit per kilo." (owner: Rosa)

However, 38% of the implementing agencies and 25% of the owners indicated that they *would like* to commercialize the UDDT compost or the products of harvest where the compost is used for. But, according to an IA representative, organizational structures are still lacking:

"You are arriving in a period in which there are already ecological latrines, one uses their ecological latrine, one uses the compost. We have created a system to do a follow up on behalf of the construction phase, on behalf of capacity building among families, and a follow up on behalf of the promotoras, of the use and maintenance of the ecological latrine. But we still don't have a follow up of the use of the organic fertilizer. [...] I think we should work more for the use of the organic fertilizer. This is a pending task, to focus more on this theme. How to use, how to commercialize, how to make it more productive. One has to strengthen the organization of this theme." (IA representative: Maria)

Thus, both groups would like to see changes regarding trade of ecosan products, but over one third of the owners are already seeing these changes gradually happening. Institutional arrangements and clarifying the 'how to' to the owners would amplify trade.

Different perspectives were also reflected in political empowerment. The IA emphasized the project's courses for capacity building and (women) empowerment such as civil participation, community development, and awareness raising activities such as festivals and a 'miss sanitation' election whereas the owners did not see (or were aware of) changes regarding empowerment. Rather, they were talking about improved practical knowledge gathered through for example the poster in their ecological toilet that indicated how to use it. Strikingly, through some of these courses the IA also aimed at tackling gender stigmatization and fostering women empowerment through stimulating men to participate in toilethousehold activities such as cleaning, stirring and arranging absorbent compound, but the owners did not report any gender stigmatization issues.

Despite these major differences in perspectives and underlying interests between the implementing agencies and the owners, the project was perceived as successful by both groups. However, for the implementing agencies 'success' meant gaining interest in the project from other communities, highly valuing community health and improving the natural environment, whereas for the owners 'success' meant user satisfaction with underlying values of feeling safe, clean, comfortable and happy.

Discussion of the case results

The success of the project, as regarded by both the implementing agency and the beneficiaries, is surprising considering the strongly different interpretative frames that both groups used to measure this success, and the lack of communication at a strategic level that occurred between these groups during its implementation. According to much literature, a prerequisite for successful implementation of development projects – that is, a sustainable uptake of the project by the target community – is not only that the purposes of the project do not violate a stakeholders' norms and values but also that perspectives and objectives of all stakeholders should be harmonized (otherwise project failure is said to be likely to occur (Risley 2011; Tembo 2003). In this case, stakeholder groups seemed to be hardly aware of each other's perspectives, but this did not prove to be an obstacle for the project's success.

Some elements in the case that may have made the lack of sharing on the level of interpretative frames less of a problem include the relative lack of taboos around sanitation and the willingness of all to engage with sanitation issues openly, as well as the fact that the individual ecosan projects are privately owned: if one user does not follow the project rules, it does not affect other users.

The fact that implementers and owners/beneficiaries were valuing the project very differently argues against attempts by implementing NGOs to convince beneficiaries of their interpretative framings to get them on board. In this case, the implementers' interpretative framing would not have been likely to be attractive to the project's beneficiaries. The fact that communication between implementers and beneficiaries focused mainly on practical aspects of the project seems to have been conducive to the project's success.

However, the success of the project could be seen as a lucky outcome for all involved, which could easily turn out otherwise in development projects with different characteristics, if the actors involved are similarly unaware of each other's interpretative frames. Furthermore, it is likely that a number of opportunities for social learning among the actors about their interpretative frames have been missed in the project. This social learning might have led to an identification of more opportunities for success and to help establish sustainable long-term partnerships.

