

Questioning Psychosocial Resilience After Flooding and the Consequences for Disaster Risk Reduction

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Accepted: 16 November 2012 / Published online: 12 June 2013
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Abstract This paper questions George Bonanno’s concept of resilience as “relatively stable, healthy levels of psychological and physiological functioning” (Bonanno in *Am Psychol* 59(1):20–28, 2004) following potentially traumatic events (PTE). It agrees with Bonanno’s claim that significant numbers of people may suffer from mental disorders following a PTE, but disagrees that the majority of people are resilient. Furthermore it argues that we should not see PTEs as one event, but as involving a number of stressors and having a variety of consequences. Drawing on fieldwork carried out in Rajni village, Bihar following the 2008 Kosi River flooding, it documents, 18 months post flood, that flood onset gave rise to symptoms related to Post Traumatic Stress Disorder (primarily re-experiencing). The villagers’ primary concern was livelihood loss which, together with their lack of hope for the future, led to symptoms of depression. It argues that mental health issues should be fully integrated into Disaster Risk Reduction plans and policies, which are likely to be included in the Post-2015 Millennium Development Goals. In addition to supporting mental health interventions, the paper suggests that deep socio-cultural changes are necessary to ensure improvements in mental health.

Keywords Resilience · Flooding · Mental health · Disaster risk reduction · MDGs · Livelihood loss · India

1 Introduction

As argued in the introduction to this special issue, the form any post 2015 development goals will take and their relationship with possible sustainable development goals (SDGs) remains

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uncertain on several accounts, not least on which goals should be included. Currently Disaster Risk Reduction (DRR) related to ‘natural’ hazards is on the SDG agenda and may well find its way onto the Post 2015 MDG agenda (UN 2012a, b). But what a DRR goal should include is open to debate. Here I will argue for mainstreaming mental health issues into DRR which should be placed in the broader context of socio-cultural change.

The epidemiological evidence clearly shows that substantial numbers of people suffer from serious mental health problems in the wake of disasters (Crabtree 2012; Norris et al. 2002b; Norris 2010). But, we may ask, how extensive should mental health interventions be? Should they be confined to those that have disorders or should they include all members of an affected population? One of the most influential researchers in the field of mental health following disasters, George Bonanno, has played a leading role in placing ‘resilience’ at the center of the disasters and mental health literature (Neria et al. 2009). He has argued that following Potentially Traumatic Events (PTEs) the *vast majority* (author’s emphasis) of people follow a resilience trajectory of “relatively stable, healthy levels of psychological and physiological functioning” (Bonanno 2004:20), and that at worst, interventions relating to resilient people may have a negative effect (Bonanno et al. 2010).

Here I shall question these claims. Based on fieldwork undertaken in Rajni village, Bihar, India, following the 2008 Kosi River flooding, I shall argue that the vast majority of villagers were not resilient in Bonanno’s sense. The evidence suggested that two people were not functioning (no diagnosis was made), that the experience of flood onset led to symptoms of Post Traumatic Stress Disorder (PTSD) (primarily re-experiencing the traumatic events) and, in a few cases, symptoms of panic attacks. Furthermore, the loss of livelihoods, which was also perceived to be life threatening, led to symptoms of depression.¹

My analysis presents a further contrast to Bonanno (and epidemiological studies more generally) as it suggests that it is mistaken to think of the flood as *one* PTE. Following the Kosi flood, people faced multiple stressors (most importantly flood onset and livelihood loss) which had multiple consequences and did not just relate to PTSD. The different problems suggest different responses which include professional help and psychosocial interventions and could be integrated into DRR.

The villagers’ highest priority was improvements in their livelihoods. This points to yet another contrast with Bonanno. His understanding of the causes of mental health problems following a PTE looks only at the PTE and does not take the future into account. Villagers in Rajni saw little hope for the future improvements in livelihoods. In the context of Bihar, substantial improvements in livelihoods would require profound socio-cultural and political change (Wisner et al. 2004; UNDP 2009) and thus DRR strategies alone are inadequate to solve mental health problems related to livelihoods.

I begin by providing a critical overview of Bonanno’s work followed by a presentation of the fieldwork undertaken in Bihar. Thereafter the consequences for DRR are drawn. The article then looks at the implications of the findings for post 2015 MDGs and SDGs. The final section concludes.

2 Bonanno, Trauma and Resilience

Hurricane Mitch hit Honduras in late October 1998. An epidemiological study carried out 2–3 months later suggested that over 10 % of the nation’s 3.3 million adult population

¹ All symptoms as defined by the fourth version of the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM IV).

could be suffering from PTSD leading to dysfunctioning in important areas of life (Kohn et al. 2005). These numbers are substantial especially given Honduras' poor mental health infrastructure (WHO 2005). The results of the Honduras study are not untypical (for reviews of the literature see Crabtree 2012; Norris et al. 2002a, 2010) though percentages of PTSD can be much higher (Otero and Njenga (2006). Such findings give good reason for the mainstreaming of mental health issues in Disaster Risk Reduction (DRR).

Conversely, approximately 90 % of the adults in Honduras did not manifest full PTSD. There has been a belief within western psychology that all people who have been exposed to traumatic events need psychological support as those who do not manifest trauma or grief are repressing it resulting in long term negative consequences (Neria et al. 2012; Bonanno 2004). If this were the case, then the task for DRR would appear even larger as psychosocial interventions would be required for the entire affected population.

