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The *Asta-Ja* Environmental and Natural Resources Policy Framework (Asta-Ja ENRPF) for Sustainable Development in Nepal

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Effective policy measures are necessary for sustainable utilization, conservation, and development of environmental and natural resources. In order to formulate effective policies, it is important to have a theoretically grounded, holistic, inclusive, science-based, collaborative, forward looking, and systematic policy framework. This paper presents the Asta-Ja Environmental and Natural Resource Policy Framework (Asta-Ja ENRPF) consisting of Asta-Ja policy guidelines and the Asta-Ja policy cycle for sustainable environmental and natural resources development and socio-economic transformation in Nepal.

1. Introduction

Environment refers to everything that surrounds us and consists of the lithosphere, hydrosphere, atmosphere, and biosphere (McKinney and Schoch, 1996). The dynamic interactions and interrelationships among these four spheres of the environment result in the "living planet" Earth. While natural resources include specific resource such as soil, water, plants, animals, air, minerals, wind, solar radiation, coal, petroleum, and natural gas; environmental resources include various service-providing natural systems such as atmospheric systems, climatic systems, ecosystems, natural habitat, and wilderness. Environmental and natural resource policies are key instruments for enhancing sustainable development and socio-economic transformation of a nation. Policies of a nation include several operational, regulatory, and financial measures including constitutional rights, acts, rules, regulations, plans, and guidelines. While policies guide a nation's developmental and resource conservation endeavors, they also define the roles, duties and responsibilities of governmental agencies, private businesses, common people, and other stakeholders in resource conservation and development. In addition, regulatory and financial policy measures demonstrate the degree of control as well as incentives for resources conservation, utilization, and development in a society.

Nepal's environmental and natural resources policy stakeholders include several governmental and private institutions as well as diverse interest groups including judicial bodies, advisory bodies, policy making bodies, corporate and local bodies, private sector organizations and NGOs, academic institutions, the media, and civil society (ADB/ICIMOD, 2006). While policy advisory bodies such as the National Development Council, National Planning Commission, and Environmental Protection Council that are chaired by the prime minister provide guidance on environmental and natural resources policy formulation and their legal frameworks, procedures, and policy implementation, policy making bodies such as the Parliamentary Committee on Natural Resources Environmental Protection has a mandate for policy guidance and issues directives to the executive branches of the government. The National Planning Commission is an apex planning agency and is responsible for formulation of the country's strategic plans and annual programs. Major line ministries involved in environmental and natural resource policy decisions include the Ministry of Agriculture and Cooperatives (MOAC), the Ministry of Forest and Soil Conservation, the Ministry of Physical Planning and Works, the Ministry of Energy, the Ministry of Irrigation, the Ministry of Land Reform and Management, the Ministry of Environment, the Ministry of Industry, the Ministry of Science and Technology, and the Ministry of Local Development. Various departments and agencies such as the Nepal Agricultural Research Council and the Central Food Research Laboratory under the MOAC, and the Department of Hydrology and Meteorology and the Nepal Bureau of Standards and Metrology under the Ministry of Industry are directly and heavily involved in the formulation and implementation of national environmental and natural resource policies in Nepal.

Nepal has enjoyed continuous assistance and support from several multinational and bilateral aid agencies on a large number of developmental projects including the drinking water supply, irrigation, rural roads, forest management, national parks and wildlife conservation, education, health, agricultural development, and policy decision making. These international aid agencies include the Asian Development Bank (ADB), World Bank, Food and Agriculture Organization (FAO), and United Nations Agencies (UNDP, World Food Program, UNICEF) as well as several bilateral donors such as Japan, Denmark, Germany, Switzerland, Norway, Canada, Australia, Finland, the United Kingdom, and the United States (ADB, 2010; Friedrich Ebert Stiftung, 2001; UNDP, 2007).

Several policy decision models and frameworks such as "the Garbage Can Model" (Cohen et al., 1972), the structure, environment and the governmental policy responses policy framework (Ripley, 1974), a rational decision model (Stone, 1988), linear process model (Meier, 1991), interactive model of policy implementation (Grindle and Thomas, 1991), and the multiple streams policy process model (Kingdon, 1995) are available in the literature. The multiple streams model that includes problem, policy, and politics streams, is believed to offer opportunities for successful policy making in developing countries, as it takes into account the fluidity of the policy process and appreciates the role of ideas and knowledge on policy change. In this model, the problem stream includes problem

definition, the policy stream includes alternative solutions and policy proposals, and the politics stream includes governmental changes, legislative turnover, or emergence of new interest groups. Appropriate policy decisions can be made when a "policy window" opens by overlapping the three streams (Kingdon, 1995). Kingdon (1995) noted the use of multiple streams model in the US federal government policy process. Despite the use of various policy models for following through a policy cycle of problem identification, alternative solutions, setting agendas, policy formulation, policy implementation, and policy monitoring and evaluation (Ligal, 2006; Clemons and McBeth, 2009; Smith, 2009), with their current policy processes many developing countries have not been able to sufficiently capture the needed policy information, improve policy environment, enhance public participation, generate effective environmental and natural resources policies, and enhance sustainable development. Various factors such as conflicting interest groups, lack of quality information, shortage of trained manpower, lack of financial resources, political conflicts, self-interest of specialized governmental agencies, the complexity of the interactions within and between natural systems, and the need for pursuing multiple-goals simultaneously complicate environmental and natural resource policymaking in developing countries (Ascher and Healy, 1990).

