

Title: Integrated action planning for biodiversity conservation and sustainable use of highland aquatic resources: evaluating outcomes for the Beijiang River, China

Authors: SW Bunting^{1a*}, S Luo², K Cai², N Kundu³, S Lund⁴, R Mishra⁵, D Ray⁵, KG Smith⁶, F Sugden⁷

Affiliations:

¹Bunting Aquaculture, Agriculture and Aquatic Resources Conservation Services, Glemsford, UK; ^a Research was conducted at the School of Biological Sciences, University of Essex, Colchester, UK; ²College of Agriculture, South China Agricultural University, Guangzhou, China; ³Institute of Environmental Studies and Wetland Management, Government of West Bengal, Kolkata, India; ⁴Department of Environmental, Social and Spatial Change, Roskilde University, Roskilde, Denmark; ⁵CDHI, Composite Complex phase II, Jalpaiguri, 735 101, West Bengal, India; ⁶Freshwater Biodiversity Unit, Global Species Programme, International Union for Conservation of Nature, 219c Huntingdon Road, Cambridge, UK; ⁷International Water Management Institute, Kathmandu, Nepal; *Corresponding author.

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Abstract

The need for enhanced environmental planning and management for highland aquatic resources is described and rationale for integrated action planning presented. Past action planning initiatives for biodiversity conservation and wetland management are reviewed. A reflective account is given of integrated action planning from five sites in China, India and Vietnam. Eight planning phases are described encompassing: stakeholder assessment and partner selection; rapport building and agreement on collaboration; integrated biodiversity, ecosystem services, livelihoods and policy assessment; problem analysis and target setting; strategic planning; planning and organisation of activities; coordinated implementation and monitoring; evaluation and revised target setting. The scope and targeting of actions are evaluated using the Driving forces, Pressures, State, Impacts and Responses framework and compatibility with biodiversity conservation and socio-economic development objectives are assessed. Criteria to evaluate the quality of planning processes are proposed. Principles

for integrated action planning elaborated here should enable stakeholders to formulate plans to reconcile biodiversity conservation with the wise use of wetlands.

Keywords: biodiversity conservation; highland aquatic resources; integrated action planning; DPSIR framework; Beijiang River, China

1. Introduction

Highland aquatic ecosystems in Asia constitute a globally important repository for biodiversity (Allan, Molur, and Daniel 2010; Allan, Smith, and Darwall 2012), which in turn sustains the stocks and flows of ecosystem services that are essential for food and water security, human well-being and economic activity in highly populated river basins downstream (Mace, Norris, and Fitter 2012). Anthropogenic activities constitute a serious threat to biodiversity globally (Hoffman et al. 2010), and deforestation, land-use change, agricultural intensification, impoundment and diversion of water for irrigation and hydroelectric power generation are having a profound impact on highland areas (Dudgeon 2011). Biodiversity loss and ecosystem degradation are having serious detrimental impacts on human well-being and economies (Russi et al. 2013). Compounding these problems, highland ecosystems and communities in South Asia are particularly vulnerable to worsening climate change impacts (Conway and Waage 2010).

Responding to this global crisis, the Parties to the Convention on Biological Diversity of the United Nations agreed the Strategic Plan for Biodiversity, including 20 targets (the Aichi Targets) to be achieved by 2020 (CBD 2013). Two targets in particular demand improvements related to planning and participation and specify that “biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes” (Target 2)¹ and that implementation of the Convention must guarantee the “full and effective participation of indigenous and local communities, at all relevant levels” (Target 18).²

¹Target 2 specifies that “By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.”

² Target 18 stipulates that “By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of

Integration of biodiversity values within wetland assessments and management planning was advocated by Springate-Baginsky, Allen, and Darwall (2009, 8) and it was noted that “to be effective, equitable and sustainable in practice, wetland management responses must be informed by an understanding of all of these [biological, ecological and socio-economic] elements, including their mutual causality and interconnectivity”. Participation has been advocated previously for sustainable agricultural development (Pretty 1995), small-scale fisheries governance (Campbell and Townsley 1996), promoting urban agriculture (PAPUSSA 2006) and floodplain management (Lewins, Coupe, and Murray 2007). Participatory approaches have, however, been criticised for having the potential to facilitate illegitimate and/or unjustified exercise of power (Cooke and Khotari 2001) and often fail to meet the challenges of bringing together multiple stakeholders in a working relationship, and to structure social learning experiences (Mackenzie et al. 2012).

Integrated action planning is defined here as a process to achieve full and equitable participation of all concerned stakeholders to define, implement, monitor and revise mutually acceptable actions to reconcile biodiversity conservation with the wise use of aquatic resources in highland areas. The need for such an approach is exemplified in the case of the Beijiang River, Guangdong Province, China (Luo et al. 2012). The river has been highly modified with numerous dams constructed to generate hydroelectric power and divert water for irrigation. This results in the loss of habitats, notably aquatic plant communities, and disruption to migratory routes for globally threatened fish species. Damage to fish stocks and the modified river hydrology have impacted badly on fishing communities (Liu et al. 2010). Against this backdrop, the HighARCS project³ was conceived

biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.”

³ The Highland Aquatic Resources Conservation and Sustainable Use (HighARCS) project aimed to assess and conserve aquatic resources at five sites in Asia. Two sites were selected in Vietnam, one in the central region on the Dakrong River in Quang Tri Province and one in the northern highlands on the Son La hydroelectric power scheme reservoir in Son La Province. Two sites in India were located in the Buxa Tiger Reserve in northern West Bengal, bordering Bhutan and the other was in Uttarakhand encompassing the historic Nainital, Bhimtal and Naukuchiatal lakes. A single site in China was centred on Shaoguan City on the Beijiang River in the upper reaches of the Pearl River basin in Guangdong Province. These sites were selected as they were moderately elevated, ranging from 300-2,000 m above sea level, shared characteristics of highland environments (sloping topography, disruption prone communications, rivers affected by dam construction, deforestation and mining) and had resident communities dependent on the exploitation of aquatic resources.

to test whether integrated action planning, incorporating elements of the integrated wetland assessment approach advocated by Springate-Baginsky, Allen, and Darwall (2009), could facilitate full and equitable stakeholder participation and reconcile biodiversity conservation, livelihoods and policy objectives in this case and in similarly complex highland areas in Asia.

This paper presents a critical review of action planning for natural resource conservation and sustainable development. Drawing on interdisciplinary research findings from five sites across Asia, the rationale for a cyclical integrated action planning process consisting of eight phases is presented. Integrated assessment methods and participatory research tools appropriate for each phase are described, together with conditions and safeguards required for an efficient and equitable process. Outcomes of integrated action planning for the study site on the Beijiang River are reviewed and prospects and potential limitations for the widespread adoption of integrated action planning founded on universal principles discussed. Finally, drawing on the review of action planning initiatives and practical experiences, emergent principles are proposed to guide effective and efficient integrated action planning for aquatic resources conservation and sustainable use in similarly complex, dynamic and vulnerable highland areas in Asia.

2. Methods and methodology

Although widely cited and applied, there are no universally agreed methods or standards concerning action planning. Consequently, a review⁴ of action planning for biodiversity conservation and aquatic resources management was conducted to evaluate promising approaches with respect to the project aims. The review focused on activities that the project team had been directly involved with and published accounts from established conservation organisations. Planning processes covered ranged from a local-level initiative within one of the study sites to national and international schemes. Given the complex and challenging physical, social and institutional context of conserving and managing highland

⁴The preliminary review of action planning presented here is not definitive and it is important that promising planning approaches developed and devised locally are incorporated through future iterations.

aquatic resources, specific Strengths, Weaknesses, Opportunities and Threats (SWOT) associated with each action planning approach were evaluated.

Action planning was adopted within the HighARCS project as a mechanism to facilitate joint assessment and decision-making amongst stakeholders in the context of multidisciplinary research. Initially, three separate strands to action planning were envisaged focusing on biodiversity conservation, sustainable livelihoods and policy; however, potential problems of inefficiency and contradiction were noted. Consequently, principles of the integrated wetland assessment approach advocated by Springate-Baginsky, Allen, and Darwall (2009) were adopted in this study. Biodiversity, livelihoods (including gender and age considerations), economics and politics were considered jointly for particular wetlands by an interdisciplinary research team to enable a more complete valuation of the wetland resource; identify and address potential conflicts of interest; and ensure the assessment exercise was systematic and efficient. An integrated action planning procedure of seven steps was proposed to guide activities with stakeholders and assessments in the study sites.

Towards the end of the project, the interdisciplinary and international research team reviewed this in preparation for finalising the WRAP toolkit (Bunting et al. 2013). At this stage, it was agreed to refine the process to better reflect what had happened in practice as it would be desirable to follow such a schedule in subsequent planning initiatives to ensure effectiveness and efficiency. The review was mediated through weekly Skype meetings involving the WRAP toolkit compilers. A preliminary summary of the process was written and a schematic diagram produced, and these were reviewed and revised to arrive at a mutually agreed outline of the process.