However, the empirical validity of this thesis has been increasingly questioned, rather, as stated earlier, Bonanno (2004) claims that the *vast majority* of people exposed to potentially traumatic events are 'resilient'. This is more than the absence of PTSD as, when Bonanno (and his various co-authors) operationalize the term, individuals cannot be classified as being resilient if they have more than one symptom of PTSD (Bonanno et al. 2010). If Bonanno is correct, the implication for DRR is that a much smaller group of people require interventions or indeed such interventions may have negative effects. To quote:

...if most people are likely to cope effectively on their own, global prophylactic interventions may be pointless or might even undermine people's natural coping abilities. Bonanno et al. (2010:32)

Bonanno's (2004) distinguishes between four different prototypical trajectories following traumatic events, offering a more nuanced picture than that of the resilient/non-resilient dichotomy as a time dimension is introduced. These trajectories are firstly, *chronic* where people have and continue to have severe disruptions in normal functioning (range 5–30 % of the affected population²); *delayed* where, at first, disruption is mild to moderate but later becomes severe (range 0–15 %.); *recovery* in which disruptions are moderate (symptoms of depression or PTSD) to begin with but returning to normal functioning within the space of a few months to 2 years (Bonanno et al. 2010) (range 15–25 %); and, fourthly *resilience*. Resilient people usually show signs of stress, such as difficulty sleeping, in the immediate aftermath of the PTE, however they are mild and transient (Bonanno and Gupta 2009). The range for this group is 35–65 %. It is worth pointing out here that the ranges given question his earlier claim (Bonanno 2004) that the *vast majority* of people are resilient; this may be the case at the high end of the range but certainly not so at the lower end.

More recently, Bonanno et al. (2011) have acknowledged other trajectories which stretch back to the time prior to the PTE. Specifically they refer to 'enduring impairment' which is a continuation of the distress that was present pre-PTE and 'distress improvement' in which a PTE actually decreases distress (ranges are not given). This first of these is a well-established predictor of negative post-PTE mental health outcomes (Crabtree 2012; Norris et al. 2002a).

In terms of disasters (Bonanno also works on bereavement and grief more generally), there is little epidemiological evidence to either support or confute Bonanno's claims. The majority of epidemiological studies concerning mental health in the wake of disasters are

² For all range estimates see Bonanno et al. (2010).

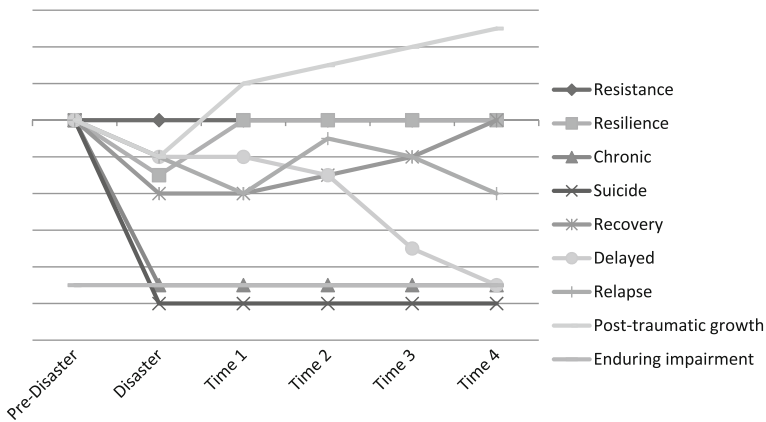


Fig. 1 Disasters and stylized mental health trajectories. *Source:* Own

cross-sectional and thus we have little knowledge of how mental health changes over time (Norris et al. 2009). Furthermore, longitudinal studies are rarely disaggregated, so we have little knowledge of individuals' specific pathways or trajectories.

To support his claims in relation to disasters, Bonanno cites a study (Galea et al. 2003) undertaken following 9/11 which suggested that 50 % or more of the respondents were resilient when defined as a maximum of one PTSD symptom at 6 months post PTE (Bonanno 2004:20), however the timeframe of this study is very limited and does not rule out the presence of delayed cases. A study Bonanno undertook following the Severe Acute Respiratory Syndrome (SARS) epidemic in 2002–2003 suggested that 35 % had high levels of psychological functioning up to 18 months post PTE (reported in Bonanno and Gupta 2009).

Developing Bonanno's ideas concerning trajectories, Norris et al. (2009) hypothesized six trajectories each starting pre-PTE. They distinguished between *resistance* (the equivalent of Bonanno's resilience trajectory) which is the case of 'no change' or mild symptoms and resilience. Their *resilience* trajectory is designed to capture its metaphorical meaning of 'bouncing back', thus after an initial rapid increase in symptoms, a person on this trajectory would fall back to the pre-disaster low level of symptoms. They further added a *relapsing/remitting* trajectory along which there is an increase in symptoms which then decrease before increasing again (see Fig. 1).

Norris et al. (2009) carried out studies of PTSD following the 1999 Mexican flooding in the cities of Villahermosa and Teziutlán (see also Norris et al. 2004). The interviews were carried out in four waves at six, 12, 18 and 24 months ($N = 561$). 34.5 % followed the resistance (Bonanno's resilience) trajectory (i.e. the lower end of Bonanno's range), and 32 % the resilience trajectory, although the authors point out that 'bouncing back' took several months so these people could potentially be placed in the recovery group. Recovery was characteristic of 11 % and chronic dysfunction was characteristic of 22 %. They did not find any evidence of the delayed dysfunctioning or relapsing trajectories though in the latter case this may have been due to the short interval length which did not account for possible variations between waves. However, following the 2000 Hat Yai flooding in Thailand, Assanangkornchai et al. (2007) did find some evidence of an anniversary effect³

³ An increase in the number of symptoms on the anniversary of the flood.

though the data were not disaggregated and therefore individual trajectories cannot be ascertained (this was not the purpose of the study).