Methodological recommendations for harnessing plurality of interpretative frames

In order to move beyond advocacy and to harness the plurality of interpretative frames that actors involved in development projects use, we propose a number of key elements:

- 1. An elicitation of actors' interpretative framings: this is an important step to understand the deeper motivations and interests of all involved. Based on this knowledge, the management or facilitation of this plurality can be designed. Perhaps interests focus on different dimensions and scales of a project (Cash et al. 2006; Vervoort et al. 2012), but are ultimately compatible or not conflicting; perhaps there are seeds for conflict; perhaps there is a great deal of overlap.
- 2. Feeding back the elicited interpretative framings to the groups that provided the information: From the perspectives of both the beneficiaries and the implementers, having their own interpretative framings made explicit makes it easier to communicate their preferences.
- 3. Facilitating a social learning process to create greater understanding between actor groups about other actors' interpretative framings: for implementers, understanding the beneficiaries' interpretative framings helps to avoid miscommunication, and helps them report on positive outcomes of the project that were unanticipated from the perspective of their own interpretative framing. For the beneficiaries, it is helpful to see how their own interpretative framings connect, or fail to connect, with the interpretative framings of the implementers which can help them communicate more strategically with these other actors. More generally, social learning through such a process stimulates actors to increase their conceptual models on a given issue (Kristjanson et al. 2014).

We propose an example methodology (which can be combined with other methods depending on project needs) in which these elements are integrated into the activities of the (grassroots) NGO, which organizes a facilitating action research role in the process that encourages the process of social learning among all stakeholders. After identifying all involved stakeholders, the facilitator approaches each stakeholder for an individual in-depth interview. Per stakeholder group, the facilitator interviews as many respondents until saturation in answers is achieved. In such interviews, the facilitator strives to elicit all layers of the respondents' interpretative frame: their views on the issue, their background theories, their normative preferences and their views on solutions to the addressed issue. After all stakeholders are approached individually, the facilitator draws tables in which the results of the four layers are presented

per stakeholder. The table should reveal the major differences in the stakeholders' interpretative framings. Through further analysis, the facilitator should be able to identify the major issues addressed by all stakeholders. Of those major issues, the participants make linked mind maps with causal relationships and proposed actions points and solutions.

Those mind maps will be presented during focus groups with each stakeholder group. Ranking methods can be used here to determine the perceived importance of each issue and the perceived likeability of success of each proposed solution. This is the first step in the social learning process: by showing the mind maps, the facilitator shows the perspectives of all stakeholders and their proposed solutions. Focus group attendants can reflect on these views and share their opinions. The scope of social learning can be measured by analyzing the interpretative frames of the in-depth interviews and those of the focus groups – differences over time can be charted. An example of this approach can be found in a qualitative research (a needs assessment) conducted in rural Guatemala: the first frames from the in-depth interviews merely revealed mutual allegations of problems and vague solutions, whereas the second frames revealed more common grounds and more concrete ideas for proposed solutions (Eelderink and Verster, 2010).

In a final generic meeting, the facilitator invites all different stakeholders (or stakeholder group representatives) to come together to discuss the outcome of this analysis. The goal of such final generic meeting was to put actions to the proposed solutions. The process of social learning was clearly seen here, and despite different interpretative frames, new projects could run successfully. The methods puts an emphasis on facilitating diversity among stakeholders and using that diversity for the process of social learning and out-of-the-box thinking; as such, it can be seen as one of the ways to facilitate social learning among stakeholders and enhancing sustainability of development projects.

Conclusions

The case study analysed in this paper demonstrated that maintaining different interpretative frames between actors in a development project can lead to a successful project as seen from each of these frames. This helps provide an argument against an over-emphasis among development projects on advocacy roles and the need to bring actors on board with certain objectives. However, to understand and potentially harness any plurality in interpretative frames in development projects, and to avoid harmful conflicts that may result from this plurality, these frames have to be elicited. Additionally, sharing the elicited perspectives in a structured and interactive process can facilitate social learning among the involved actors.