The DPSIR (Driving forces, Pressures, State, Impacts and Responses) framework was used *post hoc* to evaluate the scope and targeting of actions included within integrated action plans (IAPs) developed for each site. The DPSIR model is a “conceptual framework for the description of the environmental problems and of their relationships with the socio-economic domain, in a policy meaningful way” (Maxim, Spangenberg, and O’Connor 2009, 12). Social and economic developments constitute the main Driving forces in the DPSIR model (Smeets and Weterings 1999), and according to Maxim, Spangenberg, and O’Connor

(2009, 14), Pressures can be considered the “anthropogenic factors inducing environmental change”. Considering the past application of the DPSIR framework, State had been used in reference to either natural systems (Bowen and Riley 2003; Giupponi and Vladimirova 2006) or natural and socio-economic systems (Rogers and Greenaway 2005). Classification and characterisation of Impacts can vary significantly depending upon the academic discipline (Maxim, Spangenberg, and O’Connor 2009, 15); these authors noted that “biosciences are typically concerned with genes, species and ecosystems, whereas social sciences are concerned with social and economic systems”. Responses were conceived as decisions and actions taken by policy-makers, or other stakeholders, to counter Driving forces and Pressures and restore or enhance the State of the system or build adaptive capacity to Impacts (Maxim, Spangenberg, and O’Connor 2009). To comprehensively assess the scope and targeting of IAPs, the DPSIR framework was applied from biodiversity conservation (Smith 2012), sustainable livelihoods (Bunting 2012a) and policy and institutional (Lund 2012) perspectives to test the usefulness of such a strategy. Within future initiatives, this approach could be incorporated within the integrated action planning process, enabling stakeholders to evaluate the scope and targeting of actions.

Having formulated IAPs, the consistency of proposed actions was assessed with regards to reconciling biodiversity conservation and socio-economic development objectives. The need for such a review phase was highlighted in “An Integrated Wetland Assessment Toolkit” (Springate-Baginski, Allen, and Darwall 2009). IAP components were tested initially for consistency with respect to dual aquatic biodiversity conservation and livelihoods enhancement objectives and listed as compatible or incompatible (Bunting, Smith, and Lund 2012). This process is particularly important when one considers the difficulties of ensuring equitable participation in action plan formulation, and can act as a safeguard to cross-check for vested interests amongst stakeholders or trade-offs which could disadvantage some groups whilst privileging others (Figure 1). Ideally, an interdisciplinary team should design and implement the assessment and then collaborate to ensure the outputs are coherent and integrated across disciplines and sectors.

As the IAPs formulated in the HighARCS project had emerged from assessments integrated across sectors and carried out by multidisciplinary and interdisciplinary teams, it was

expected that actions proposed would not pose an immediate threat to biodiversity or seek to promote unsustainable practices. It was anticipated, however, that some actions might present a degree of risk to aquatic biodiversity or demand certain safeguards to avoid adverse impacts on selected stakeholder groups, in particular, women and children and poor and marginal⁵ groups. Consequently, a more nuanced strategy was conceived to permit preliminary evaluation of the relative potential of actions for aquatic biodiversity conservation and promotion of sustainable livelihoods. A scale from compatible (+), to promising (++) to very promising (+++) was adopted, whilst potentially problematic or incompatible actions (-) were also highlighted. As the various sector-specific reviews had identified a different array of actions relevant to conservation (Smith 2012), livelihoods (Bunting 2012a) and policy (Lund 2012), the first step in the compatibility assessment was to compile a composite list of Responses.

The degree to which proposed actions addressed different points in the DPSIR cause-and-effect framework was assessed and rated on a scale from a single point (+), two points (++) or multiple points (+++); an absence of any relationship was also noted (-). Prospects for actions to promote social capital and avoid dependence on externalising technologies were rated as positive (+), good (++) and very good (+++) or potentially negative (-).

3. Results

Outcomes of the review of action planning experiences are presented below followed by the elaboration of the sequence of integrated action planning phases. Results of evaluating the IAPs with the DPSIR framework and consistency checking are then described.

[Figure 1]

3.1. Review of action planning experiences

Outcomes of assessing past experiences of action planning within the SWOT framework are summarised in Table 1. The Nature Conservancy (TNC) devised the concept of Conservation Action Planning (CAP) to address biodiversity conservation goals based on international

⁵ Marginal groups are defined here as those households that are geographically isolated, do not share the prevailing cultural belief and value systems, or who are poorly represented in decision-making processes.

targets and at locations demarcated through Major Habitat and Ecoregional Assessments. The CAP process was described and comprehensively reviewed in the 'Conservation Action Planning Handbook' (TNC 2007) with several areas identified to refine and strengthen the approach. The International Union for the Conservation of Nature (IUCN) published guidance on the production of species conservation strategies (SCS) (IUCN/SSC 2008). The SCS approach provides a strategic blueprint for saving a species (or group of species) across all or part of the species range, and is focused on stakeholder engagement and producing achievable actions on the ground. While the HighARCS project did not adopt the SCS approach fully, as it was working at a much smaller scale (individual wetland sites) and aimed to incorporate livelihoods assessments, it did benefit from the SCS strategic approach to action planning (stakeholder identification and development of a vision with goals and associated actions and monitoring). In addition, the HighARCS project adopted the SCS "status review" principles with the conservation assessment of species found at the sites through the application of the IUCN Red List Categories and Criteria (IUCN 2012).

[Table 1]

Conceived as a consensus building and planning approach to be carried out during closely facilitated joint stakeholder workshops, Participatory Action Plan Development (PAPD) was predicated on fostering mutual awareness of livelihoods dependent on a particular resource base and problems faced by other stakeholders (Lewins, Coupe, and Murray 2007). The PAPD process was developed in Bangladesh to facilitate stakeholder engagement within a large-scale natural resources management programme that had predefined objectives. A fixed sequence of planning activities was central to PAPD starting with a problem census across different stakeholder groups, then problem solving in separate groups and plenary sessions, followed by feasibility analysis and, finally, eliciting commitment to act and develop an implementation committee. Strong workshop facilitation was needed. At key stages, influential people, including local politicians and community leaders, were invited to attend the meeting, witness what was happening and, in the process, add gravitas to the planning. Consensual planning, upon which PAPD was based, highlights the inter-connectedness of resource users and opportunities for interventions that address the needs of several stakeholder groups (Bunting and Lewins 2006).

Considering the case of the 12,500 ha East Kolkata Wetlands (EKW) Ramsar site, West Bengal, India comprehensive and technocratic planning approaches were deemed to have limited prospects to address the needs of poor and vulnerable groups in such a dynamic land-water interface and peri-urban setting (Bunting and Lewins 2006). Water resources management planning for the EKW required specific modifications to the PAPD process to contend with the complicated institutional, physical and social setting. Both the context and objectives were different compared to when the PAPD processes had been used in Bangladesh. Periods for reflection and consolidation in the planning process were critical to allow representatives from political parties and producer associations the opportunity to meet and discuss emerging plans with their constituents, identify potential problems, elicit support for promising actions and establish a mandate to proceed.

Drawing on the past experience of participatory and local-level planning at the Buxa site, a summary of lessons learned was prepared (Mishra 2010). This highlighted the need to appreciate the knowledge and skills of communities and acknowledge ongoing planning within communities. Reflection on the process by the facilitators indicated that trust between the community and those contemplating action planning was essential and that participatory planning requires resources, time and effort to establish genuine relationships and mutual understanding. Trust and understanding are often tacit and, therefore, difficult to measure and assess. Trust is an essential prerequisite to building social capital (Pretty and Smith 2004) and following participatory action planning designed to support the Gram Unnayan Samittee: stakeholders formed farmers clubs; self-help groups were revitalised, and able to offer extended credit limits; the Village Education Committee became more effective (Mishra 2010). Heightened understanding was evident as the Panchayat (local level government agency) acknowledged that outcomes of the planning activity represented the needs and aspirations of the people, villagers were able to prioritise development needs through ranking of options in public meetings and then they grouped together to establish new institutions with shared objectives.

3.2. Elaboration of action planning phases

Considering prevailing environmental, social and institutional settings in highland areas in Asia, eight phases to integrated action planning were identified by the interdisciplinary and

international research team whilst reviewing the process as it had evolved in each site towards the end of the assessment. The process was conceived to facilitate the transition from research findings, to implementation of IAPs by communities, resource users and key stakeholders. The eight phases in the integrated action planning strategy are presented in Figure 1. Each phase is discussed separately below, including reflection on past initiatives and examples of approaches from the HighARCS project.

3.2.1. Phase 1: stakeholder assessment and partner selection

Accepting that stakeholders, by definition, should have the right to participate in joint assessment and decision-making regarding the formulation of plans and selection and implementation of management practices for highland aquatic resources, the first requirement is to agree upon and define system boundaries. Commonly, the initial focus may be on the wetland area, but threat-mapping and ecosystem services assessments highlighted the need for aquatic resources planning and management to comprehend and integrate linkages to the wider catchment (McIvor, Allen, and Darwall 2009). Knowledge of how management is influenced by (and can itself influence) processes in interlinked hydrological systems, whether natural or modified wetlands or areas classified as wetland agroecosystems is crucial (Finlayson et al. 2013). Administrative and geopolitical boundaries may dictate or restrict the physical area in which research and action can be implemented. Practical and resource considerations may constrain the scope and depth of stakeholder engagement and geographical coverage. Consideration of international treaties, export markets, biodiversity loss and climate change concerns and non-use and existence values may demand that the assessment is extended to have a global frame.

Within the SCS guidelines, stakeholders were defined as people, groups or organisations who demonstrate some combination of concern (about the outcome of an SCS process), expertise (anyone who has information) and/or power (anyone who is able to either block or facilitate recommendations). In practice, this included anyone who could impact the formulation of recommendations; implement recommended actions; be impacted by the conservation actions. Stakeholders may occupy multiple positions and notional stakeholder groups will not be homogenous with different needs and expectations based on age, ethnicity, gender and socio-economic status. Differences in control over resources, decision-

making roles and power within households are often overlooked by biodiversity conservation specialists, commercial organisations, government extension staff, planners and policy-makers and researchers and this can mean that the needs of more vulnerable groups, such as children and women, are not considered (Panelli, Punch, and Robson 2007; Punch and Sugden 2013; Weeratunge et al. 2012; Tallis et al. 2014).