On the basis of other cross-sectional studies we may posit two further trajectories, namely *suicide* which is limited to a small section of affected populations (Crabtree 2012), and, more positively, the possibility of *Post-Traumatic Growth* (Tedeschi and Calhoun 2004). These various trajectories are summed up in a highly stylized version presented in Fig. 1.

It is important to note that the disaster in this perspective is seen as the one and only stressor which is the cause of the subsequent trajectory.

3 What Can We Learn from the People of Rajni?

On any measure, Bihar is one of the poorest areas of the world. It has a multi-dimensional poverty rate of approximately 81 % which is similar to many Sub-Saharan African countries (UNDP 2010), and it will miss many of the MDG targets (India Statistics Division, 2011). Rajni is a fairly typical village of Madhepura district, one of the poorest regions in Bihar and one of the areas worst hit by the 2008 Kosi River flood which affected 2.5 to 3 million people (UNDP 2009). It has approximately 11,500 inhabitants and a Sex Ratio of 916 females per 1,000 males. Roughly 4,000 of its 5,800 workforce are agricultural labourers⁴ and a further 1,300 are cultivators.⁵ About 31.5 % of the villagers belong to Scheduled Castes. Approximately 28 % of the villagers were literate (according to the 2001 Indian census⁶), the average literacy rate for Bihar being 63.8 %—the lowest in India. Although the immediate cause of the 2008 flood was the neglect of maintenance work on the embankment given more extreme monsoon rains, and glacial melt due to climate change it is not implausible that such flooding will occur again (Kale 2008) making Disaster Risk Reduction of even greater importance to the state.

3.1 Methodology

The main aim of the fieldwork was to determine the psychosocial consequences of the flooding and how and why they changed over time—up to 18 months post onset. Given the lack of knowledge concerning flooding and psychosocial well-being in developing countries (IPCC 2007), qualitative interviews were undertaken to generate new information. These were to be supported by the use of the General Health Questionnaire 12 (GHQ-12) a screening test for disorders, however its use was limited by the fact that the official translation of question 12, concerning happiness, was literal and failed to capture the meaning of the original. Hence only information from the first 11 questions could be used. These suffice to establish some symptoms of depression.

The qualitative data was initially gained through the electronic media—newspapers, the Bihar Government's home page, YouTube and, above all, the India Water Portal which provided almost daily reports and links to other sources. Subsequently, focus group interviews, semi-structured interviews with individuals and unstructured conversations

⁴ Defined as “A person who works on another person's land for wages in money or kind or share” (Indian Census).

⁵ Defined as a person “engaged in cultivation of land owned or held from Government or held from private persons or institutions for payment in money, kind or share” (Indian Census).

⁶ Rajni was not included in the 2011 census.

were held in Bihar. A total of five focus group interviews were held in different geographical areas, and therefore potentially capturing differences in exposure, which is one of the strongest predictors of mental health outcomes following floods (Crabtree 2012; Norris et al. 2002a). A separate focus group interview for women from all geographical areas. Meetings lasted for approximately half a day.

All interviewees in the village were asked questions relating to PTSD. Importantly, DSM-IV introduced a clinical significance criterion (functional significance) to avoid the false positive problem—someone being diagnosed with a disorder when they do not have it (Spitzer and Wakefield 1999). Thus in addition to lists of symptoms for each disorder a person should show “clinically significant distress or impairment in social, occupational or other areas of functioning” to be classified as having that disorder. As researchers often do not have clinical experience, it is impossible for them to determine clinical significance, and thus the vast majority of epidemiological studies concerning the psychological consequences of flooding employ screening tests which are only indicative of the presence of a disorder. Additionally, the DSM IV does not clearly define the notion of functional significance (Spitzer and Wakefield 1999). The issue was approached in this study by asking the focus group members, the traditional healer, the quack⁷ and the health workers how many people they considered were suffering from mental disorders and not ‘functioning’.

Semi-structured individual interviews were undertaken with the former Mukhia (village head at the time of the flood), the traditional healer, a quack, and two health workers. Further semi-structured interviews (two men, two women) were held permitting a more in-depth understanding of people’s emotions and how they changed over time. Finally, semi-structured interviews were made with three doctors and the hospital administrator at the nearest hospital at Murliganj. All interviewees had life threatening experiences during the flood.

Interviews were not always static. We inspected lost land, stunted crops and dried up fruit trees due to silting. The silt carried by the Kosi River had a devastating impact on livelihood loss throughout the flooded region (UNDP 2009). We also visited the site of one of the camps for displaced persons during the floods. Often this led to further conversations with people who happened to be there, thus adding to and triangulating findings.

Bihar Voluntary Health Association (BVHA) provided me with unpublished internal reports. Together with the United Nations Family Planning Association, BVHA provided 5,000 adolescent girls and women with psychosocial counseling throughout the flooded area, including Madhepura district. It is not known whether or not they worked directly with people from Rajni, but their accounts tally with my findings and add elaborate the limited data I have concerning women and adolescent girls. Being a foreign male⁸ was a double barrier to me interviewing females and I also did not interview children.

The research was stopped as there were armed gangs in the area. Consequently, two small minority groups, Muslims and a scheduled tribe were not included in the study. These groups account for a total of 1.6 % of the village population. Cultural differences are certainly an avenue for further research.

⁷ A quack is “one who practices a form of medicinal system without qualification, training and registration from the appropriate council or authority” (Gupta, 2010:795). Gupta estimates that there are 1.5 million quacks working in India who will have had little medical training.

⁸ My translator, a senior researcher with previous field experience in Bihar, provided valuable insights into how interviewees were positioning themselves, what was likely to be exaggerated, and the political and cultural situation in Bihar.