Literature

Albó X (2008) The "long memory" of ethnicity in Bolivia and some temporary oscillations. In J. Crabtree & L. Whitehead, Unresolved tensions. Bolivia, past and present (pp 13-35). Pittsburg: University of Pittsburg press

Altieri MA (2000) Enhancing the productivity of Latin American traditional peasant farming systems through an agroecological approach. International Journal of Sustainable Development and World Ecology 7(1):50-61

Arellano-Lopez S, Petras JF (2008). Non-governmental organizations and poverty alleviation in Bolivia. Development and Change (25)3: 555-568

Banks N, Hulme D (2012) The Role of NGOs and Civil Society in Development and Poverty Reduction (June 1, 2012). Brooks World Poverty Institute Working Paper No. 171

Barbier E B (1998) Deforestation, land degradation and rural poverty in Latin America: examining the evidence. Planejamento e Políticas Públicas. No 18

Berkes F, Colding J, Folke C (2003) Navigating social-ecological systems: Building resilience for complexity and change. Cambridge University Press, Cambridge

Breslin ED (2002) Introducing ecological sanitation: some lessons from asmall town pilot project in Mozambique. Water Science and Technology 45(8): 217-224

Cash DW et al. (2006) Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World Ecology and Society 11:12.

Crabtree J, Whitehead L (2008). Unresolved tensions. Bolivia, past and present. University of Pittsburg press, Pittsburg

Cook B, Kothari U (2007) Participation: the new tyranny? ZedBooks, New York

Corrales LF, Izurieta R,Moe CL (2006). Association between intestinal parasitic infections and type of sanitation system in rural El Salvador. Tropical Medicine and International Health. 11(12): 1821-1831

Diaz MLM (2009) Valoración económica del uso de tecnologías de saneamiento ecológico para aguas residuales domiciliares. Revista de la Red Iberoamericana de Economía Ecológica. 13:1-13

Ducrot R et al (2014). Learning integrative negotiation to manage complex environmental issues: example of a gaming approach in the peri-urban catchment of São Paulo, Brazil. Reg Environ Change (May 2014)

Eelderink M, Verster J (2010) Development of a community specific health promotion plan to improve children's health in rural Guatemala. International Journal of Disability and Human Development. 9(1):35-46

Esrey SA (2000) Towards a recycling society. Ecological sanitation- closing the loop to food security. In: Werner C, Schlick J, Witte G, & Hilderbrandt A (eds) Ecological Sanitation. Closing the loop in wastewater management and sanitation (pp 34-44). Proceedings of the International Symposium, 30-31 October 2000, Bonn, Germany

Esrey SA, Gough J, Rapaport D Sawyer S, Simpson-Hébert M, Vargas J et al. (1998) Ecological Sanitation. Stockholm: Swedish International Development Cooperation Agency.

Esrey SA, Andersson I, Hillers A, Sawyer R (2001) Closing the loop. Ecological Sanitation for food security. Stockholm: Swedish International Development Cooperation Agency.

Fewtrell L, Kaufmann RB, Kay D, Enanoria W, Haller L, Colford JM Jr (2005) Water, sanitation and hygiene interventions to reduce diarrhoea in less developed countries: a systematic review and meta-analysis. Lancet Infectious Diseases. 5(1):42-52.

Folke C, Carpenter SR, Walker B, Scheffer M, Chapin T, Rockström J (2010) Resilience thinking: Integrating resilience, adaptability and transformability Ecology and Society 15

Fogelberg K, Montes J, Soto B (2010) From excrement to pines to mushrooms to money in Bolivia. *Sustainable Saniation Practice*. *5*(10):4-9.

Förch G, Kalbessa A (2000). Ecological Sanitation – case study Adulala-Oromiya/Ethiopia. In: Werner C, Schlick J, Witte G, & Hilderbrandt A (eds) Ecological Sanitation. Closing the loop in wastewater management and sanitation (pp 34-44). Proceedings of the International Symposium, 30-31 October 2000, Bonn, Germany

Fortemu (2006) Estudio Socioeconomico Municipio San Pedro. Santa Cruz, Bolivia: Formulacion de Planes Municipales de Ordenamiento Territorial.

Grambauer F (2010) Community-based, resources-oriented management of separated human waste in peri-urban areas in Nakuru, Kenya. Sustainable Sanitation Practice. 5(10): 10-15.

Grin J, Van de Graaf H (1996) Technology assessment as learning. Science, Technology, & Human Interpretatives 21(1):72-99.