Knowledge of relevant policies, institutions and associated process is also critical (DFID 2001), and action may be needed to address inconsistencies in legislation, or poor enforcement of rules and regulations, or promote an enabling institutional environment where change is more likely to be permitted and supported. Acknowledging the wide range of circumstances and motivations that may encourage or discourage people from engaging in a process of integrated action planning, the adoption of the boundary critique approach could contribute significantly to designing a strategy to better engage with stakeholders and accommodate multiple perspectives within integrated action plans (Ulrich, 2002).

With regards to integrated action planning, a pragmatic approach is needed for partner selection, based on who it is possible to work with, who shares and supports the conservation and development goals and who establishes contact requesting to collaborate. Considering the Beijiang River running through Shaoguan City, almost everyone in the watershed could be considered as a stakeholder. Consequently, many individuals and groups were engaged with initially to explore what impact they were having or how they were dependent on the river, with the most relevant ones to work with being determined through meetings with the responsible authorities and village representatives to garner support and according to the resources (e.g. time, financial support and number of researchers) available.⁶ Initially, stakeholder interviews, market surveys and key informant interviews were undertaken, village group discussions were held (including wealth ranking), an institutional review was completed and a stakeholder Delphi assessment was carried out (Liu et al. 2010). This was followed by surveys conducted with a sample of 30 households in three fishing villages and focus group discussions disaggregated by gender and age (Liu et al.

⁶Stakeholders identified at the China site included: fishers, farmers, farming companies; fish consumers, industrial companies discharging wastewater, sand mining companies, hydropower stations; government officers working in departments dealing with fisheries, agriculture, forestry, environmental protection, social welfare, water management, education and planning.

2010). Draft action plans were prepared by the interdisciplinary research team and discussed with 40 officers from the city and township governments representing 26 departments, representatives from a tourism company and six members from each of the three fishing villages (Luo et al. 2012).

3.2.2. Phase 2: rapport building and agreement on collaboration

Having identified the range of stakeholders associated with particular issues or resource use systems, then attention should turn to establishing constructive dialogue with the various groups and individuals representing organisations and institutions. It may transpire that some groups are competing for resources or have, in the past, been involved in disputes. On the Beijiang River, fishers had previously been in conflict with the operators of the hydroelectric dams upstream regarding sudden releases of water and the resulting damage to their fishing gear. Communities living in the Buxa Tiger Reserve, India had been invited to leave by the forest department resulting in tension. Consequently, it may be difficult to arrange joint meetings, for example, or expect strong consensus on problems or agreement on which management strategies have the greatest potential. Alternatively, certain groups may be accustomed to working together and may not appreciate being asked to participate in remedial activities aimed at facilitating interaction and knowledge sharing. Accepting this, however, it may not be possible to address problems with aquatic resources management when business as usual prevails. Joint meetings when opportunities to challenge preconceived ideas and reaffirm or renegotiate relationships are provided should be central to the integrated action planning process.

Sand mining company representatives operating on the Beijiang River were invited to a joint meeting with other stakeholders. Consequently, the sand mining companies better understood the negative impacts of extraction on aquatic resources, livelihoods of fishers and water quality (Luo 2011). The discussion also proved informative for officers from the Water Management Bureau who had previously concentrated on physical aspects of river modification through abstraction of irrigation water, flood control, dam building and sand mining. Outcomes included more restrictive quotas, regulations governing the location of sand mining activities and more effective means of sand mining supervision. Cooperation from the sand mining companies was strengthened based on mutual understanding.

Critical aspects of any process founded on interactive stakeholder participation are to ensure activities are transparent and trustworthy and to acknowledge when certain stakeholders are not represented or missing from the process (Pretty 1995). Researchers and NGOs may be perceived as impartial and trustworthy and may be well placed to act as intermediaries and encourage groups with divergent views and opinions to engage in joint assessment and planning exercises. Issues ranging from practical limitations to social constraints and deliberate exclusion may prevent people from participating in meetings and planning activities (Bunting 2010). As the context in which integrated action planning may be invoked will vary widely, the need for safeguards and remedial measures must be assessed by the facilitators and approaches should be practically feasible and culturally acceptable and tailored to the scale of the actions being contemplated. While identifying stakeholders to participate in highland aquatic resource planning, for example, minority groups with limited political representation, or who may live in geographically dispersed or socially and ethnically segregated communities, can be overlooked. Discussions with community leaders and advocates for disadvantaged groups should be combined with reconnaissance by the facilitators to identify such communities and ensure that they are included in the integrated action planning process.

Within the defined stakeholder groups, there will be hierarchies and inequalities in power and measures are needed to ensure that when similar stakeholders hold a variety of views and opinions that this is accounted for in the process. There will be limits, however, to what level of enquiry is manageable and useful. In certain circumstances, hard choices and difficult decisions may be required but the likely impact of these on poor and marginal groups should be better understood and accounted for through adopting an integrated and participatory planning approach. Within households, for example, the needs and perceptions of women and children may frequently be missed owing to a tendency to interact primarily with older male household members. Biodiversity conservation must also be regarded as a planning goal that is often poorly represented or ignored and, consequently, requires third parties (often NGOs or researchers) to advocate its importance based on their expertise, interests, norms and values, and to elaborate conservation concerns and priorities. Particular stakeholder groups will possess more detailed knowledge about specific topics. Mechanisms such as plenary sessions in workshops or a stakeholder

Delphi for a more structured interaction will be required to facilitate knowledge sharing amongst groups and more knowledgeable individuals to enable joint assessment and decision-making.

Within government and administrative bodies, there will be a range of priorities and opinions, perhaps divided along political or sectoral lines (Luo et al. 2012). Depending on the individual invited or delegated to attend a meeting or respond to a survey, the outcome may vary significantly (Lund 2011). Institutions can have clear affiliations along ideological, political or religious lines and this can prevent people within them from working with, or even attending meetings with, individuals from opposing bodies. Personal circumstances (family ties, patronage, relationships, social networks) and belonging to common interest groups adds another dimension to the institutional landscape. The role and influence of illegal and illicit activity must also be considered and may often be impossible to discern and consequently overlooked. It is crucial to note that hierarchies of gender, status and age are not only relevant when ensuring the equitable participation of community level stakeholders, but they are equally important within institutions. Micro-level power relations associated with these inequalities can shape the capacity of individuals to influence decisions. At each stage in the planning process, it is important to specify who has been involved. When anonymity has been guaranteed, this may be problematic; however, it should be possible to state the number and broad characteristics of stakeholders that participated without disclosing their identity.

3.2.3. Phase 3: integrated assessment of biodiversity, livelihoods, ecosystem services and policy

Integrated assessment means that all the disciplines that need to be considered for wetland resource conservation and sustainable use, such as biodiversity, livelihoods (including gender and age inclusivity), ecosystem services (Brooks et al. 2014), sustainable energy provision, economics and policy are considered together from the start when developing management plans. An integrated approach supports efficient research and planning, demands a multidisciplinary approach and reduces the likelihood of contradictory actions.

Within an integrated assessment, a range of methods and tools might be considered and further guidance is provided in the WRAP toolkit (Bunting et al. 2013) on how to select and combine approaches from the natural, social and political sciences to ensure assessment activities are efficient and generate the required information. The use of an assessment planning matrix (as provided in the WRAP toolkit) can tailor the methods and tools selected to the management issues of concern and ensure opportunities for multidisciplinary information collection are capitalised upon (Springate-Baginsky et al. 2009). Within the context of the HighARCS project, the added imperative to generate data for global biodiversity assessments and databases meant some activities that were not essential, but still informative, for integrated action planning had to be included within the process. Integrated assessments within locally initiated initiatives could be less thorough based on the knowledge, skills and resources available, but still yield adequate, reliable and trustworthy information.

3.2.4. Phase 4: joint problem analysis and target setting

Stakeholder participation is enshrined in international agreements and treaties and increasingly specified in national policy and planning frameworks; however, interpretation and understanding of what constitutes participation varies. Frequently, a need to define what might be regarded as acceptable or desirable modes of participation is apparent, whilst the actual nature of participation achieved is seldom assessed and reported. During the 1990s, a number of classification schemes were proposed to raise awareness of this issue and to guide and inform better practices when participation was being proposed (Lund 1990, 1998; CARE 1994; Pretty 1995; Platt 1996). More desirable approaches demand joint assessment and decision-making with concerned stakeholders with an ultimate objective of establishing self-organisation to address emerging challenges. Participation in certain circumstances could be highly divisive or superficial, paying people to undertake development work or merely advising them about what was going to happen. Participation, contrary to the intended outcomes, can give rise to new forms of power hierarchies (Cooke and Khotari 2001). At an intra-community level, “participation” may entail simply being a member of a committee or user group but without actively influencing decisions. This is particularly common for women, who may be “token” members of participatory planning initiatives, while their actual role in shaping outcomes may be limited (Akerkar 2001).

Within the HighARCS project, research approaches and processes conceived to facilitate joint assessment and decision-making with stakeholders were designed to encourage interactive participation. The sequence of activities in China began with separate visits to different stakeholders to listen to their opinions, then two joint meetings, one with government officers and one with other stakeholders. Building on the dialogue established, stakeholder Delphi assessments were used to evaluate opinions on ecosystem services and potential actions (Lund, Banta, and Bunting 2014). Finally, interviews were conducted in the homes of fishing families and focus groups convened. In some countries and situations, it can be counterproductive to go against the prevailing norms of social interaction between men/women, adults/children and government officials and the public.

To ensure broad-based and interactive participation in action planning at a community level, separate focus groups were held to develop the action plans with key intra-community interest groups, notably women, men, boys and girls (Punch and Sugden 2013). A two-stage process was adopted. Development of a broad set of ideas based upon the initial stakeholder meetings and field-level data collection, followed by prioritising possible interventions with communities in focus groups with a ranking exercise to facilitate discussion of the possibilities and challenges of each. Efforts were made to hold focus groups in relatively private locations where respondents could talk freely to voice their concerns and aspirations. This was found to work more effectively than mixed groups, where dominant men or government officials tended to take control. Outcomes from such meetings can be integrated within the process by revising the IAP to include environmental or social safeguards and ensuring that systems are in place so that stakeholders always have access to, and refer to, the latest version of an IAP.