Formulating effective environmental and natural resource policies, especially for a developing nation, is a very challenging task. This challenge, however, can be effectively handled by adopting an appropriate policy framework for environmental and natural resources policy making. Such a policy framework should be holistic, science-based, systematic, inclusive, and forward looking. The policy framework should also enhance the generation of environmental and natural resources information, raise environmental awareness, encourage public involvement in policy process, and offer opportunities for learning policy problems and issues to all stakeholders. Considering these facts, below I propose a systematic, science-based, and comprehensive Asta-Ja Environmental and Natural Resources Policy Framework (Asta-Ja ENRPF) for sustainable environmental and natural resources conservation and socio-economic transformation in Nepal.

2. The Asta-Ja Framework

Recognizing the vast natural resources in Nepal, I propose a theoretical framework based on sustainable development and management of Eight *"Ja"*—Nepali letter *"Ja"*, *Jal* (water), *Jamin* (land), *Jungle* (forest), *Jadibuti* (medicinal and aromatic plants), *Jansakti* (manpower), *Janawar* (animals), *Jarajuri* (plants), and *Jalabayu* (climate) referred to as Asta-Ja in the Nepali language, for economic development and management of Nepal (Poudel, 2008). In my recent publication (Poudel, 2010), I have assessed challenges and constrains of Asta-Ja development in Nepal and have proposed a strategic framework for Nepal's sustainable development and socio-economic transformation. This paper presents the Asta-Ja ENRPF consisting of Asta-Ja policy guidelines and the Asta-Ja policy cycle.

3. Policy Overview

The Nepalese government formed a Land Reform Commission in 1953 and its First Five Year Plan was launched in 1956. Since then, Nepal has successfully completed 10 five-year plans and currently is into the Three-year Interim Plan. These plans have emphasized the overall development of the nation through developments in agriculture, forestry, water resources, population control, trade, transportation, industries, and other issues. The development of long-term plans such as a Master Plan for the Forest Sector (MPFS) (1989-2010), the Agriculture Perspective Plan (1997-2017), the Nepal Water Plan (2002-2027), the Renewable Energy Perspective Plan of Nepal (2000-2020), the Perspective Energy Plan (1991-2017), and the Tiger Conservation Action Plan (2008-2012), clearly indicate Nepal's emphasis on environmental and natural resources for the nation's economic development. Various environmental and natural resources policies, guidelines, acts, and regulations after Nepal had begun planned development were compiled and are presented in Table 1.

Natural resources policies which were begun through the centralization of management and decision making through the introduction of the Private Forests Nationalization Act of 1957 turned into decentralized management, especially in the forest sector, after the development of the National Forestry Plan of 1976 and the introduction of the *Panchayat* Forest Rules of 1978 and the Community Forestry Programs in 1980. However, public involvement in planning forestry resources through the adoption of the "bottom-up" approach began as early as 1965 with the implementation of Nepal's Third Plan (1965-70) (Wagle and Ojha, 2002). The "bottom-up" approach emphasized the involvement of local and field level forestry staff in planning and management of forestry resources. While the Seventh Five-Year Plan of Nepal (1985-90) emphasized the involvement of rural communities in forest resource management, the Eighth Plan (1992-97) was a major breakthrough in collaborative and participatory forest management, as this plan adopted the MPFS (1989-2010), and showed commitment to the establishment of Community Forest User Groups (CFUGs) for community management of forests in Nepal (Wagle and Ojha, 2002). The enactment of the Nepal Water Corporation Act in 1989 can be considered as the decentralization and the devolution of power with respect to water resources in Nepal. The Ninth Plan (1997-2002); however, put a major thrust on decentralization and the involvement of the private sector in hydropower, telecommunications, education and health, transport, and irrigation development in Nepal (NPC, 2003).

The Constitution of the Kingdom of Nepal, 1990, Part 4 Article 26, stipulates that the State shall pursue policies to mobilize natural resources and heritage for the benefit of the nation, provide protection of the environment, increase public awareness about environmental cleanliness, and conserve wildlife, the forests, and vegetation. As a result, Nepal witnessed the formulation and implementation of a large number of forest, water, and environmental policies in the 1990s. Governmental initiatives on medicinal and aromatic plants as well as environmental sustainability is apparent from the policies and acts that were

formulated in those fields (Table 1). It is noteworthy that these policies, acts, rules, and regulations can effectively serve as the basis for future policy making. Lessons learned from these policy implementations will be a great asset for future policy decisions.

In the past two decades, Nepal's policy decision making has been quite ad hoc in nature, hasty as well as haphazard. Often polices were made with limited discussion and without understanding what the policy entailed. Despite active roles played by several international agencies, the private sector, and NGOs in recent years in policy formulations and implementations (Dahal et al., 2000; NPC, 2003; Maltsoglou and Taniguchi, 2004; Larsen et al., 2005; SDC, 2009; ADB, 2010; The World Bank, 2010), Nepal's success in policy implementation is very unsatisfactory (NPC, 2003; Larsen et al., 2005; Sharma, 2009). This policy failure is primarily due to the lack of a comprehensive and systematic policy framework, especially in environmental and natural resources, and the lack of adequate engagement of the public in the policy process. A systematic policy approach enhances the involvement of ordinary citizens, the media, and other stakeholders in the policy process, establishes a momentum of national awareness, and develops commitment to resource conservation and development.