Grin J, Van de Graaf H, Hoppe R (1997) Interactive technology assessment: een eerste gids voor wie het wagen wil. Den Haag: Rathenau Instituut.

Grin J, Van de Graaf H, Hoppe R, Pelinx A (1998) Bouwstenen voor de argumentatieve beleidsanalyse. Den Haag: Elsevier

Grin J, Loeber A (2007) Theories of policy learning: agency, structure and change. In: Fisher F, Miller GJ, Sidney MS (eds) Handbook of public policy analysis: theory, politics and methods (pp 201-129). CRC/Taylor & Francis

Grootaert C, Naranyan D (2004) Local institutions, poverty and household welfare in Bolivia. Elsevier. 34(7): 1179-1198

Hayward G, Diduck A, Mitchell B (2008) Social learning outcomes in the Red River Floodway Environmental Assessment. Environmental Practice 9(4).

Hermans FLP (2011) Social Learning in Innovation Networks: How multisectoral collaborations shape discourses

of sustainable agriculture. Dissertation, Wageningen University

Incade (2007a) Diagnostico consolidado municipal-2006. Tomo I. Municipio de San Pedro, plan de desarrollo municipal 2007-2011. Obispo Santistevan, Santa Cruz, Bolivia

Incade (2007b). Estrategia integral de desarollo municipal 2007-2011. Tomo II. Municipio de San Pedro, plan de desarrollo municipal. Obispo Santistevan, Santa Cruz, Bolivia

Incade (2011a). Escuela de Lideres. Modelo de Gestión Municipal Participativa. Cuaderno de Capacitación № 1. Montero: Incade

Incade (2011b). Proyectos. Construcción de baños ecologicos y capacitacion sobre su uso y mantenimiento correcto. Departamento de Santa Cruz, Estado Plurinacional de Bolivia

Kessler CA, Stroosnijder L (2006) Land degradation assessment by farmers in Bolivian mountain valleys. Land Degradation and Development 17: 235–248

Kristjanson P, Harvey B, Van Epp M, Thornton PK (2014) Social learning and sustainable development Nature Climate Change 4:5-7

Langergraber G Muellegger E (2005) Ecological Sanitation – a way to solve global sanitation problems? Environment International 31: 433-444

Mc Kinley J W, Parzen RE, Guzman AM (2012) Impact of climate and bulking materials on characteristics of compost from ecological toilets. Journal of Water, Sanitation and Hygiene for Development, University of San Simón, Cochabamba

Meuleman, L. (Ed.) (2012) Transgovernance. Advancing Sustainability Governance. Heidelberg: Springer

Miller RL, Shinn M (2005) Learning from communities: overcoming difficulties in dissemination of prevention and promotion efforts. American Journal of Community Psychology 35(3/4):169-183

Moret-Hartman M, Knoester PD, Hekster YA, Van der Wilt GJ (2006) Non-compliance on the part of the professional community with a national guideline: an argumentative policy analysis. Health Policy 78: 353-359

Moret-Hartman M, Van der Wilt G (2007) Health technology assessment and ill-structured problems: A case study concerning the drug mebeverine. Int Journal of Technology Assessment in Health Care 23(3): 316-323

Moret M, Reuzel R, Van der Wilt GJ Grin J (2007) Validity and reliability of qualitative data analysis: interobser agreement in reconstructing interpretative frames. Field Methods 19(1):24-39

Moret-Hartman M, Reuzel R, Grin J, Van der Wilt GJ (2008) Participatory Workshops are not enough to prevent policy implementation failures: an example of a policy development process concerning the drug interferon-beta for Multiple Sclerosis. Health Care Analysis 16:161-175

Neuburger M (2010) Political reforms and local development in the Bolivian Amazon. In: Van Lindert P, Verkoren O (eds) Decentralized development in Latin America: experiences in local governance and local development (pp 87-100) Springer, Heidelberg

Ostrom E, Schroeder L, Wynne S (1993) Institutional Incentives and Sustainable Development. Infrastructure Policies in Perspective. Westview Press, Boulder