3.2.5. Phase 5: joint strategic planning

Evaluation of problems with households and communities is bound to yield a wide range of issues that may affect many groups or be specific to certain resource users or household members. Although it is important to include all relevant issues in an emerging plan for action, an initial focus on issues that affect a number of groups has been advocated to garner broad-based support and demonstrate that different stakeholders can work together (Lewins, Coupe, and Murray 2007). It is prudent to try and address some modest objectives

first to be able to demonstrate progress, whilst more ambitious goals can be broken down to identify manageable tasks for the participating stakeholders. Giving priority to modest objectives is important to prevent unrealistic expectations amongst stakeholders, particularly when working at a community level whereby the action planning process can be misinterpreted. Following the elaboration of potential actions through stakeholder meetings and focus group discussions in China, meetings with prospective implementing agencies were arranged to discuss opportunities and constraints to proceeding. Consequently, a revised version of the action plan was discussed with stakeholders for verification. Regular planning meetings and workshops may be needed to identify incremental actions and measures to be taken to reach goals.

3.2.6. Phase 6: joint planning and organisation of activities

Building on dialogue and working relationships established through the IAP formulation process, tools such as SMART (Specific, Measurable, Achievable, Realistic, Time-bound), STEPS (Social, Technical, Environmental, Political, Sustainability) and SWOT frameworks were used to prioritise actions and elaborate the conditions required to proceed with implementation. Accepting that there are potential constraints and limitations to implementing Responses, in particular related to different worldviews concerning proposed actions, this demands that anticipated changes should be both desirable and feasible (Checkland and Poulter 2006). Previously, the STEPS framework was used to test the feasibility of action plans developed with stakeholders for enhanced floodplain fisheries management in Bangladesh and distribution of wastewater resources in the EKW, India (Bunting et al. 2005; Lewins, Coupe, and Murray 2007). Critical aspects of implementing the STEPS approach in these cases included holding joint meetings at convenient locations and in neutral venues, and ensuring all those stakeholders with an interest in the prospective actions were invited. Stakeholders associated with the EKW were identified during a workshop attended by a range of representatives from user groups and organisations, with 29 stakeholder categories being identified, including several not at the meeting (Bunting et al. 2001). To accommodate the range of interests in the EKW during action planning, it was divided into 11 distinct regions based on physical, environmental and socio-economic factors and joint meetings with relevant stakeholders convened in each region by liaising with user group representatives and contacts within institutions (Bunting et al. 2005).

Participants attending joint planning meetings should be able to decide which actions to prioritise and how to proceed with implementing these, although it may be more difficult to agree on who should take responsibility for specific tasks. All responsible authorities and concerned stakeholders should be represented at a well-conceived joint planning meeting and the design and facilitation of workshop activities should ensure that stated policies and legal obligations are cited and peer pressure exploited to gain commitment to undertake relevant tasks. Agreement should be reached on when tasks will be completed and a process implemented to monitor progress and revise the plan as deemed necessary. During the initial phase of action plan implementation, a focus on more modest or bankable activities is considered prudent to build confidence and develop relationships of trust, to demonstrate timely and mutually beneficial progress and to establish ways and means for groups to address more challenging problems (TNC 2007). Actions not deemed appropriate for immediate implantation must not be dropped from IAPs but more work may be required to refine and target the proposed actions or to implement appropriate safeguards.

3.2.7. Phase 7: coordination of implementation and joint monitoring

Coordination of IAP implementation could be promoted through the adoption of appropriate project planning and monitoring frameworks. A logical framework approach could be used to help disaggregate actions into more manageable activities with associated objectively verifiable indicators and means of verification to aid monitoring. Gantt charts could be used to visualise the agreed sequence and timing of activities. Monitoring during the implementation phase is essential and can be categorised as results or process monitoring. Results monitoring refers to evaluating the effectiveness of the activities and whether they are having the desired effect; water quality monitoring, for example, if the activities were targeted at reducing water pollution. Process monitoring refers to the implementation of activities, for example, monitoring interactions amongst stakeholders and checking that deadlines are being met. Properly instigated, both can provide feedback to prompt changes needed to improve the implementation of actions or attainment of desired outcomes. Results monitoring uses quantitative or qualitative indicators that can be evaluated to assess whether actions are achieving their aims. Process monitoring is less formal and can involve keeping reflective journals or records of meetings and stakeholder interactions. The purpose is to produce evidence to demonstrate where problems with

implementation are occurring. An integrated approach is essential for the monitoring strategy to ensure well-designed monitoring tools and indicators meet the needs of multiple disciplines.

Monitoring within the HighARCS project was also intended to demonstrate when better practices for integrated action plan implementation (Table 3) had been achieved and when less desirable outcomes were in evidence. Such assessment requires an associated element of process monitoring to establish, for example, what levels of stakeholder representation and engagement are achieved. Where different stakeholder groups come together, there will be inherent barriers and constraints to full⁷ and equitable⁸ participation. Consequently, appropriate measures to ensure transparency and facilitate broad engagement and representation are needed. Where difficulties with IAP implementation are identified, appropriate mechanisms to revise and modify the IAP and implementation strategy will be required.

[Table 3]

3.2.8. Phase 8: joint evaluation and revised target setting

Work plans produced to guide integrated action plan implementation should include a timeframe within which outputs and targets or impacts are expected. A joint evaluation event, such as a stakeholder workshop or focus groups with selected stakeholders, could be arranged with the purpose of comparing the observed outcomes with those expected. Evaluation events should be arranged at the start of the action plan implementation phase and announced widely, making the purpose and procedure clear. Joint meetings should enable stakeholders to engage in peer review of outcomes, including assessment based on different gender and age perspectives. Focus groups (gender and age specific groups where appropriate) could address sensitive issues that would not be discussed in open meetings. Joint evaluation meetings can also ensure transparency and accountability and provide an

⁷ Full is used here to indicate the participation of stakeholders who could impact the formulation of recommended action, implement recommended actions or could be impacted (positively or negatively) by the actions.

⁸ Equitable is used here to indicate the interactive participation of all stakeholders with their needs and priorities being afforded equal weight in the integrated action planning process.

opportunity for collective IAP revision and reorientation, including establishing new targets and timeframes. At this point, it may be decided to proceed with a further cycle of integrated action planning (Figure 1), but some aspects of the process may be redundant as previous findings remain valid or appropriate means of verification might be easily accessible to confirm whether any change has occurred.

While implementing the action plan, it should be anticipated that the stakeholders are constantly evaluating the content, process and outcomes, not in response to external evaluation criteria but as an inbuilt condition to see what works and what not. This has an enabling and self-correcting intent. Engagement with the action planning process must be regarded as a notable outcome in its own right and a confirmation of the needs assessment carried out using participatory strategies and tools. It is, therefore, important to reflect with participants about how to explain the positive (or unsatisfactory) results to promote greater understanding and identify appropriate follow-up actions. Targeted questionnaires and key informant interviews with selected stakeholders could be used to evaluate changes in knowledge, attitudes and practices.

3.3. IAP scope and targeting evaluation and consistency checking

The DPSIR framework assessment conducted on the IAP for the Beijiang River, China, from a livelihoods perspective is presented in Figure 2. In structuring the review of IAPs from this perspective, actions were assumed to represent Responses corresponding to other parts of the DPSIR cause-and-effect continuum. The State of livelihoods is considered in terms of access to resources, well-being and vulnerability (DFID 2001), and the consequences of this were assumed to result in broader “socio-economic Impacts” (Maxim, Spangenberg, and O’Connor 2009, 21). Assessment outcomes demonstrate that it is possible to use the DPSIR framework to evaluate IAPs and identify anchor points within the cause-and-effect framework. The need to define “clear anchoring points” was highlighted by Maxim, Spangenberg, and O’Connor (2009, 12) “to specify the scheme and to make it suit to different discourses”. Outcomes may be regarded as rather superficial, however, as several Responses had potential to address multiple points in the cause-and-effect continuum.

[Figure 2]

Outcomes of the compatibility evaluations performed on the IAP for the Beijiang River, China (see Luo et al. 2012), are presented in Table 2. In certain cases, negative short-term impacts may be expected, for example, the effect of implementing a no-fishing season on livelihoods, as could be the case with the Beijiang River (Table 2), but that over the medium- to long-term enhanced fish stocks could support more productive and remunerative capture fisheries. In this case, the near- and long-term prospects are alluded to (-/+). A “Continued moratorium of fish cage culture” may not result in new employment opportunities being created but could help safeguard the environment and an array of associated ecosystem services and avoid competition for, and over-exploitation of, aquatic resources.

[Table 2]

Action to implement water treatment such as “Reduction of agricultural pollution through location of new livestock farms away from river, construction of water treatment for farms close to river” and “Extend public sanitary facilities to rural areas” may demand technology and energy inputs, but may help avoid environmental degradation demanding far greater inputs to rectify in the future. Similarly, action to curtail irresponsible and illegal activity such as “Setting up Aquatic Conservation Zone offices” might demand external inputs, but should result in more positive outcomes subsequently. Actions such as “Increased numbers of fish fry released” will be heavily dependent on artificial propagation and culture of suitable fish species, but could support a substantial number of livelihoods associated with fishing.