Table 1: Various environmental and natural resource policies, acts, regulations, guidelines, and plans in Nepal.

Resources	Policies, rules, regulations, legal provisions	References
Water	*Muluki Ain* 1963; National Legal Code 1963; Water Resource Act 1967; Water Supply and Sanitation Policy Guideline 1985; Irrigation Policy 1988; Nepal Water Supply Corporation Act 1989; Irrigation Policy 1992; Hydropower Development Policy 1992; Electricity Act 1992; Industrial Enterprise Act 1992; Water Resource Act 1992; Nepal Water Supply Sector Policy 1998; Drinking Water Regulation 1998; Hydropower Development Policy 2001; The Water Resources Strategy Formulation 2001; The National Water Plan (2002-2027); Irrigation Policy 2003; the Rural Water Supply and Sanitation National Policy 2004; Rural Water Supply and Sanitation National Strategy 2004; Rural Water Supply and Sanitation National Action Plan 2004; Rural Energy Policy 2006;	Wicken et al., 2006; Kafle, 2008; MOST, 2010; MOIR, 2010; MOEN, 2010

Resources	Policies, rules, regulations, legal provisions	References
Land	Land Reform Commission 1953; Promulgation of Land Reform Program, 1956; Preparation of Land and Cultivator's Record Act 1954; Lands Act 1955; Abolition of Birta Land Act 1957; Agriculture Act, 1960; Land Act 1964; Land Acquisition Act 1977; Mines and Mineral Act 1985; Mines and Mineral Act 1994; High Level Land Reform Commission 1995; National Action Program on Land Degradation and Desertification 2004; Mines and Minerals Regulation 1999; Amendment of Land Related Act 2000; National Wetland Policy 2003;	Chapagain, 2001; Kuo, 1998; ADB/ ICIMOD, 2006; MOLRM, 2010; MOI, 2010
Forest	Private Forests Nationalization Act 1957; Forest Act 1961; Forestry Act 1963; Forest Protection (Special Arrangements) Act 1967; Forest Products Sales and Distribution Rule 1970; National Forestry Plan 1976; *Panchayat* Forest Rules of 1978; The Community Forestry Programme of 1980; Soil and Water Conservation Act 1982 and Regulations 1985; National Conservation Strategy 1983; National Conservation Srategy, 1988; Master Plan for the Forestry Sector (1989-2010); Forest Act 1993; Forest Regulations 1995; Monopoly rights on timber sales, 1998; First amendment of Forest Act 1993, 1998; Timber at reduced prices, 1999; Ban on green felling, 1999; Forestry Sector Policy, 2000; Community forestry stopped in Terai, 2000; Special forest policy for Terai, 2000; Forest inventory guideline, 2000; Community forestry guideline revision, 2001; Second amendment of Forest Act 1993, 2001; Community Forestry directives, 2001; Tax on community forest user groups (CFUG), 2003; Collaborative forest management guideline, 2003; revised	Ojha et al., 2007; Ojha, 2000; Rasul and Karki, 2007; ADB/ ICIMOD, 2006; Wagle and Ojha, 2002; Gautam, 2006;
Medicinal and aromatic plants	National Ayurveda Policy, 1996; Nepal Biodiversity Strategy 2002; Non timber forest products (NTFP) policy, 2004;	Ojha et al., 2007; MOHP, 2010;

Resources	Policies, rules, regulations, legal provisions	References
National parks and wildlife	Aquatic Conservation Act 1960; National Parks and Wildlife Conservation Act 1973; Amendment NPWC 1993; Buffer Zone Regulations 1996; Tiger Conservation Action Plan 2008-2012;	Ojha, 2000; DSCWM, 2007; DNPWC/ MoFC/GoN, 2007;
Agriculture, plants, animals	Food Act 1967; Plant Protection Act 1972; Plant Protection Regulations 1975; Nepal Agricultural Research Council Act 1991; Master Plan for Livestock, 1991; Agriculture Perspective Plan (1997-2017); National Seed Act; The National Agricultural Policy 2004; Agro Biodiversity Policy, 2006; Nepal Biotechnology Policy 2006;	MOAC, 2010; MOST, 2010;
Environment	Ancient Monument Protection Act 1956; Solid Waste Management and Resource Mobilization Act 1987; National Conservation Strategy 1988; Pesticides Act 1991; Industrial Enterprises Act 1992; Vehicle and Transport Management Act 1992 and its Regulations 1997; Nepal Environmental Policy and Action Plan 1993; National EIA Guidelines 1993; Environmental Impact assessment Guidelines for the Forestry Sector 1995; Environmental Protection Act 1996 and its Regulations 1997; National Plan of Action on Habitat 1996;	ADB/ ICIMOD, 2006; MOI, 2010;
Manpower	Industrial Training Act 1982; Labor Act 1991; Trade Union Act 1992; Local Self Governance Act 1999; Open and Distance Learning Policy, 2006; Non-formal Education Policy, 2006; Technical Education and Vocational Training Skill Development Policy, 2007.	MOLTM, 2010; MOE, 2009;

4. Policy Problems

Inadequate public participation in policy decisions is a major problem. Nepal's unique working environment, developmental challenges and constraints, and prevailing natural resources utilization and management systems demand the involvement of the general public as well as the knowledge and experience of government officials and other stakeholders on policy making. Development experts affiliated with multilateral and bilateral agencies possess highly valuable knowledge and experience on many issues related to the environment and natural

resources. This experience, expertise, and knowledge must be well utilized for the nation's environmental and natural resources conservation and development. Although the government of Nepal initiated decentralized planning through the introduction of the Local Administrative Act of 1965, the District Administrative Plan of 1975, and the Decentralization Act of 1982; as well as stipulating decentralization in the Constitution of the Kingdom of Nepal in 1990, Article 25 (4), and emphasizing it further in subsequent National Plans (Dahal et al., 2000), public participation in policy process is still dismal. The major constraints to public participation in the policy process include poverty, inequality, isolation, gender biases, lack of public awareness (Dahal et al., 2000) as well as lack of necessary resources. Policy decisions lacking public involvement are certain to fail.