Ostrom E (2009) A general framework for analyzing sustainability of social-ecological systems Science 325:419-422

Ostrom E (2010) Polycentric systems for coping with collective action and global environmental change Global Environmental Change 20:550-557

Oswald P, Hoffmann H (2007) Results of an evaluation of ecological sanitation projects in the peri-urban settlements of Lima/Peru. In: Hoekzema F (ed) International conference on Sustainable Sanitation "Water and Food Security for Latin America" –Ecosan, Fortaleza, Ceará

Pahl-Wostl C, Hare M (2004) Processes of social learning in integrated resources management. Journal of Community & Applied Social Psychology 14: 193-206

Peralta E (2006) "ecosan" (ecological sanitation): una nueva alternativa ecologica para el saneamiento en Argentina. Ingeniería sanitaria y ambiental Buenos Aires (91):96-99

Risal S (2014) Mismatch between NGO services and beneficiaries' priorities: examining contextual realities. Development in Practice 24(7)

Risley A (2011) The Power of Persuasion: Issue Framing and Advocacy in Argentina. Journal of Latin American Studies (43): 663

Robert C, Zeckhauser R (2011) The Methodology of Normative Policy Analysis. Journal of Policy Analysis and Management, (30):3 613–643

Sawyer, R. (2003) Sanitation as if it really matters: Taking toilets out of the (water) closet and into the loop. Sarar Transformación SC, Morelos

Sim J, Groeber K, Greenlee T (2010) Making a Business of Sanitation: Establishing a World Trade Hub for the Poor. Sustainable Sanitation Practice. 5(10): p 25-29

Snel M, Smet J (Eds) (2006) The interpretative of environmental sanitation – case studies. IRC International Water and Sanitation Centre, Delft

Tembo, F (2003) The multi-image development NGO: An agent of the newimperialism? Development in Practice, 13:5, 527-532

Unicef (1997) Towards better programming: a sanitation handbook. United Nations Children's Fund, New York

Unicef (2014) UNICEF Data: Monitoring the Situation of Children and Women. Current status + progress. http://data.unicef.org/water-sanitation/sanitation#sthash.FO2NF8cE.dpuf. Accessed 17 November 14.

Van der Well A, Bereziat E, De Brijne G, Barendse J (2010) Financing the Informal Entrepreneur: Recognizing Business Opportunities in Sanitation. Sustainable Sanitation Practice 5(10):21-24

Van Lindert P, Verkoren O (2010) Local governance and local development in Latin America: views from above and below. In: Van Lindert P, Verkoren, O (eds.) Decentralized development in Latin America: experiences in local governance and local development (pp 1-23) Springer, Heidelberg

Vervoort JM, Rutting L, Kok K, Hermans FLP, Veldkamp T, Bregt AK, van Lammeren R (2012) Exploring dimensions, scales, and cross-scale dynamics from the perspectives of change agents in social-ecological systems Ecology and Society 17

Waste (2006) World map with ecosan cases. http://www.ecosan.nl/page/393. Accessed 9 November 2011.

Water for People (2011a) Field level operations watch. Map data. http://watermapmonitordev.Appspot.com/? country=BO. Accessed 8 November 2011

Water for People (2011b) Mission, Vision, and Guiding Principles. http://www.waterforpeople.org/about/mission-and-vision/. Accessed 22 November 2011

Wegelin-Schuringa (2000). Public awareness and mobilization for ecosanitation. In: Werner, C., Schlick, J., Witte, G., & Hilderbrandt, A. *Ecological Sanitation. Closing the loop in wastewater management and sanitation* (pp 169-177). Proceedings of the International Symposium, 30-31 October 2000, Bonn, Germany.