Given hardships endured by fishers and their families and apparently poor prospects for an imminent renaissance in fishing fortunes, action to “Implement specific policy measures to address fishers as a group warranting special attention regarding pensions and medical insurance” and “Promote primary education and training for fishers to ease transition away from fishing” is undoubtedly needed. But there is a danger in this. Describing the prevailing nature-society interactions and resource use in mountain areas of the Hindukush-Himalaya region, it was noted by Jodha (1998, 293) that there was “greater physical, administrative and market integration of traditionally isolated areas/communities with the dominant, mainstream systems, reducing critical dependence of the former on local resources and

hence the degree of their stake in the conservation of local resources". Interacting with communities in Buxa demonstrated that people living in the more remote and inaccessible Adma cluster were less likely to benefit from action to support alternative livelihoods opportunities (Bunting et al. 2014). This reflects the cultural heterogeneity across the three village clusters in the site and their different cultural beliefs and value systems pertaining to biodiversity. Compatibility assessments could, therefore, be included within future integrated action planning processes to be carried out by stakeholders and this should include the elaboration of mutually agreed rating scales and criteria.

4. Discussion

Prospects for integrated action planning to facilitate participatory joint assessment and decision-making with stakeholders for aquatic resources management and more general development planning are considered below. Apparent opportunities for adapting and institutionalising integrated action planning are reviewed. Emergent principles of interdisciplinary assessment and integrated action planning are presented and discussed with regards to practical experiences and research and development outcomes.

4.1. Integrated action planning for aquatic resources management and development planning

To formulate appropriate plans, they may need to accommodate formats and formalities stipulated by (or inscribed in) relevant legislation and administrative rules and procedures in use at particular sites. For example, who normally has the right or opportunity to make plans (if anybody); where and to whom are they submitted; which procedures are normally applied during the next steps of political, technical and administrative processing; how are the proposals discussed; how are decisions made and by whom? During provisional work in preparing for action planning it is important to identify, engage and document such institutions and consider how the voice, interests and concerns of the local poor can be strengthened in relation to these specific institutions and processes.

Where action planning or a similar approach is not an established practice, it might help overcome entrenched problems of natural resources management, planning and governance. Where action planning is established, it may suffer from being inefficient, lack

transparency and accountability, and not be suited to addressing issues relevant to highland aquatic ecosystems, their conservation and wise use. It may be necessary to devise appropriate adaptations to engage with hierarchies of stakeholders across different disciplines and domains and enable poor and vulnerable groups to participate interactively in joint assessment and decision-making.

Cognisant of the theory surrounding action planning, it is important to anticipate and accommodate the expected transformations and evolutions in knowledge dynamics. Initially, it might be assumed that resource users possess a comprehensive knowledge of the resource system, practices used by other user groups and the roles and responsibilities of other stakeholders. Often this is not the case, and through bringing different stakeholder groups together to share knowledge and their perceptions of the situation, it can challenge the *status quo* and preconceived ideas. Following initial interaction divergence in opinions and thoughts about how to proceed and address problems is commonly observed (Lewins, Coupe, and Murray 2007). Progress towards closer consensus is then promoted through appropriate facilitation and participatory activities designed to achieve joint assessment and decision-making.

Viewing integrated action planning as a novel process instigated by external stakeholders, it is important to acknowledge potential constraints and limitations to this approach. It may be necessary to adopt a pragmatic approach that fits more coherently with existing institutional norms and planning procedures to ensure it is productive and is not dismissed as illegitimate or unconstitutional. This may be a particularly sensitive issue where outcomes of the planning process call for revised policies or constitutional change. Adopting the catchment as the boundary for stakeholder engagement may not fit with administrative boundaries for planning and may transgress national borders. This may risk raising false expectations where actions are required in areas that fall outside of the jurisdiction of those institutions that it is possible to engage in the planning process. Threat mapping and ecosystem services assessments demonstrate that a failure to address issues at a catchment scale will, however, not help resolve the fundamental barriers to biodiversity conservation and will not satisfy the needs and expectations of stakeholders. When actions demand trans-boundary cooperation, mechanisms should be sought to facilitate this, and it would be

appropriate to recall international agreements and treaties that require the signatories to instigate such initiatives (CBD 1992; FAO 1995). Integrated action planning will not be appropriate where open conflict or social schisms exist, and in such circumstances, specialist conflict resolution and reconciliation mechanisms will be required.

Outcomes of applying the DPSIR are included here to demonstrate how it can be applied to assess the scope and targeting of actions. It should not, however, be regarded as an essential component of the process, especially when it could over-complicate or dilute a focus on issues of priority to participating stakeholder groups. A notable advantage to adopting the DPSIR framework to assess potential management strategies to reconcile multiple demands on highland aquatic resources and promote biodiversity conservation is that it makes explicit higher level Driving forces (Figure 2). Pressures resulting from such Driving forces in highland areas are often a consequence of local-level management failures, the degree to which individual communities are integrated with the market economy and inappropriate national and regional development policies that permit environmentally damaging activity and unsustainable natural resources exploitation (Chi et al. 2013; Galipeau, Ingman, and Tilt 2013; Pandit 2013; Lund, Banta, and Bunting 2014). Given the geographical scale of the assessments presented here and focus on three communities, dependent on shared highland aquatic resources in each site, it may have been expected that Responses conceived and formulated by user groups, communities and key stakeholders would target obvious and local Pressures; an attempt to counter immediate impacts with available resources and assets. It was significant, therefore, that Responses proposed to address conservation issues and problems faced by aquatic resources user groups and communities ranged from initiatives focused on behaviour change locally to constituting national policies to address higher level Driving forces. This suggests that the stakeholders involved in IAP formulation were aware of the need for action to address immediate problems and investment of time and resources in changing attitudes, management practices and policies in the medium- to long-term to counter the root causes of biodiversity declines and livelihoods constraints.

Pressures being exerted further away, for example, deforestation and mining activity may be suspected generally of having negative impacts on highland aquatic resources, but

knowledge of the extent and impact of such activities may be difficult to quantify. Even when there is a good amount of information available about negative activities elsewhere in catchments, it will probably not be feasible for local resource user groups and communities to address them directly or even make representation to the relevant authorities. Problems of addressing issues in watersheds are complicated further when administrative and political boundaries separate sites where negative impacts are being felt and areas where management activities and land-use practices constitute the underlying pressure. Furthermore, by assessing the range of ecosystem services derived from highland aquatic resources and adopting the approach developed within the HighARCS project to extend this assessment to areas where ecosystem services originate and pathways facilitating their transfer, such problems will come to prominence and highlight the need for interdisciplinary, participatory and integrated watershed planning and management.

4.2. Opportunities for institutionalising and adapting integrated action planning

IAP implementation within the HighARCS project had potential to directly enhance highland aquatic biodiversity conservation and promote wise use at a number of important sites throughout Asia. Institutionalisation of an integrated action planning approach may, however, be constrained by limited information and capacity to facilitate such an approach. Limited knowledge of other planning approaches and apprehension that “wider involvement is less controllable, less precise and so likely to slow down planning processes” (Pretty 1995, 1252) can perpetuate reliance on conventional planning modes, even when they are known to be flawed. Greater knowledge and understanding concerning effective approaches to integrated action planning amongst wetland managers and policy-makers throughout the region could, however, result in much wider benefits. Benefits of adopting an integrated and participatory planning approach including awareness raising and mutual learning, and demonstrating that groups can work together, should be highlighted.

Ultimately, it might be expected that productive stakeholder associations and constellations established through integrated action planning may result in new legislation and institutions to promote biodiversity conservation and wise use of highland aquatic resources. Novel social institutions, such as clusters of farmers, co-management organisations, producer associations and self-help groups, have been widely advocated elsewhere to foster

sustainable agriculture development and better manage common property resources (Brechin, Murray, and Benjamin 2007; Pretty, Toulmin, and Williams 2011). Farmer clubs in Buxa were reinvigorated through their engagement with the integrated action planning process. But as with other novel social institutions, refinement with regards to evolving local conditions “requires ongoing community participation both to assure that management principles are relevant to human behaviour and resource ecology and to enhance their legitimacy among resource users” (Brechin, Murray, and Benjamin 2007, 567). There are dangers, too, in benefits being captured by more powerful groups and individuals (Chambers 2005), with the active role of women and young people, as well as more marginalised farmers or fishers often being questionable.

Institutions, both established and recently constituted, have scope to interact and overlap and it is essential that appropriate assessments are undertaken to highlight areas of common ground, identify opportunities for mutual support, demarcate where there might be a danger of replication of effort and inefficiency and make explicit competing agendas and areas of potential conflict. Applying elements of institutional analysis to the scope and targeting of international development and environmental protection agreements has clearly identified potential areas for conflict (MEA 2005). Widespread damming of rivers to generate hydroelectricity to reduce greenhouse gas emissions, in line with climate change mitigation obligations, has negatively impacted provisioning ecosystem services, thus undermining the food security of local populations. An appropriately modified assessment framework could be used to evaluate policy and legislation developed for highland aquatic resources conservation and wise use and to identify inconsistencies and contradictions.

4.3. Principles of interdisciplinary assessment and participatory integrated action planning Building on the better practices defined for IAP formulation and implementation (Table 3), it was possible for the interdisciplinary and international research team to elaborate guiding principles for integrated action planning and implementation for biodiversity conservation and sustainable use (Table 4). Each principle corresponds to the characteristics of better practices identified through working extensively with a broad spectrum of stakeholders at five sites in China, India and Vietnam. With further testing, it may be possible to refine and improve these emergent principles, or to include new principles, the purpose at this time is

to effectively communicate the lessons we have learned, help guide future integrated action planning initiatives and enhance the likelihood of positive outcomes for biodiversity conservation and the wise use of aquatic resources. The first principle specifies a focus on biodiversity conservation, avoiding invasive and non-native species introductions, adopting an integrated wetland assessment and action planning approach, adhering to the precautionary principle to environmental protection and Better Management Practices. The second establishes wise use of biodiversity and wetland resources as legitimate and desirable, but specifies the need to maintain environmental stocks and flows of ecosystem services to sustain ecosystem functioning. The third and fourth principles state the need to promote sustainable livelihoods and social-ecological resilience whilst guaranteeing that stakeholder participation is interactive and good levels of representation are achieved. The fifth principle specifies inclusion of gender and age considerations explicitly in the integrated action planning process and implementation stages. The sixth principle acknowledges that the process must be transparent and trustworthy with an appropriate degree of accountability and that the rights of poor and marginal groups must be respected. The seventh principle calls for an efficient action planning process, with IAP implementation that adheres to mutually agreed timeframes and the adoption of an adaptive management approach to overcome barriers and contend with emerging challenges.