The lack of quality information for policy decisions (Ligal, 2006) presents another major challenge for effective policy making in Nepal. For better policies, there should be a timely availability of relevant information for various interest groups and stakeholders. Even if there did exist some environmental and natural resources information, it would be much dispersed, heterogeneous, inaccessible, discontinuous, and unreliable (ADB/ICIMOD, 2006). An up-to-date Asta-Ja database that is accessible to policy makers and other stakeholders will facilitate policy making in Nepal. As many environmental and natural resource issues such as water pollution, air pollution, soil pollution, industrial pollution, and hazardous waste are closely related to public health, emerging health consciousness among the public often drives environmental and natural resources policy decisions. Lack of scientific information prevents policy makers from effective policy decision making.

Fragmented policies are another problem in Nepal (NPC, 2003; Gautam, 2006). As Asta-Ja resources are highly interrelated and interlinked, policy decisions relating to one resource with insufficient thought and analysis on its impacts on other resources may result in negative impacts on the natural resource base of the nation. Coordination of these highly fragmented policies has become a challenge. It can easily be understood how complicated the coordination of water policies will be when at least three Ministries: the Ministries of Energy, Irrigation, and Physical Planning and Works, as well as various multilateral and bilateral agencies, are directly or indirectly involved in Nepal's water policies. Realizing the importance of water policy coordination, the Water and Energy Commission Secretariat (WECS) was established in 1981. However, due to lack of explicit authority for WECS, its coordination role has not been effective (Wicken et al., 2006). The National Water Resources Development Council is another overarching body which includes representatives from political parties, senior government officials, non-government spokespersons, and governmental agencies mandated for assisting the government in national water policy formulation. Despite these efforts on water policy coordination, Sharma (2009) reported that coordination of water policies is a major challenge in Nepal. Similar policy coordination issues are found in other sectors such as land, forest, medicinal and aromatic plants.

Implementation failure of policy measures is another major problem

in Nepal (NPC, 2003; ADB/ICIMOD, 2006; Ligal, 2006). Several causes for policy failures include inadequate focus on cross-cutting issues, lack of adequate resources, continuous interventions by political parties, the inability of policy institution to implement policies, political instability, inability of national advisory bodies to function effectively (ADB/ICIMOD, 2006); formulation of national policies in haste, lack of public participation, inadequate homework on policy formulation (Legal, 2006); and frequent changes in senior staff with changes in government. Misuse of policies by politicians to win voter interest (Gautam, 2006), and policies not representing the ground realities such as arbitrary royalty rates, lengthy and costly export formalities, contradictions between forest acts and local governance acts, and inadequate fiscal incentives for non-timber forest products (Ojha, 2000) predispose policies to have poor rates of acceptance and success. Lack of understanding and inconsistency in policy objectives among local communities and various levels of governmental agencies have also been identified as factors responsible for policy failure in Nepal (Larsen et al., 2005). According to Ascher and Healy (1990), natural resources policy implementation failure results from various causes including political rivalry, regional and ethnic disputes, and corruption. Insufficient collaboration among various stakeholders including the general public, universities, research institutions, multilateral and bilateral agencies, NGOs, civic society organizations, the media, and private businesses in policy decision making and implementation is another reason for policy failure in Nepal.

5. Asta-Ja Policy Guidelines

5.1 Comprehensive approach

Sustainable development and resource conservation requires comprehensive management of environmental and natural resources (Ascher and Healy, 1990; Regan, 2004). For instance, while we deal with water resources development and management it is important to consider forests, land, wildlife, agricultural and other resources. A comprehensive approach in the policy process helps in tackling cross-cutting and highly interlinked issues such as poverty alleviation, rural development, and natural resource conservation and development. Policy formulation without having comprehensive knowledge of natural resources and socio-economic conditions results in policy failure and resource degradation (Gautam, 2006). Therefore, in order to enhance sustainability of natural resource systems, a broad range of factors such as political, socio-economic (National Research Council, 1993), biophysical, institutional, informational (Poudel et al, 1999), and international should be recognized and considered in policy decisions. Realizing this fact, the Nepal government had developed overarching policy measures such as the Nepal Environmental Policy and Action Plan of 1993 and the Environmental Protection Act of 1997 for environmental and natural resources conservation and development in Nepal. These policy measures include a broad scope of environmental and natural resources such water, land, forest, air, rangeland, health, education, urban and industrial development, natural and cultural

heritage, and public resource management (Chapagain, 2001). Such an approach to environmental and natural resource policy decisions should be continued.