Werner C, Fall PA, Schlick J, Mang HP (2003) Reasons for and principles of ecological sanitation. In: Werner C, Schlick J, Wiltte G, Hildebrandt A (eds) GTZ ecosan project. (pp 23-30) GTZ, Eschborn

Winblad U, Simpson-Hébert M (eds) (2004) Ecological Sanitation. Envised and enlarged edition. Stokholm Environment Institute, Stockholm

World Health Organisation (2009) MDG 4: Reduce child mortality. http://www.who.int/topics/millennium_develop-ment_goals/child_mortality/en/index.html. Accessed 29 April 2010

WHO, Unicef (2012) Joint Monitoring Programme for water supply and sanitation . Estimates for the use of improved sanitation. http://www.wssinfo.org/fileadmin/user_upload/resources/BOL_san.pdf.facilities. Bolivia. Accessed 5 January 2013

About the authors:

Drs. MA Madelon Eelderink (corresponding author):

Madelon is founder of 7Senses and 7Senses Foundation. She holds a Masters' degree in International Public Health (VU University Amsterdam) and an Advanced Masters' degree in Latin America Studies (Cedla Amsterdam). She has (action) research experience in Guatemala, Bolivia, Cameroon, Uganda and the Netherlands. She also guided over 100 action researchers worldwide. Via 7Senses she offers an action research programme for students and post-graduates called the 7Senses Challenge, where she guides multidisciplinary research teams during their fieldwork (trainings, workshops, intervisions and personal guidance). To scale up, she founded the 7Senses Action Research Academy, offering post-graduates the opportunity to start a career in guiding new 7Senses Challenges.

Contact: madelon.eelderink@gmail.com

Websites: www.7sens.es and www.7sensesfoundation.org.

Joost Vervoort PhD:

Joost Vervoort is a senior researcher at the Environmental Change Institute, University of Oxford. He holds a PhD in Production Ecology and Resources Conversation from Wageningen University, on strategies for participatory knowledge development in social-ecological systems, and an MSc in Natural Resources Management from Utrecht University. Since 2011, he leads a global project on scenario-based policy guidance for CCAFS in six global regions (South Asia, Southeast Asia, East Africa, West Africa, the Andes and Central America). This project has led to successful national and regional policy outcomes in each of these regions as well as partnerships with major global partners (FAO, UNEP WCMC, OXFAM GB, WRI). Vervoort leads a work package on scenario development in FP7 TRANSMANGO (2014-2017) on European food systems, and co-leads a work package in H2020 SUSFANS (2015-2019) which focuses on a modelling toolbox for policy on European food and nutrition security. Vervoort has a keen interest in combining scenarios and games for the exploration of strategies and policies – he is developing a scenario game for the Future Earth project 'Seeds of a Good Anthropocene'. He has taught scenario methods at Oxford University (including training for high-level private sector executives as the Saïd Business School), Wageningen University, the University of Amsterdam, at Microsoft, and a range of design schools.

Contact: joost.vervoort@eci.ox.ac.uk

Drs. Demian Snel:

After obtaining a Master's degree in Biomolecular Sciences at the University of Utrecht, Demian became active in the biopharmaceutical industry in Utrecht. Holding a temporary position at Cellution BV he validated the primary functionalities of the CELL-tainer disposable bioreactor. At Bioceros BV. he

participated in various research and administrative activities within the pre-clinical development of monoclonal antibodies, the generation of GMP-ready protein producing cell lines (in cell line generation programs), CRO services and in-house product development. He now facilitates the knowledge link between VBD's (Malaria, Rift Valley Fever, Schistosomiasis) and multi-stakeholder regional scenarios to assess the viability of policy interventions at CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Oxford University.

Contact: demian_snel@hotmail.com

Fabio de Castro PhD:

Fábio de Castro is Assistant Professor of Brazilian Studies. He is an environmental anthropologist with MSc in Ecology in 1992 (State University of Campinas, Brazil) and PhD in Environmental Science/Anthropology in 2000 (Indiana University, USA). Fabio has research experience with academic, non-governmental and governmental organizations in Brazil and in the United States. He is a collaborating researcher at the Anthropological Center for Training and Research on Global Environmental Change (Indiana University, USA), and at the Center for Maritime Research (MARE), University of Amsterdam).

Contact: F.deCastro@cedla.nl.