[Table 4]

5. Conclusions

Approaches that could contribute to an interdisciplinary, participatory and integrated action planning process have been described and the contribution of these within the HighARCS project was reviewed and perceived limitations discussed. Such a process has the potential to avoid major failures associated with conventional bureaucratic and comprehensive and technocentric planning procedures (Moser 1989; Dietz, Ostrom, and Stern 2003; Pretty 2003; Te Boekhorst et al. 2010). Participatory approaches can mobilise people with shared concerns to jointly assess the situation and to formulate shared goals that have the potential to conserve biodiversity whilst permitting continued wise use of highland aquatic resources for livelihoods and food security. Precautions are needed, however, to ensure that poor and marginal groups are not excluded from the planning process but interactively

engaged using appropriate mechanisms. Integration within action planning and implementation must encompass tools and approaches, actors and stakeholders and policies and programmes. Integrated action planning should be regarded as a flexible approach that can be adapted to suit particular social-ecological settings and resources use dilemmas. An enabling institutional environment with policy support and resource allocation would ensure that processes initiated by communities and highland aquatic resources user groups are regarded as legitimate and attract broad-based support.

Practices and principles for integrated action planning presented here could make a significant contribution to integrating biodiversity conservation and sustainable use into plans thus contributing to implementing the general measures outlined under Article 6 of the Convention on Biological Diversity (CBD 1992). The integrated action planning process devised during the HighARCS project could make a significant contribution to achieving Aichi Targets 2 and 18 by 2020.

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Table 1 *Critical reflection on action planning strategies for the conservation and highland aquatic resources wise use management.*

Action planning approach	Strengths	Weaknesses	Opportunities relevant to HighARCS	Threats relevant to HighARCS
The Nature Conservancy Trust - Conservation Action Planning	Focused on the development and implementation of strategies to address priorities and goals arising from Major Habitat and Ecoregional Assessments that were used to identify biodiversity needing conservation and where to conserve it. Provided a framework for practitioners to target specific biodiversity and conservation goals and the means to measure success to permit adaptation and learning.	Several opportunities for innovation were identified based on past experience (TNC 2007). Notably, how to deal with stakeholders with polarised positions; how to represent all biodiversity in complex areas, how to apply to non-biodiversity goals and include cultural values; weaknesses in testing of viability; how to improve the “spatial representation of threats” (p52); how to better analyse stakeholders.	The framework offers a comprehensive and tried and tested approach to designing conservation strategies to address identified targets. The importance of implementing actions was central to the approach and the need for ‘at least one “owner”’ was highlighted (TNC 2007, 105) as was the importance of implementing modest steps straight away to maintain momentum.	Key areas where the CAP approach could be refined and strengthened were noted (TNC 2007). Integration of biodiversity conservation, livelihoods and policy considerations was deemed critical for the HighARCS project. The limit of eight or fewer conservation targets would not be appropriate for an integrated planning approach encompassing biodiversity conservation, livelihoods and policy.
UK Biodiversity Action Plans - developed for counties in the UK to coordinate conservation efforts for vulnerable species and landscapes	County-specific plans addressed a range of priority species and habitats at a national level identified by expert committees in a national context. The action plans presented the main issues in a clear and concise manner. Objectives for the	Actions proposed are very generic and it can be foreseen that a great deal of subsequent refinement and follow-up work would be required from the responsible authorities identified. Targets might seek to maintain or enhance population levels,	The HighARCS aquatic biodiversity assessment and subsequent IUCN RedListing has the potential to place the selection of species or habitats in a global context. It is reasonable to expect that the scope and detail of these action plans could be	Plans constitute the outcomes of a constitutional process involving government bodies and responsible authorities. It may be difficult to engage all responsible authorities in such a process without a constitutional basis. The action plans cite a number of

	plans are stated with associated targets. Lead agencies with responsibility for the proposed actions are identified. A range of actions, including the protection and enhancement of populations, awareness raising and research are covered.	but often these are not known. Targets based on contemporary surveys may risk introducing a shifting-baseline. No means of verifying achievement (i.e. quality, quantity, time) is included for specific actions.	replicated in the HighARCS project and that the associated process of formulation and stakeholder engagement could be monitored and reported for added transparency and accountability.	regulations and planning requirements; this supporting institutional framework may well be less developed in the HighARCS study sites.
IUCN Species Conservation Strategies	Focused on delivering conservation action on the ground and involving a wide range of stakeholders, rather than just a status review as with the old Species Action Plans.	Designed to be implemented on a specific taxonomic group (or individual species) across all or part of the species' range, or at a national or state/province level, rather than targeting multi-species ecosystems at the site scale. While identifying the need to incorporate non-conservation stakeholders there is limited guidance on linking to species associated livelihoods – again linked to the different scale of application.	Raising awareness of biodiversity conservation needs through a focus on a globally important species could encourage national and international bodies to allocate resources to conservation action in highland areas. Inclusion of species of both conservation and livelihoods significance could garner broader support. Strategic planning process can inform the HighARCS action planning approach.	Conservation priorities identified through a species centred process may not align with needs of local stakeholder groups at the site scale.
Participatory Action Plan Development facilitated	Process centred on an extended joint stakeholder	Where positions are entrenched, competition for	Theory of consensus building could be critical to	Where action planning is not a routine practice and has no

in Bangladesh (DFID-funded project)	workshop where groups with different interests could be brought together to share knowledge and information and then reflect on this and reconvene to identify workable solutions that had potential to benefit several groups.	resources exists and the status and power of different stakeholders varies greatly there is a danger that people will be unwilling to participate in joint meetings and if they do they may be unwilling or unable to engage fully in the process or reveal their true feelings and motivations.	formulating an action planning process with potential to result in mutually agreed and beneficial actions. An initial focus on modest actions that could benefit several groups is pragmatic, ensuring progress and showing that different stakeholder groups can work together and help establish an action planning process suited to promoting wise-use of aquatic resources.	constitutional basis it would be unrealistic to expect to bring together primary and key stakeholder in a joint meeting and reach agreement on solutions to highland aquatic biodiversity conservation and use problems. When trying to address apparently manageable problems, other conflicts and problems could come to subvert and dominate discussions.
Participatory Planning in the East Kolkata Wetlands (EKW)	An initial problem census across diverse user groups in different locations permitted inclusion of issues of concern to the majority of stakeholders. Purposefully engaging with stakeholders in different regions identified based on acknowledged differences in socioeconomic status and resource-use practices permitted wider stakeholder engagement and highlighted potential win-win	Adopting a planning approach based on interactive participation and targeting problems at a local level may place greater demands on resources in the short term compared to comprehensive approaches. The possible exclusion of poorer and more vulnerable groups from joint meetings was identified as a problem demanding appropriate safeguards.	Highland aquatic resources sustain a broad array of ecosystem services benefiting numerous stakeholder groups. Hence, a planning approach founded on joint assessment and decision-making is more likely to identify feasible actions to address common problems and make explicit competing demands whilst providing opportunities to share knowledge, dispel	Knowledge and information on the range of user groups in the EKW was widely available. Where this is not the case extensive preparatory work may be required to formulate an appropriate planning strategy to engage with all user groups. Water management in the EKW could be coordinated and planned owing to the engineered nature of the system. This will not generally be the case for highland

	actions and possible areas of conflict.		misunderstandings, promote consensus and build trust.	aquatic resources.
Micro-planning in Buxa, India facilitated by CDHI	Acknowledging that communities possess authentic insights and skills to assess their situation, articulate their priorities and strategise actions to reach common goals can enhance the efficacy of planning.	Such planning depends on trust between the facilitator and local communities who are otherwise isolated from mainstream government and society. This takes resources, time and depends on establishing genuine relationships and shared understanding.	CDHI has extensive experience of this planning approach and has established ways and means of working with local communities. Principles established to guide successful micro-planning could be shared to guide and inform action planning at all HighARCS sites.	Where communities are less isolated and are more used to interacting with key stakeholder representatives such an approach may not be appropriate. User groups may be more aware of their entitlements and how to plan and work with key stakeholders.

Table 2 Potential conservation and livelihoods impacts of Responses proposed in the Beijiing River IAP and assessment of key indicators.