3.2 Flood Phases and Stressors

According to the villagers, the flood can be divided into four overlapping phases which vary from individual to individual or household to household, namely: (1) Pre-flood, (2) Flood onset, (3) Time away and (4) Return to a different everyday life and future. Unfortunately there was no pre-flood study of mental health in the village (or Bihar as a whole). Two people were described as having mental health problems pre-flood and were deemed by participants in the focus groups and other key informants to be non-functioning post-flood. This is in line with the findings of epidemiological studies that show that pre-PTE mental health problems are predictive of post-PTE problems (Crabtree 2012).

3.3 Flood Arrival and Chaos

The Kosi River breached its embankment on 18th August 2008, although villagers disagreed about when the flood arrived (the morning of 21st or 22nd August). Some people were given a warning by relatives as early as 19th August but they did not react as they dismissed the warnings as “the usual flooding”. No-one in the village had experienced a flood of this extent before. It is probable that people’s livelihood loss could have been significantly reduced had the warning been understood. To what extent this and a quicker response by other actors would have reduced the negative psychosocial consequences is unknown, but it is safe to assume that better communication could have at least *reduced* the threat to life and livelihood loss (cattle could have been saved), which were identified by the villagers as the most important problems (on warnings see Parker et al. 2007).

The immediate response to flood onset was to act, and to give the flood meaning. Some people started to build makeshift dams which later led to guilt for having made the wrong decision. Others sang songs to the Goddess Kosi who they thought was angry with them for their evil deeds (this is not fatalism; the villagers saw themselves as the cause of the flooding)⁹. The traditional healer repeated all of his *sabri mantras*.¹⁰ Others tried to save cattle. As one man said “It was too pathetic and too horrible to describe”. By the end of the morning, the entire village was surrounded by water. Most people (including children and old people) left the village wading for 4–5 km through 1 meter deep water. Many had only the clothes that they were wearing. One man, who had a weak heart, died of a heart attack and another man was swept away by the floods (had the warning been understood, it is possible that both fatalities would have been prevented).

Everyone in the village felt their life threatened and on this measure exposure was the same throughout the village and was thus not a predictive factor. All met Criterion A for PTSD as established in the fourth version of the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM IV), namely that.

The person has been exposed to a traumatic event in which both of the following have been present:

1. The person has experienced, witnessed, or been confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of oneself or others.

⁹ For the legends about Goddess Kosi see Mishra <http://www.himalmag.com/component/content/article/468-The-legends-of-Kosi.html>

¹⁰ A type of tantric mantra used for healing often using local languages.

2. The person's response involved intense fear, helplessness, or horror. Note: in children, it may be expressed instead by disorganized or agitated behavior.

Flood onset was designated as the worst time by the villagers in all interviews. In the focus group discussions, people were asked questions concerning the major criteria for PTSD namely intrusive recollection (B), avoidance/numbing (C), hyper-arousal (D), had had these symptoms for over 1 month (E) and functional significance (F). According to the focus group interviews many people had several of these symptoms in particular nightmares, some avoided reminders such as escape routes, while others were happy to show me where they were during the flood. A few said they were hyper-aware during the monsoon season though this had decreased because the embankment had been rebuilt. Although re-experiencing a disaster is common, few studies ask what specifically people re-experience and why. In Rajni nightmares predominantly, but not exclusively, concerned the loss of cattle rather than the direct threat to villagers' lives.¹¹ Cows are clearly expensive and they play a central role in the villagers' lives and livelihoods. Cow dung is used for fires and fuel for cooking, building houses and also putting on the fields as manure. Furthermore, there was a cultural aspect to their nightmares. The villagers are Kabir panthis.¹² For Kabir panthis, purity involves *ahimsa*, the avoidance of violence, hence they are vegetarian, and thus cow's milk plays a central role in their diet. Thus, intrusive recollection (PTSD criterion B) related more to their culturally defined livelihoods and long term well-being than it did to the immediate threat to their lives from drowning which is the emphasis of PTSD criterion A.

Perhaps the most important feature of the initial phase was the breakdown of cultural norms and caste distinctions. Everyone helped everyone else and shared what food there was. This increased social cohesion within the village may well have been crucial for mitigating negative mental health outcomes. Several epidemiological studies have shown that social support can reduce the risk of developing mental disorders (Norris et al. 2005; Feng et al. 2007; Partick and Patrick 1981; Suar et al. 2002). This explanation was also offered by the people of Rajni. For example, one might expect suicide rates to increase after such devastation and loss of livelihood. However, according to the doctors at Murliganj hospital, suicide rates in the area did not change as a consequence of the flood, and there have been no cases in Rajni despite the devastation and loss of livelihoods. The explanation offered by the villagers was that there was a strong sense of togetherness as people within the village helped each other and there was a sense of common purpose¹³ (see also Neria et al. (2009)).

3.4 Time Away

Throughout the flood affected area, 15.6 % stayed in their villages, 33.9 % in government camps, 3.8 % in NGO camps, 18.9 % stayed with relatives or friends and a further 24.1 % made their own other arrangements (UNDP 2009:14). Villagers from Rajni also went to a variety of places, those who could went to stay with relatives and friends, most went to camps, and some moved from one place to another. A few stayed in the village throughout the period to look after cattle and prevent theft (safeguarding their livelihoods).

¹¹ The loss of cattle was not just due to flood onset. Cattle also died later from drinking contaminated water.

¹² Followers of Saint Kabir, one of the leading figures in the Bhakti movement (see Kabir 2008).