5.2 Long-term Perspective

The government's long-term strategic plans, statement on intended policy outcomes, and forecasting demonstrate a long-term approach to a policy process (Bullock et al, 2001). It is commendable that Nepal has developed long-term perspective plans such as the Master Plan for Forest Sector (1989-2010), the 20-year Agricultural Perspective Plan (APP) (1997-2017), and the 20-year Water Resource Plan (2002-2027); however, it is important to have effective policies and successful implementation of these plans in order to make positive impacts on the resource base and the socio-economic transformation of the nation. It is equally important to assess and analyze the long-term impacts of the policy measures using statistical trends and informed predictions on political, economic, and cultural dimensions of the nation (Bullock et al., 2001). Although politicians generally have a short-term time horizon (Ascher and Healy, 1990) and may prefer short-term policies and programs to make immediate impacts, a long-term perspective is needed for the nation's Asta-Ja resource development and management and socio-economic transformation.

5.3 Competitive Advantage

Nepal is a member of several international trade-related organizations and has entered into various regional and international trade agreements. Some of the organizations and agreements include the South Asian Association for Regional Cooperation (SAARC), Bay of Bengal Initiative for Multisectoral Technical and Economic Co-operation (BIMSTEC), the World Trade Organization (WTO), SAARC Preferential Trading Arrangement (SAPTA), and South Asian Free Trade Area (SAFTA). Nepal is attempting to increase its participation in European, Mid-Eastern, Australian, and American global markets. Market competition for such a nation with poorly established institutional mechanisms are enormous and the challenges for meeting the increasingly high international trade standards are formidable (ADB/ICIMOD, 2006). Nepal certainly needs to identify industries and production units that offer competitive advantages. Michael E. Porter (1998) has proposed the four-diamond model for creating national competitive advantage of nations. Factor conditions, demand conditions, company's strategy, structure and rivalry, and associated and supporting industries are the four points of Porter's four-diamond model. According to this model, a nation's competitive advantage is based on factors such as human and natural resources including infrastructures; demand conditions such as customer's needs and wants domestically and internationally; a company's strategy, structure, and rivalry such as domestic competition, product innovations, marketing investment, management styles; and associated and support industry such as educational institutions, competitiveness of local industries supporting the industry, and good connections and relationships with the suppliers of raw materials. Factors like these must be taken into consideration while formulating natural resources policies for enhancing competitiveness of local

industries in the regional and global markets. Nepal's unique conditions such as natural panoramic scenic views, diverse climatic conditions, excellent landscapes for high-value crops production and seed industries, and even development of residential areas and theme parks may offer a competitive advantage for Nepal.

5.4 Global Climate Change

Global climate change has adversely impacted the Himalayan region, resulting in extreme rain events, glacial retreat, earlier snowmelt and shorter winters, natural hazards, altered river regimes, interrupted water supply and people's livelihoods (Gaur, 2007; Schild, 2007). Understanding and the adaptation of appropriate measures to cope with climate change and related natural incidents such as landslides, avalanches, and debris flows are major challenges for Nepal (Kenneweg, 2008; Schild and Banskota, 2008). Continued monitoring of glacial lakes and the development of mitigation measures for protecting infrastructures and human life are urgent (Poudel, 2010). Greenhouse gases such as CO_2, CFC, CH4, O3, and N2O, which cause global warming and climate change are generated through various sources including electricity and heat generation, transportation, mining, industrial processes, agriculture, and coal power usage. In recent years, the annual global emissions of total carbon (CO_2, CH_4, hydrocarbons, etc.) have increased 4.3% annually, and CFC, CH_4 and N2O have increased by 5%, 1% and 5%, respectively (Botkin and Keller, 2005). As a result of these increased levels of GHG, the earth is getting warmer. The National Academies (2009) reported that the average surface temperature of the earth has risen about 1.3oF since 1850, and based on model predictions, if the current rates of the GHG emissions continue, compared to 1990 the earth will be 4.3 to 11.5^{o}F warmer by 2100. This rise in global temperature will impact sea level rise, water supply, occurrences of extreme weather, shifts in species' ranges and in their phenologies, habitat shrinkage and loss, melting of ice caps and glacial lake outbursts, flooding, agricultural shifts, wildfire, droughts, poorer food quality, an increase of invasive species as well as outbreaks of insects and diseases (The National Academies, 2009; Hua, 2009; Nellemann and Kaltenborn, 2009; Armstrong et al., 2009; Bloom, 2010). The impacts of global climate change will be most evident in high altitudes such as Nepal where the Himalayas and the highest peak, Mt. Everest, are located. Understanding vulnerabilities associated with global climate change and formulating appropriate policy measures for mitigation and adopting necessary precautionary measures for maintaining people's livelihood is critical for Nepal.

5.5 Interdisciplinary Approach

Natural resources such as land, water, air, forests, and wildlife are highly connected and interlinked (Poudel, 2008). Therefore, experts in various fields such as engineering, forestry, agronomy, horticulture, anthropology, hydrology and soils are needed while analyzing environmental and natural resource problems and identifying their solutions. Because there are multiple users of environmental and natural resources, any change in the governance, management, and utilization of these resources often results in conflicts and differences among the stakeholders.

Since interdisciplinary communication and cooperation helps to solve the problems that arise due to differences in the perspectives of various stakeholders in developing and implementing natural resources strategies and projects (Regan, 2004) and brings experts from diverse fields and backgrounds together in problem solving, an interdisciplinary approach is necessary for environmental and natural resources policy decision-making.