Responses identified in IAP	Conservation potential ^a	Livelihoods potential ^b	Addressing multi-DPSIR components ^c	Social capital enhancing ^d	Externalising technology avoiding ^e
Current actions					
R1.1. Development Strategy for Shaoguan assigned as “Ecological Development Zone”	++	+	+	+	+++
R1.2. Forest cover in Shaoguan better protected and expanded	++	+	+	-/+	+
R1.3. Setting up Aquatic Conservation Zone offices	+++	+	+++	-/+	-/+
R1.4. Improved regulations regarding water pollution	++	++	+	+	+
R1.5. Improved access to and maintenance of biogas tanks	+	+	+	+	+++
R1.6. Increased numbers of fish fry released	-/+	+++	++	+	-
R1.7. Continued moratorium on fish cage culture	++	-/+	+	+	++
R1.8. Adherence to regulations requiring environmental impact assessment for sand mining improved and increased fines for illegal sand mining	++	+	+	+	+
New actions (short term)					
R2.1. Compensation received from sand mining and hydropower to be used for conservation of aquatic resources	++	+	++	+	+
R2.2. Implementation and monitoring of no-fishing season	++	-/+	+	+	-/+
R2.3. Improved reporting of iron polluting incidents to Bureau of Environment Protection	++	++	+	+	+
R2.4. Reduction of agricultural pollution through location of new livestock	++	+	+	+	-/+

farms away from river, construction of water treatment for farms close to river

R2.5. Development of improved eucalyptus forest strategy	+	+	+	+	+
R2.6. Improved education on aquatic biodiversity and resources for all stakeholders	+++	++	+	+	+
R2.7. Promote better communication between dam operators and fishing communities	-	++	++	++	+
New actions (long term)					
R3.1. Research into aquatic plant and animal cultivation and release/establishment, and fish migration routes through dams	-/++	++	++	+	-/+
R3.2. Move to 'green' and 'organic' agricultural food production	+	+	+	++	+++
R3.3. Extend public sanitary facilities to rural areas	+	++	+	++	-/+
R3.4. Improved support from Guangdong Province for the eco-compensation program	++	++	++	+	+
R3.5. Close loop hole in the '2002 Law of the People's Republic of China on Evaluation of Environmental Effects' that allows builders to begin work before an EIA is undertaken, and to include species on the 'Law of the People's Republic of China on the Protection of Wild Life' that are not officially 'endangered' or 'rare'	+++	+	+++	++	++
R3.6. Implement specific policy measures to address fishers as a groups warranting special attention regarding pensions and medical insurance	-/+	++	++	++	-
R3.7. Promote primary education and training for fishers to ease transition	+/-	++	+	++	-

away from fishing

Source: Bunting (2012b).

Note: ^aConservation potential: compatible (+); promising (++); very promising (+++); incompatible or problematic (-). ^bLivelihoods potential: compatible (+); promising (++); very promising (+++); incompatible or problematic (-). ^cAddressing multi-DPSIR components: one point (+); two points (++); multiple points (+++); absence of any relationship (-). ^dSocial capital enhancing: positive (+); good (++); very good (+++); potentially negative (-). ^eExternalising technology avoiding: positive (+); good (++); very good (+++); potentially negative (-).

Table 3 Description of criteria to employ when assessing the IAP implementation process.

Process quality ^a	Aquatic biodiversity conservation	Wise use of highland aquatic resources	Sustainable livelihoods and resilience	Stakeholder participation*	Representation and age and gender	Timely with efficient use of resources	Consistent with IAP, reflects adaptation and is transparent
++	Aquatic biodiversity conservation and enhancement is central to IAP implementation and the precautionary principle, integrated wetland assessment and BMPs are adopted when appropriate	Principle of wise use is respected with appropriate measures instigated to avoid exceeding the environmental carrying-capacity for ecosystem services or disrupting environmental stocks and flows	Sustainable livelihoods and well-being based on rational use of ecosystem services whilst maintaining environmental stocks and flows for continued ecosystem functioning and social-ecological resilience central to implementation	Self-organisation established with stakeholders working together to implement actions and adapt strategy as required	All groups well represented and encouraged to contribute and in-depth assessment of needs and age and gender differences	Process consistently meets mutually agreed deadlines and is accountable and transparent, thus ensuring available resources are used efficiently	Progress of IAP implementation process is regularly assessed against current version of IAP to ensure it is consistent and reflects adaptive measures taken and all groups are involved in assessing progress and stakeholder engagement levels
+	Conservation of aquatic biodiversity is considered important and measures are taken to ensure	Wise use is broadly supported and need for continued access to highland	Implementation is guided by a need for sustainable livelihoods, but factors such as	Interactive participation in evidence with stakeholders engaging in joint assessment and	Majority of groups represented with reasonable discussion of main issues	Mutually agreed deadlines are broadly met and there is no apparent waste of resources,	Attention is focused on implementing agreed IAP activities and main stakeholder

	implementation has no negative impacts	aquatic resources recognised but supporting policy and management practices needed	vulnerability and the influence of policies, institutions and processes are neglected	decision-making	related to age and gender	whilst options for more efficient working remain limited	groups are kept informed with regular accounts of progress
+/-	Potentially damaging actions such as stocking invasive, non-native species are avoided but IAP does not provide actions to address biodiversity threats, or enhance or protect biodiversity at site	Need for wise use is acknowledged but limited measures are adopted to counter unsustainable use practices and overexploitation	Need to include livelihoods in planning and assessment of IAP implementation acknowledged but limited adaptation to enhance assets and counter vulnerability	Participation is tending toward a functional mode with stakeholders primarily engaged to fulfil project objectives	Some groups invited but missing due to logistical or practical issues, with limited consideration of age and gender	Limited attention is paid to deadlines and implementation of IAP actions progresses in poorly coordinated manner	Action is centred on limited number of IAP actions and objectives that might benefit selected groups preferentially but not safeguards are in place to provide reassurance
-	Biodiversity conservation is not considered a priority and implementation threatens to damage biodiversity indirectly	Limited awareness of wise use as a concept and limited value assigned to ecosystem services and biodiversity	Livelihoods are not considered within comprehensive planning and management of highland aquatic resources	Stakeholders participate in activities but primary incentive is material gain	Groups missing due to poor organisation and not being invited to participate and very superficial discussion of gender and age	Process is relatively uncoordinated, with limited returns on time and effort invested in IAP implementation	Actions coincide to limited extent with IAP but it is not clear if they are consistent with agreed implementation strategy
--	Implementation of IAP damages	Overexploitation of natural	Livelihoods of poor and	Attitude and approach to	Selected groups and individuals	Implementation process is very	Actions being implemented

biodiversity directly and undermines long-term prospects for enhancement and environmental improvement	resources and biodiversity occurs, with benefits captured by rich and powerful groups and individuals	marginal groups are undermined and vulnerability is increased owing to increased costs and greater exposure to hazards	participation is disingenuous and unethical and poor and marginal groups are exploited and coerced	excluded, whether deliberately or tacitly and no consideration of gender and age	badly organised and coordinated resulting in very little return on time and resources invested	bear no resemblance to those included in IAP and there is a complete lack of accountability and transparency
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Source: Bunting (2012b).

Notes: ^aIntegrated action planning process quality: very negative (--); negative (-); neutral (+/-); positive (++); very positive (+++). *Based on the typology presented by Pretty (1995) where self-organisation was deemed most desirable of seven modes of participation elaborated, followed by interactive participation, functional, for material incentives, by consultation, passive and manipulative.

Table 4 *Seven principles for integrated action planning and implementation.*

Domain	Principles
Biodiversity conservation	1. Ensure aquatic biodiversity conservation is central to IAP formulation and implementation, avoid over-harvesting, the introduction of invasive and non-native species and other threatening activities, and adopt the precautionary principle, integrated wetland assessment and management and Better Management Practices when appropriate
Wise use of natural resources	2. Principle of wise use is respected with appropriate measures instigated to avoid exceeding the environmental carrying capacity for ecosystem services or disrupting environmental stocks and flows
Sustainable livelihoods and resilience	3. Promotion of sustainable livelihoods and well-being based on equitable and rational use of ecosystem services whilst maintaining environmental stocks and flows necessary to ensure continued ecosystem functioning and promote social-ecological resilience
Stakeholder participation and representation	4. IAP formulation and implementation founded on promoting self-organisation and adaptive management, with good stakeholder representation and interactive participation assured
Gender and age	5. Ensure joint assessment of needs and priorities with heterogeneous social groups disaggregated by age, gender and wealth
Efficiency, timeliness and adaptability	6. IAP implementation process should be as efficient as possible and adhere closely to mutually agreed timeframes and deadlines and appropriate mechanisms to enable adaptive management and appropriate IAP reformulation adopted
Trustworthiness and accountability	7. Implementation of actions should be consistent with IAP, reflect adaptations and the process should be transparent and trustworthy with appropriate measures to promote accountability, whilst respecting the rights of groups and individuals