¹³ Opinions differed as to how together the villagers still were 18 months later, whilst some villagers maintained that old divisions were gone as now they were all poor, others argued that divisions were reappearing. Nonetheless, it seems plausible that social cohesion has played a strong mitigating role.

According to the focus group interviews, several people found their lives threatened whilst they were in the camps (PTSD criterion A). At one camp on an embankment, the flood water rose to almost the top of the embankment, before it broke through a roadway nearby and subsided. People also felt threatened by cobras and scorpions which searched for the same high ground as the villagers. These were additional stressors.

Life in the camps varied, some villagers reported being treated equally in the camps; others mentioned fighting between members of different villages. Still others complained about corruption in the distribution of relief materials and getting less food than those distributing the food who were saving it for themselves. Some suggested that the local mafia was involved in the corruption, but it has not been possible to cross-check this. None of the Dalit villagers said they were discriminated against though Dalits were elsewhere (see Dalit Watch 2008). One Dalit woman talked of her shame and loss of dignity. When there was no food, no water and no-one to help their status “was even worse than beggars”. At the start of their time in the camps, the women expressed anxiety, they described themselves as being in a state of “numbness” and they were “indecisive and helpless”, not knowing what to do. Others said that their “senses were not working” and they were in grief. All the time they were worried about the loss of cattle and household belongings.

The benefits of psychosocial interventions are hotly disputed. They have been criticized for not being culture related and not being relevant when people are rebuilding their lives (Summerfield 2005). They are a new dimension to disaster management in Bihar (BVHA 2010). A Tata Institute for Social Sciences Report released in September (Jha and Raghavan 2008) drew attention to the need for psychosocial interventions and complained about the lack of response to people’s psychosocial needs at that time. Many of the villagers in Rajni received psychosocial help when they were in the camps. This included singing songs to Goddess Kosi, and yoga lessons by one of India’s most famous yoga gurus Baba Ramdev who came by fleetingly and, later, his followers (see also Telles et al. 2010 on the positive effects of yoga and psychosocial interventions following the Kosi flood). One man said he gave counseling, and some villagers received counseling. All these approaches were seen as positive by the villagers. Those who did not receive psychosocial help said that they would have liked to have had it and, 18 months post-onset, those who received it said they would have liked to continue receiving it, suggesting the need for long term interventions.

3.5 Return, Livelihood Loss and the Future

Satellite data suggests that 2,516 km² of agricultural land was lost in all (Singh et al. 2011). 75 % of the major *kharif* season (autumn harvest) crop (paddy) was lost, 37 % of houses were either completely or severely damaged and a further 40 % were partially damaged, there were substantial food grain losses, and two thirds of those interviewed by the UNDP said that they had lost 50 % of their income. Government support was the main coping mechanism as people had few savings and borrowing was expensive. There was an estimated 390 Crore¹⁴ Rs loss of livestock. There was also major infrastructure loss throughout the region (UNDP 2009).

Rajni villagers felt their lives threatened on return to the village because of livelihood loss, food shortages, lack of purchasing power and health threats (see also UNDP 2009). The village had only two *pucca* houses; approximately 60 % of the *kutchha* houses had collapsed. An estimated 30 % of the land had been lost due to silting and waterlogging and

¹⁴ 1 Crore equals 10 million (approximately \$182,000,000).

the trees had dried up. The silt from the river had stunted the growth of crops and new pests including rats had arrived. Most cattle had been lost. Household goods and farming equipment had been lost or destroyed. Livelihood loss, rather than the initial trauma, became the dominant theme. In fact some villagers *still* felt that their lives were threatened 18 months post flood onset.

The Bihar government had promised three rehabilitation packages to each flood victim. They received the first package worth Rs 2,250 (approx. \$40) plus 100 kg food grain and a second package of Rs 2,090 but with no grain. The third package never came. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) entitles rural households to at least one hundred days work per household per annum. However, the villagers reported that they were cheated by being paid for 6 days work when they had worked for 18 days. As the workers were illiterate they could not control what was being written in the job cards issued to the laboring families under MGNREGA (on MGNREGA and corruption in Bihar see Witsoe 2012). Microcredit loans from commercial banks were problematic as bribes had to be paid to get them.

Even before the floods, seasonal migration had been a major livelihood strategy and typical jobs included agricultural labour, construction, rickshaw pulling and hawking. Migration increased after the flood (UNDP 2009). In Rajni it was most commonly Dalit males that migrated leaving their wives feeling lonely, afraid and insecure and increasing their burden of work. Other research suggests that this was a general pattern throughout the flooded area (UNDP 2009; for a discussion of migration trends in Bihar see Kumar 2012).

Ill health was also a problem, villagers mentioned several diseases—diarrhea, colds, kalazar (a potentially fatal parasite carried by sandflies), malaria, fever. Four children had died since the flood from diseases the villagers attributed to the flood. In Rajni the greatest number of deaths occurred ‘after’ the flood as the flood water was still present in the village for a long time. Water borne diseases were the most common causes of death throughout the flooded area (UNDP 2009).

Eighteen months post flood many people showed symptoms of depression, as indicated by the 11 questions of the GHQ12 questionnaire that could be used. Villagers said they were unable to make decisions or take initiatives, had difficulty sleeping, felt depressed and unhappy, and were unable to concentrate on things. Some took comfort in the prediction that the world will end in December 2012. Again, these symptoms were not clinically significant. These symptoms related to both actual livelihood loss and their hopes for the future. However, it is important to realize that lack of initiative was not due to an *underlying lack of will* to do something, on the contrary the question often put to me was: What can we do? The problem was that they saw no way out of their situation. They would like to be active, but they could not be.