5.6 Public Participation

Adequate engagement of citizens and stakeholders at different levels is necessary for effective policy making and implementation to achieve success in natural resources development and management (Bhattarai et al., 2005; Zhen et al., 2006). Sufficient and effective public involvement in the policy process not only results in effective policy-decisions but also provides opportunities for citizens' learning on policy formulation, developing civic pride, and motivating common people in nation building. People participation in policy implementation is also the best way of minimizing conflicts among stakeholders. Low public participation in decision making is often the outcome of "top-down" decision making, inadequate education, and a low level of literacy (Zhaoli, 2004), as well as social and gender inequalities and exclusion. Environmental and natural resources policies that are devoid of public participation and depend entirely on external technologies will never be self-reliant. Likewise, policies oblivious to grassroot realities that lack community participation are doomed to fail, and the society will have to pay a larger price for survival in the future.

5.7 Environmental and Economic Priorities

Prioritization of the environmental and economic issues and problems to be solved is important for effective allocation of resources. Nepal's Tenth Plan (2002-2007) embraces broad-based economic growth as well as targeted programs to include all beneficiary groups in developmental initiatives (NPC, 2003). Major strategies adopted in the Tenth Plan for the nation's development were based on four pillars: broad-based economic growth, social sector development including human development, targeted programs including inclusion of poor, marginalized, and vulnerable groups in the mainstream of development, and good governance. It is important to note that the priority of the issues related to environmental and natural resources may vary by regions and localities. For instance, while pasture development and livestock production may be a high priority for one region, the issue of the management of medicinal and aromatic plants and their trade may rank high for another region.

5.8. Collaborative Model

While the devolution of the power and the decentralization of responsibilities in management of environmental and natural resources such as forest resources, irrigation, pasture lands, etc. have become a major worldwide trend, especially after 1990 (Fisher, 1998), collaborative resource governance,

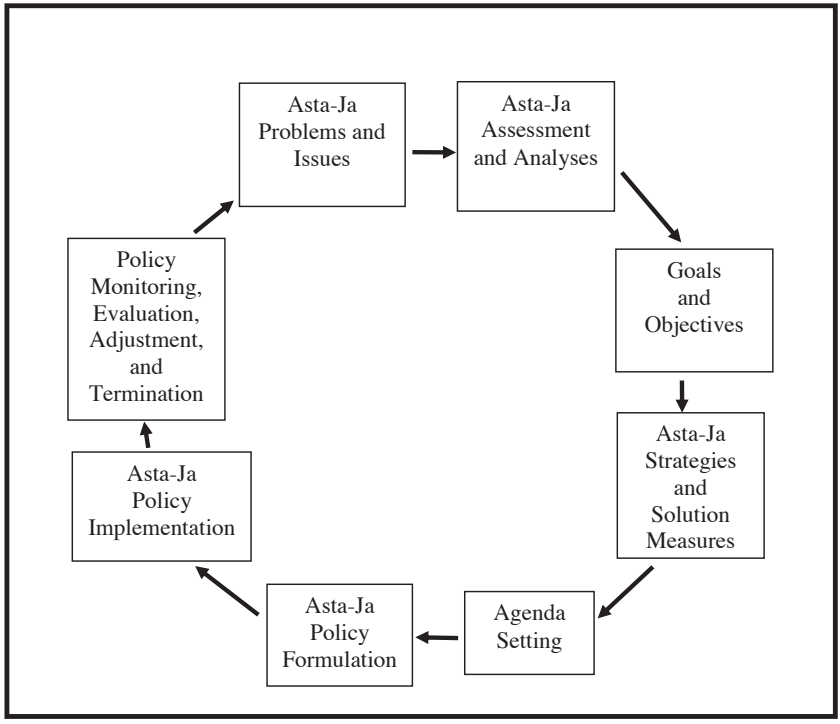
conservation and development is on the rise worldwide in recent years (Zhaoli, 2004; Cheng, 2006; Gerlak and Heikkila, 2006). In fact, Cheng (2006) claims that collaboration and related words such as cooperation and coordination have become the major agenda issues for public land policy initiatives in recent years in the US. According to Gerlak and Heikkila (2006), collaborative resource governance involves bringing various stakeholders including governmental agencies and resource users together in programs to solve environmental and natural resources problems. Some examples of such a large-scale natural resource program in the US include the Chesapeake Bay Program, Lake Tahoe program, Columbia River Basin, California Bay-Delta, the Florida Everglades Restoration Program, and Louisiana's Coastal Wetlands Planning, Protection and Restoration Act program. In order to achieve their goals and objectives, participants in these large programs collectively make decisions on environmental and natural resources polices and rules in implementing the programs (Gerlak and Heikkila, 2006). Similarly, Zhaoli (2004) found remarkable success in rangelands management and development in China, using ICIMOD supported co-management of rangelands approach in policy negotiation and program implementation. In this approach, local communities, governmental agencies and experts collaborate and negotiate in the design and implementation of rangeland management policies, rules and strategies. The collaborative approach to natural resource governance, conservation and development draws critical attention, especially when there are conflicting results with respect to the success of decentralization on natural resource development and management. While some researchers have reported decentralization of forest management as quite cost-effective (Somanathan, et. al., 2009) resulting in better forest regeneration (Chhatre and Agrawal, 2008), other scholars have found that decentralization and participatory management of forest resources is associated with overexploitation, social conflicts, corruption by the elite, and disparity in revenue sharing among participating groups (Wagle and Ojha, 2002; Bhattarai et al., 2002). These findings clearly suggest that a collaborative model is appropriate for natural resources governance, sustainable resource conservation and development, and policy decision-making. A collaborative approach in policy decision making and program implementation provides opportunities for all participants to present and discuss their views and perspectives and come up with a collaborative vision and perspective for resource conservation and development. This will enhance effective policy formulation and implementation.