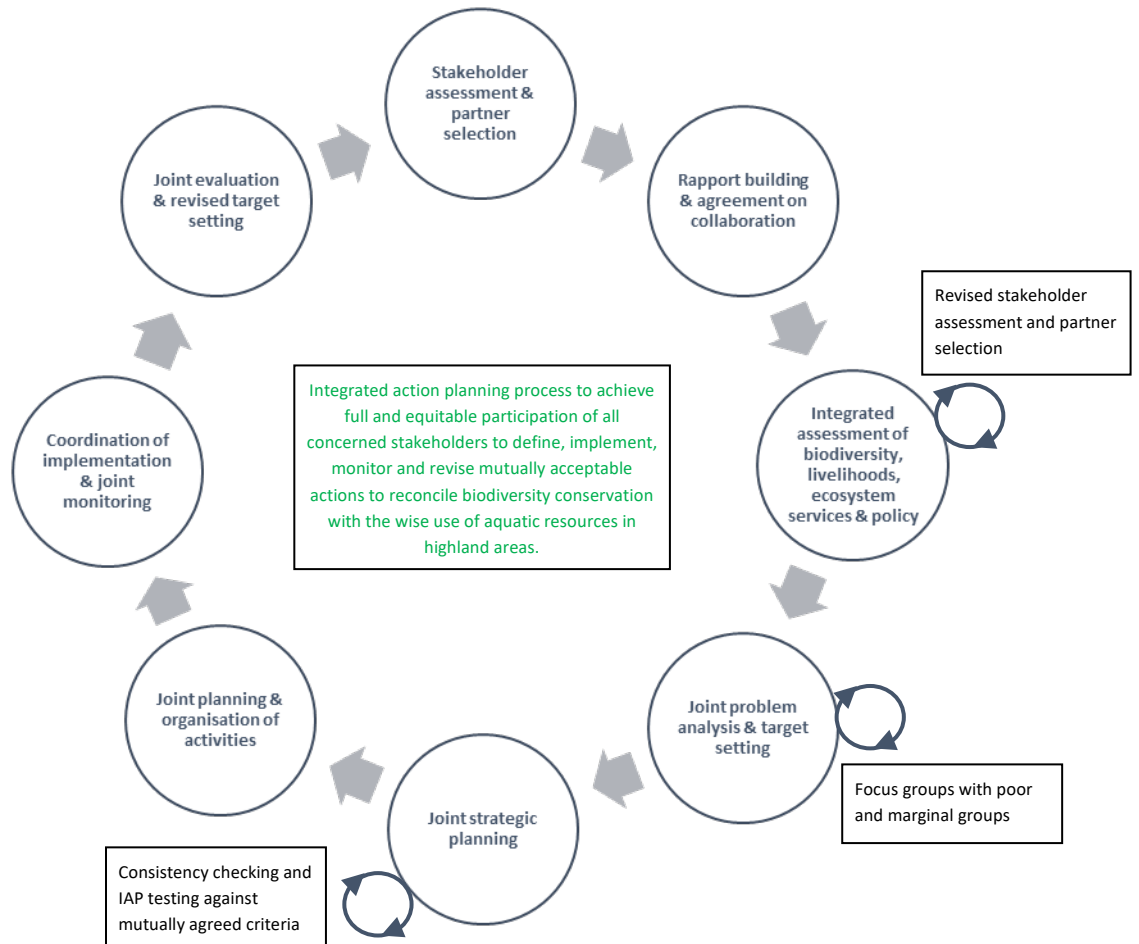
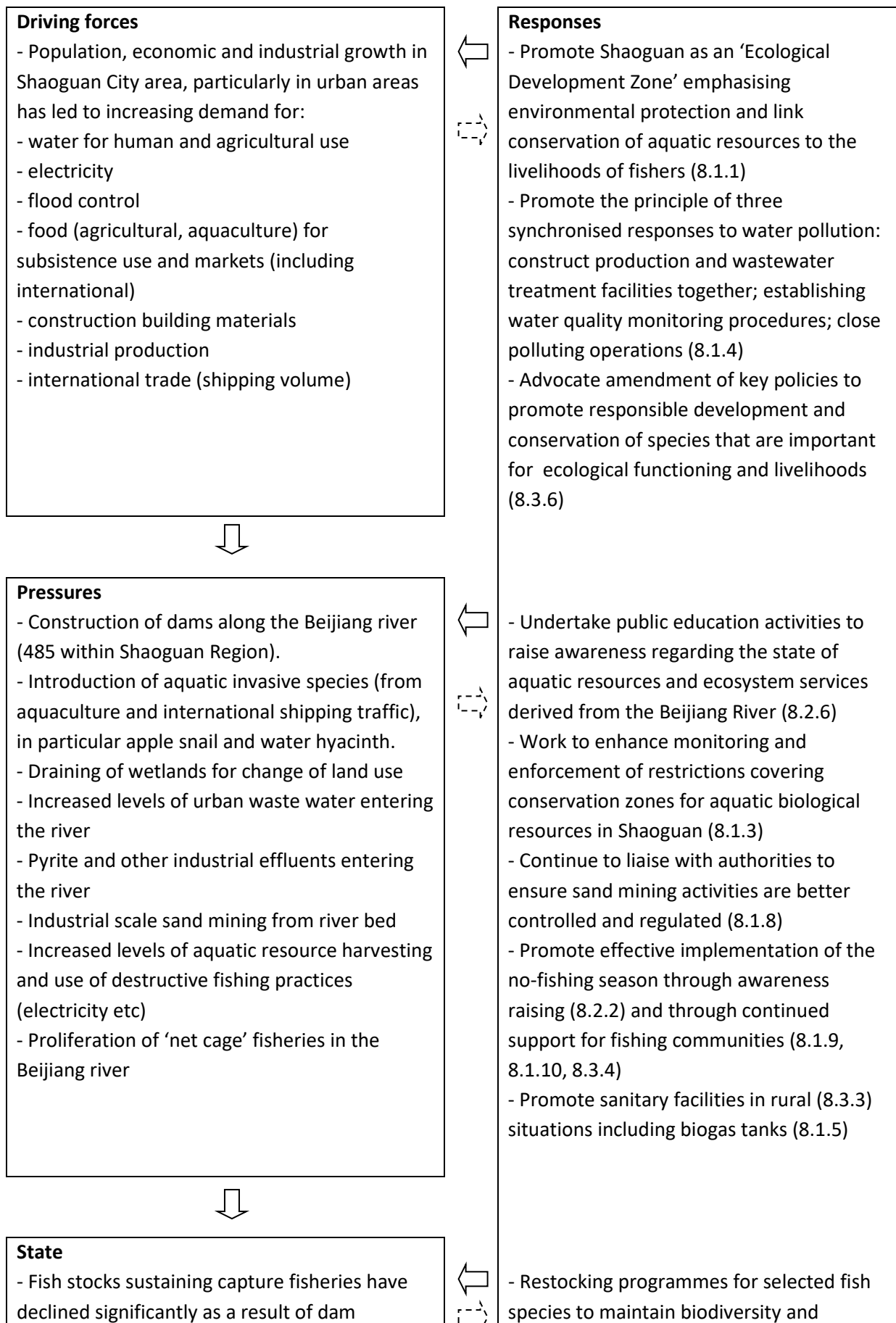


Figure 1. Systematic diagram of an integrated action planning process.



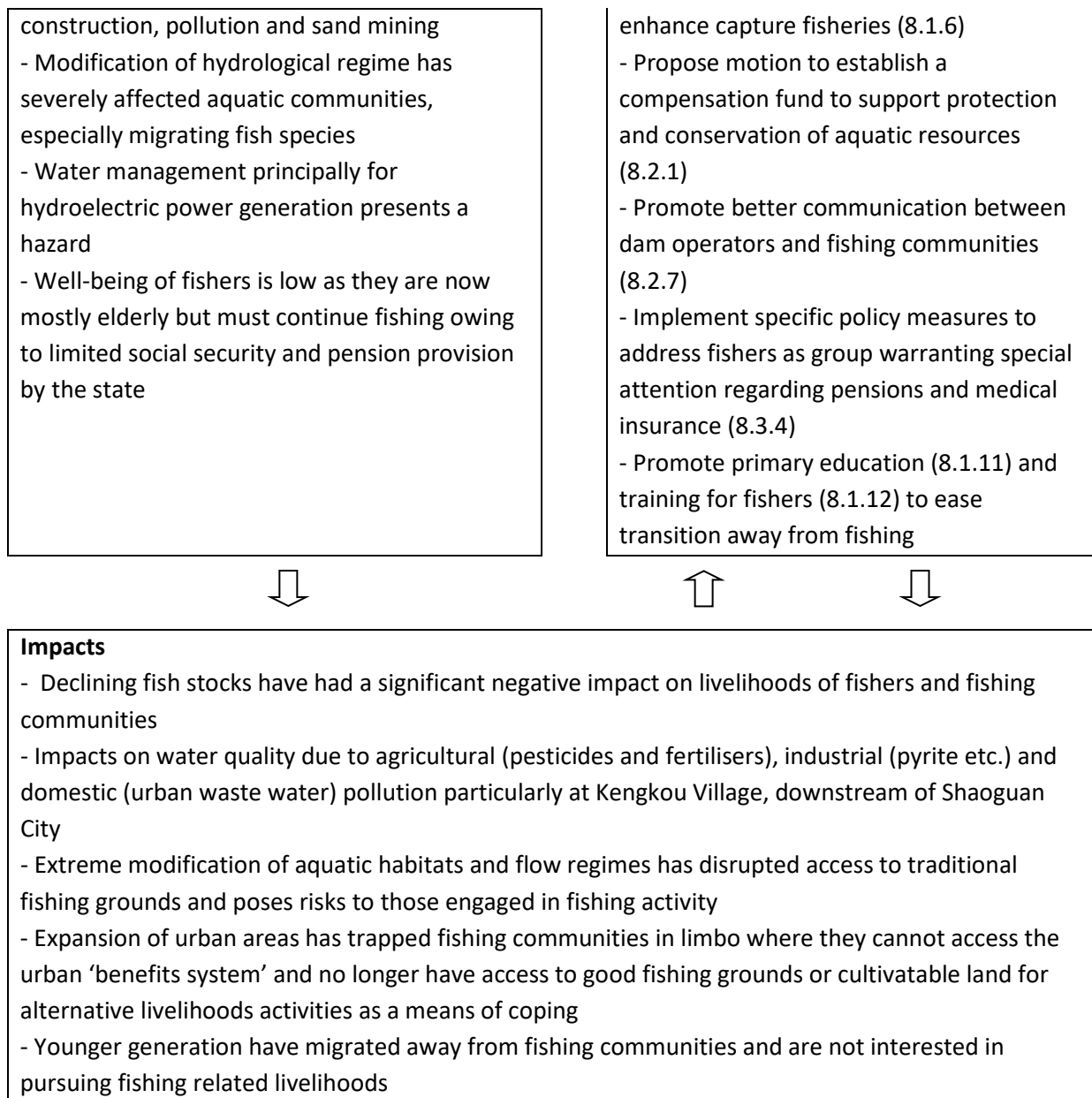


Figure 2. DPSIR framework from a livelihoods perspective for the Beijiang River, China (solid arrows indicate the typical cause-and-effect interpretation of the DPSIR framework and scope for Responses across this continuum; broken arrows indicate that Responses must be moderated in light of prevailing conditions). Source: Bunting (2012a).