3.6 Gender Differences

One of the most consistent finding in disasters and mental health is that women are more likely to have mental health problems than men post disaster (Norris et al. 2001; for an exception see Amstadter et al. 2009). However, it is far from clear as to why this is so (Kimberling et al. 2009). Reviewing the epidemiological literature Bonanno et al. (2010) maintain that women’s subjective experience of disasters is the most important factor. Other factors have also been suggested: the caring role of women, responsibility for households, experiencing violence and lower perceived social support (Kimberling et al. 2009). It is an area for further research.

Focus group interviews in Rajni also suggested that in general, women were thought to be more badly affected by the floods than men. This is supported by the only epidemiological study following the Kosi floods (Telles et al. 2009). The reason given by the male interviewees was that women are more 'sensitive' than men. However, women pointed to their dependency on men. The evidence from Bihar suggests that women are subject to different stressors. BVHA who worked on psychosocial interventions during the floods state:

The women and adolescent girls... were not used to mingle and lead a life in open public place. All the privacy, comforts of their home were vanished rather they faced many sufferings which left a very long lasting negative impact. BVHA (2010)

Similarly, the UNDP observed:

In the relief camps, women and adolescent girls faced very complicated situations in terms of personal hygiene. The problem was more acute during menstruation, as no cloth or sanitary napkins were available. "We had hardly any space or water to clean ourselves. At the same time, we were short of clothes to wear. We had to wrap our body with the same wet clothes after we showered, which caused skin diseases and irritation". Women's Group, Kusha village, Supaul district quoted in UNDP (2009:22)

Issues relating to menstruation are clearly not ones that Hindu women would discuss with a male. But the examples suggest that women have additional sources of stress which have root causes in the traditional Hindu family role and the mobility of women whose place is essentially in the home where they feel safe (on root causes see Wisner et al. 2004). This contrasts with the conditions in relief camps, which were not untypical for developing countries and exemplify the impacts of poverty on psychosocial outcomes.

Research by the International Centre for Integrated Mountain Development (ICIMOD) in the Saharsa district confirms these problems and makes the point that they may be particularly acute for Muslim women as it is considered shameful if women defecate in open areas. The Report states that "Self-imposed starvation to avoid having to defecate is a common occurrence in flood-affected areas" (ICIMOD 2009:28). Two female researchers, Rashid and Michaud (2000), had similar findings among female adolescents of both Hindu and Muslim communities following the 1998 floods in Bangladesh.

During unstructured conversations, I had heard rumors of rape and abuse that had taken place either during the evacuation or in the camps. This was a taboo subject, some of the men confirmed that sexual abuse took place (though not necessarily of the women of Rajni), but as one man said, "I can confirm that it happened, but I refuse to tell you anything more." Thereafter he left. According to the BVHA report the problem was not uncommon "During the rescued work many women faced violence and misbehavior which added to their sorrow and grief" (BVHA 2010). However, "many" here is not specified. There are also numerous reports of the trafficking of women and children (Jha and Raghavan 2008), but this was not discussed in Rajni.

Overall, this suggests that the explanation for women's 'sensitivity' is to be found in socio-cultural factors and vulnerability rather than 'subjective experience'. More research is need in this area, and in the context of Bihar, being a white male is a limitation.

3.7 Longer Term Psychosocial Coping

As stated above, the DSM IV non-functioning criteria are unclear. The issue was approached by asking the focus group members, the traditional healer, the quack and the

health workers how many people they considered were suffering from mental disorders and not ‘functioning’. All agreed that two men were. One was the son of one of the health workers; he had a nervous disposition prior to the flood and had been almost unable to sleep since. He had seen a psychiatrist and been given sleeping tablets which had helped. The other man was said to be mentally weak and had “lost everything”. In neither case was a diagnosis given. As stated above, both cases are in line with research which shows that those who have a history of mental disorders are particularly vulnerable to trauma (Kar et al. 2002, 2004).

The village quack reported that, since returning to the village, he had treated four people who he described as “senseless because of fear”. They had very high palpitations and their whole bodies were shaking. He described them as ‘depressed’ for which he gave them vitamin B which the quack said had helped. The symptoms suggest panic attacks on DSM-IV criteria. The traditional healer’s healing methods include people rubbing mustard oil on themselves and saying *sabri mantras*. This he says sometimes helps and sometimes not. He did not report any significant difference since the flood.

Eighteen months post-flood onset, it was clear that the vast majority of the villagers were not actively seeking any “professional” help (including the quack and traditional healer). Of the 11,500 villagers, less than 1 % had sought help of this kind. Most villagers coped by themselves and types of coping reflected gender differences.

According to BVHA (2010) there are restrictions on women as they do not have the possibility to relieve their stress:

While male generally eke out their own way to release their mental stress by either associating in community activities, recreations or taking drugs etc. but women and adolescent girls have no social outlets. BVHA (2010)

The evidence from Rajni only partially confirms this. Whilst male interviewees in Rajni pointed out that the normal religious and social festivals which included drinking and dancing helped them to relieve their stress, there was no significant increase in alcohol or tobacco use as was confirmed in interviews with the health workers. Drug use in the village was limited to two members both of whom had been users before the flood. Drugs were not used to release stress as suggested by BVHA. The women’s outlet was social as they talked, and continue to talk, to each other about their experiences of the flood.