6. Asta-Ja Policy Cycle

Policy scholars have identified various stages through which a policy decision generally follows. These stages include problem definition, agenda setting, policy making, and policy implementation. The conventional approach to policy decision-making largely involves a single sector, and policy decisions are often made without holistic consideration. As opposed to the conventional single sector policy cycle, the Asta-Ja policy cycle (Figure 1) requires a multisector, participatory, and holistic approach in problem assessment and analyses, identification of alternative solutions, and policy formulation. This approach requires adherence to the Asta-Ja

policy guidelines presented in the earlier section. The Asta-Ja policy cycle passes through the following eight stages.

Figure 1: The Asta-Ja Policy Cycle



6.1 Asta-Ja Problems and Issues

Problem analysis involves the identification, description, evaluation, assessment, and documentation of the reasons or causes of the problems. Every Asta-Ja problem should be analyzed considering its interrelationship and linkages among and between the Asta-Ja while paying full attention to its biophysical, socio-economic, institutional, and informational aspects. Problem definition often involves heavy politics and those problems that affect a large number of the population or threaten the values and interest of higher and powerful strata of the society receive more governmental attention (Clemons and McBeth, 2009). Availability of quality information and the active involvement of stakeholders in problem identification and analysis are necessary for an accurate problem definition (Ligal, 2006). It is necessary, therefore, to increase the nation's environmental awareness and generate quality information for accurate problem definition and policy decision-making.

6.2 Asta-Ja Assessment and Analyses

Availability of quality information with regards to Asta-Ja problems is critical for effective policy decision making. Reconnaissance surveys, field observations, data collection, historical data analysis, and use of literature, etc., can be useful in Asta-Ja assessment and analyses. The information collected may also include public opinions, media reports, politicians' speeches, scientific reports, databases, or any other information that is relevant to policy making. Sources for such information include advocacy groups, townhall meetings, media houses, universities, public offices, students theses, scientific reports, papers, NGOs, INGO, annual reports, government reports, etc. News media reports such as radio, television, newsletters, and newspapers would be other sources of information. Different tools and techniques such as GIS, RS, GPS, system dynamics modeling, time series analyses, geo-spatial analyses, computer graphics, computer models, etc., could be used for data analyses and presentations.

6.3 Goals and Objectives

Environmental and natural resources problems often require targeting multiple goals. For example, water quality improvement in a river basin may require effective control of point sources as well as nonpoint sources pollution in the basin, an increase in public education and awareness, implementation of best management practices for pollution control, forestation of degraded lands, soil erosion control, and formulation of effective programs and policies for water quality improvement. Achieving these multiple goals may require considerable time and resources. It is important to set up goals and objectives across time ranges, from short-term to long-term. From the utilitarian perspective, a society may like to utilize the resources for immediate well-being of the society, but from a sustainable development perspective, it is important to utilize the resources at present without compromising the opportunities for resource utilization by our future generations. Goals and objectives reflect societal perspectives on environmental and natural resources conservation and development.

6.4. Asta-Ja Strategies and Solution Measures

While identifying solutions to the problems, it is important to have a clear definition of technological measures, feasibility, and the benefits of these solutions to society. For each problem, we should have alternative solutions and strategies. These alternative strategies and solution measures should be thoroughly assessed and analyzed. Environmental impact assessment or strategic environmental assessment of alternative solution measures will provide information, at an early stage of the decision-making process, to the decision-makers in relation to the sustainability of these alternative solutions (Therivel, et. al., 1994). Before making policy decisions, it is important to understand and consider value conflicts that may arise in society due to a policy suggestion (Clemons and McBeth, 2009). In a situation of serious value conflicts, the policy process may have to go through a series of compromises and tradeoffs. In order to enhance sustainability of natural

resources, some of the considerations that are critical while evaluating alternative strategies and solutions include knowledge of indigenous technology, self-reliant measures, and economic advantages.

6.5 Agenda Setting

Agenda setting entails developing a list of items for policy decision making (Smith, 2009). Cobb and Elder (1971) identified two types of agendas: the systematic agenda and the institutional agenda for policy decisions. While systematic agendas are more general and broader in scope, institutional agendas include specific issues in relation to a decision-making body. According to them, the involvement of the public in agenda setting as well as an understanding of the relationship between these two types of agendas is important for effective policy decision-making. Certainly, agenda setting is an important step in a policy cycle as it determines the items that enter into policy discussions and eventually may result in policy decisions. Agenda items that have overarching impacts and affect the socio-economic conditions of a broader population should certainly get high priority. On the other hand, agenda items dealing with important environmental and natural resource issues such as extinction of endangered species should not be undermined. Another important factor to be considered while setting environmental and natural resources policy agendas include international agreements and treaties that impact environmental and natural resources conservation, utilization and development.