There is an important line of thought found within the literature concerning the “tyranny of Western expertise”. For example, Wessells quoted in Marsella states:

Local communities have specific methods and tools for healing such as rituals, ceremonies, and practices of remembrance. Since they are grounded in the beliefs, values, and the traditions of the local culture, they are both culturally appropriate and more sustainable than methods brought in from outside. Wessells quoted in Marsella (2010:18)

This does not appear to be the case in Rajni. Traditions played an important role in giving meaning to the flood and singing songs to Goddess Kosi were part of psychosocial interventions. However, the traditional healer did not experience an increase in the number of villagers who visited him. Furthermore, traditional gender divisions placed limitations on possible sources of healing. Other interventions were not ‘local’. Psychiatric help, the quack and even yoga was not previously practiced in the village (the fact that these traditions were Indian does not make them local). Villagers expressed a desire for help with their psychosocial problems, and felt that their present options were inadequate.

4 Rajni, Resilience and the Implications for DRR

To recapitulate, Bonanno conceives resilience as a trajectory of little change following a PTE (what Norris et al. call resistance). The evidence from Rajni above suggests this needs rethinking. Firstly, Bonanno's conception of a PTE is too monolithic. The flood was not just one stressor but several. In the first phase people felt their lives threatened at flood onset (leading to symptoms of PTSD and in four known cases symptoms of panic attacks). In the second phase, some found their lives threatened whilst in the camps due to the rising water and poisonous animals. Other stressors included (possibly) rape, shame, lack of privacy, humiliation and corruption (see also UNDP 2009; Dalit Watch 2008). On return villagers also found their lives threatened by the loss of livelihoods (leading to symptoms of depression and playing an important role in nightmares), which is not surprising given the fact they are cultivators and agricultural labourers and amongst the poorest in the world. This suggests that the idea of individuals following just one psychosocial trajectory is misleading. Different stressors might suggest different trajectories which may intertwine.

Secondly, if resilience is measured in terms of one or fewer symptoms of one type of disorder (PTSD) and this is all that is investigated, it rules out the possibility of people not being resilient in terms of other disorders. Relatedly, a person may have just one symptom of depression and be classified as resilient on that scale and one symptom of PTSD and be resilient on that scale but in total they would not be resilient. Although Bonanno is clearly aware of the variety of mental health disorders that follow a PTE and the possibility of comorbidity (Bonanno et al. 2010), the data Bonanno offers to support his case do not account for these possibilities. The interviews undertaken in Rajni show that although a small minority of people were dysfunctional (fitting in with Bonanno's claim), most people had symptoms of both PTSD and depression although they are not clinically significant. Thus the evidence from Rajni also draws into question Bonanno's claim that the majority of people are resilient.

Bonanno's operational definition of resilience as one PTSD symptom or less has the advantage of allowing for the existence of non-PTE related symptoms (Bonanno et al. 2010). The problem is that people who do have just one PTE related symptom are considered resilient and therefore not in need of help. However, the Rajni case shows that people who have just one symptom of PTSD (nightmares) found them a significant problem and would like help dealing with them. This contrasts strongly with Bonanno's claim that the majority of people do not need help.

The question is: Who decides what resilience is? It would be better to define resilience in a bottom up fashion and ask people what problems they feel they need help with, rather than define resilience in a top down fashion, as Bonanno does, and maintain that those who have one symptom of PTSD or less are by fiat resilient.

What are the implications for DRR? Firstly, prevention is better than cure. The flooding was a result of human negligence. Had the embankment not broken, the problems would not have arisen. Similarly, significantly reducing CO₂ emissions will reduce the likelihood of future flooding (IPCC 2007). Furthermore, had the warnings about the Kosi Flood been understood, it is plausible that the negative psychosocial consequences of the flood would have been fewer.

Some of the problems are clearly linked to the conditions in the camps such as rising water, poisonous animals, shame, lack of privacy, and humiliation. Whilst these issues are not taken up in much of the epidemiological literature they are well-known by NGOs working in disaster situations (e.g. IFRC 2009), and it is clear that such problems can be reduced by improving the camp situation.

Bonanno et al. (2010) suggest that in the early phases psychological first aid (PFA) as practiced, among others, by the Red Cross appears to be beneficial though, partially because of the difficulty of making any assessments in disaster chaos, systematic studies of its benefits have not been undertaken. The evidence from Rajni suggests that culturally specific psychosocial interventions were well received and were still desired 18 months post-flood suggesting that such interventions should be long term.

Beyond that, Bonanno et al. (2010) recommended the use of screening tests to establish those people at risk of having severe trauma symptoms (the *chronic* and *delayed* trajectories) and that resources should be aimed at helping at risk people. Again the evidence from Rajni supports the view that interventions are needed. Importantly, Bonanno et al. (2010) point out that different methods might be preferable for children compared with adults (children were not included in the Rajni study). Furthermore they point to the importance of community interventions which fit in with long term, culturally specific, community based psychosocial interventions which the villagers of Rajni would like.

In addition, we should also note practicalities. Estimates suggest 2.5–3 million people were affected by the floods. BVHA offered assistance to 5,000 adolescent girls and women. According the mental health NGO BasicNeeds BasicRights, there are no mental health hospitals, state psychiatrists or outreach programs in Bihar (www.basicneedsorg.org). The doctors in Murliganj knew of two full time and one semi-retired private psychiatrists in Bihar. This clearly points to a long term need for capacity building. But in the short run community based interventions seem to be the only practical possibility.

These interventions are important. However, they will not be sufficient to deal with the problems resulting from livelihood loss. Reducing the number of depressive symptoms will involve improving people's livelihoods, the villagers' top priority. This requires deep, radical, socio-cultural changes—land reform, reducing women's dependency, ending caste discrimination, abolishing corruption, improving health and education. The problems relating to migration will only disappear when jobs local are available. Enforcing legal rights is important in connection with rape. These changes go far beyond the kinds of interventions Bonanno et al. (2010) consider. What then are the implications for the Post-2015 agenda?

5 The Post-2015 Agenda: MDGs, SDGs, Disaster Risk Reduction and Mental Health

MDG 7 concerns the ensuring of environmental sustainability; its first Target (7A) is the integration of “the principles of sustainable development into country policies and programs and reverse the loss of environmental resources”. As Fukuda-Parr (2008) has shown, while environmental sustainability has been a core priority of donor programs, it has not been a developing country priority. Her review of 22 Poverty Reduction Strategy Papers revealed that only six countries saw water and sanitation as a priority area, and natural resources protection and conservation was only a core objective for four countries. The environment more generally was not a major priority.

This prioritization may change as a result of Rio +20 and the development of SDGs. The outcome document of Rio +20, *The Future We Want*, again calls for mainstreaming sustainability and supporting the MDGs. Furthermore, the importance of DRR is emphasized (UN 2012b). The likely cohesion between the two sets of goals (MDGs and SDGs) is supported by the work being undertaken by the UN system task team on the post-2015 UN development agenda. A thematic think piece on disaster, risk and resilience (UN 2012a) acknowledges that DRR was given insufficient attention in the present MDGs. It points to

Table 1 Possible goal, targets and indicators on disaster risk and resilience

Goal	Targets	Indicators
To reduce risk and build resilience to disasters for all	<i>Target 1:</i> Nations to halve disaster mortality by 2030	<i>Indicator 1.1:</i> Crude mortality rate (disaster deaths by 1,000 inhabitants)
	<i>Target 2:</i> Nations to halve disaster related economic loss by 2030	<i>Indicator 2.1:</i> Direct economic losses as percentage of GDP
	<i>Target 3:</i> All nations to develop a national disaster risk reduction and resilience plan by 2020	<i>Indicator 3.1:</i> National disaster risk reduction plans adopted and referenced in national development plans

Source: UN (2012a:6)

the increasing human cost due, in part, to population increases and the economic cost of disasters over \$100 million per annum have been lost due to disasters during the last decade). Hurricane Ivan is estimated to have cost Grenada more than 200 % of its GDP, the 2010 earthquake in Haiti is estimated to have cost 120 % of its GDP and countries such as Bangladesh and Mozambique lose 3–5 % of their GDPs every 5–10 years as a result of disasters.

When the UN task team turns to establishing future DRR goals a number of constraints apply which are also likely to apply to SDGs as it would be surprising to see two different goals and sets of targets. Goals and targets need to be “credible” which is translated into “the measurement and estimation of either mortality or economic loss suffered as a result of impact of natural hazards on vulnerable populations and assets” (2012a:9). This would be supplemented by targets and indicators relating to national DRR and resilience plans as summed up in Table 1 below.

How does the previous discussion concerning the psychosocial consequences of flooding relate to this present state of play as reflected in Table 1? Firstly, it is clear that a wide range of specific mental health indicators, although desirable, would be too sophisticated for such a framework. Crude mortality rates would implicitly include suicides and deaths due to substance abuse. But in relation to suicide this might be misleading as some evidence suggests that the suicide rate decreases after disasters due to increased social cohesion (Kessler et al. 2006). Too few measures would bias the picture.

Given the foregoing discussion, the obvious place for mental health within this framework would be its mainstreaming in disaster risk reduction and resilience plans. In turn these would have to be included in countries’ development policies. If the current mismatch between MDGs and country policies continues, then future MDGs and SDGs may be of questionable value (this mismatch may be positive if MDGs and SDGs do not reflect ‘local’ needs). Including mental health in national plans would be a step in the right direction.

6 Conclusion

This article has been an attempt to convey the situation of the villagers’ of Rajni following the 2008 Kosi River flooding. Flooding is likely to increase with climate change. The evidence from Rajni does not suggest that people will ‘bounce back’ following a disaster, in the words of one of the doctors in Murliganj, who has a relatively good livelihood, “How can I tell you what I feel, I’m not a writer.” The majority of villagers still had symptoms, primarily of PTSD and depression 18 months post onset. This questions

Bonanno's claim that the majority of people after disasters are resilient meaning that they have one or fewer symptoms of a disorder. The research presented here suggests that Bonanno's arbitrary definition of resilience would rule out the possibility of some people with just one symptom getting help even though they may desire it. The findings point to the variety of stressors people face during disasters and the different consequences the individual stressors may have. The results also suggest that different genders face different stressors which may play a role in explaining women's 'sensitivity' to the flood. Villagers were able to draw on the help of a quack, a traditional healer and, in one case, a psychiatrist. This was rarely done. Instead people coped on their 'own'. However, they expressed a wish for long term psychosocial interventions.

Disaster Risk Reduction is on the agenda for both post-2015 MDGs and SDGs for which one would expect one common goal. Epidemiological studies and the evidence presented here argue for mental health issues being mainstreamed in future DRR national plans, which might constitute one of the indicators of a DRR goal. However, the villagers' main priority was improving livelihoods which would require deep rooted changes in the social-cultural situation in Bihar such considerations are not included in Bonanno's approach to resilience or in DRR plans. To concur with Wisner et al.:

We are...concerned about what happens even when it is admitted that social and economic factors are the most crucial. There is often a reluctance to deal with such factors because it is politically expedient (i.e. less difficult for those in power) to address the technical factors that deal with natural hazards. Changing social and economic factors usually means altering the way power operates in society. Radical policies are often required, many facing powerful political opposition. (Wisner et al.; 2004:7)

Acknowledgments I would like to thank Terry Cannon, two anonymous referees and my co-editors for many interesting comments and helpful suggestions. The responsibility for the final version is, of course, mine.

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