6.6 Asta-Ja Policy Formulation

Policy formulation involves decision making on the agenda items listed in the previous step. Any of the three governmental branches: the legislative, judiciary, or executive, can make decisions on the agenda items. Policy decisions must correspond with the problems and issues identified in Step One (Ligal, 2006); however, policy decisions in Nepal are often weak due to factors such as lack of accurate problem definitions, insufficient information sharing among various policy making agencies, inability to analyze and interpret data, and the shortsightedness of politicians. Due to the complexity and interconnectivity of environmental and natural resources, policy related to one resource must enhance sustainability of the other resources as well (WCED, 1987; Poudel, 2008). For instance, agricultural policies for food security must increase soil quality, enhance conservation, improve biological conservation, and augment forest and water resources sustainability. For effectiveness, the environmental and natural resources policies must be expressed in the body of environmental or natural resource laws such as water quality, air quality, biodiversity, pesticides and hazardous chemicals, management of degraded lands, and trade (Salzman and Thompson, Jr., 2003). Current policy making processes in Nepal demand immediate governmental attention for improvement and development in the policy environment and decision-making process.

6.7 Asta-Ja Policy Implementation

Policy implementation is largely under the discretion of government administrators (Smith, 2009). Simple initiatives such as holding townhall meetings or public debate sessions with governmental agencies with regard to environmental and natural resources issues and concerns may result in large-scale programs and projects in the future. It is important to note that value conflict may still arise while implementing policies (Clemons and McBeth, 2009); therefore, sufficient governmental and political commitment and the availability of resources for policy implementation are vital. When Asta-Ja policies are formulated through the involvement of the public and other stakeholders, their chances for successful implementation are high. In order to facilitate policy implementation, governmental agencies could form technical advisory committees at national, regional, and local levels. These committees often bring about an enormous amount of knowledge and experience to the table which is needed for successful policy implementation.

6.8 Policy Monitoring, Evaluation, Adjustments, and Termination

This step involves the monitoring, evaluation, and reporting of policy implementation. The goals and objectives stated in the policies must be directly monitored, assessed, and evaluated. It is important to develop the governmental agency's monitoring and evaluation capacities for Asta-Ja programs and projects. Such monitoring programs may include crop yield monitoring, water quality monitoring, or forest growth monitoring. Economic indicators such as income per household and employment generated through a policy measure should be assessed. Based on the monitoring and evaluation reports of a policy measure, there may be need for policy reforms or policy adjustments to achieve stated goals or objectives. Otherwise, a policy may have to be terminated. In policy reform, it is important to correctly identify the adjustments and the initiatives needed for policy success. Policy reforms are necessary to incorporate emerging environmental and natural resources issues and problems.

7. Conclusions

Nepal's pre-1990 import substitution policies as well as the post-1990 export-led growth policies have miserably failed in sustaining economic development. One of the major reasons for this failure is the lack of a policy framework that is based primarily on Nepal's natural resource base, grassroot realities, and economic status. Nepal's government, therefore, urgently needs to adopt a sustainable environmental and natural resources policy framework for the nation's fast-paced socio-economic transformation and sustainable development. Considering this fact, the Asta-Ja Environmental and Natural Resources Policy Framework (Asta-Ja ENRPF) for policy decision-making in Nepal is suggested. The Asta-Ja ENRPF is based on a theoretically grounded Asta-Ja framework and offers an opportunity for effective environmental and natural resources policy formulation, implementation, and socio-economic transformation. The basic guidelines for policy formulation in this framework include the comprehensive

approach, long-term perspective, competitive advantage, global climate change, the interdisciplinary approach, public participation, economic and environmental priorities, and a collaborative model for environmental and natural resources governance and policy decision-making. The Asta-Ja ENRPF constitutes an eight-stage policy cycle involving Asta-Ja problems and issues, Asta-Ja assessment and analyses, goals and objectives, Asta-Ja strategies and solution measures, agenda setting, Asta-Ja policy formulation, Asta-Ja policy implementation; and policy monitoring, evaluation, adjustment, and termination.

References

ADB (Asian Development Bank). 2010. *Country Assistance Plans-Nepal*. Available at http://www.adb.org/documents/caps/NEP/0500.asp

ADB/ICIMOD (Asian Development Bank/International Center for Integrated Mountain Development). 2006. *Environment Assessment of Nepal: Emerging Issues and Challenges*. ADB/ICIMOD: Kathmandu.

Armstrong, R., Alford, D. and Racoviteanu, A. 2009. Glaciers as Indicators of Climate Change: the Special Case of the High Elevation Glaciers of the Nepal Himalaya. *Sustainable Mountain Development*, 56: 14-16. ICIMOD: Kathmandu.

Ascher, W. and R. Healy 1990. *Natural resource policy making in developing countries, Environment, economic growth, and income distribution.* Duke University Press: USA

Bhattarai, B., Ojha, H., and Humagain, Y. 2005. Is leasehold forestry really a pro-poor innovation? Evidences from Kavre district, Nepal. *Journal of Forest and Livelihood*, 4(2): 17-30.

Bhattarai, K., Conway, D., and Shrestha, N.R. 2002. The vacillating evolution of forestry policy in Nepal: historically manipulated, internally mismanaged. *International Development Planning Review*, 24(3): 315-338.

Bloom, A.J. 2010. *Global Climate Change: Convergence of Disciplines*. Sinauer Associates, Inc.: Sunderland, Massachusetts.

Botkin, D. and Keller, E. 2005. *Environmental Science: Earth as a Living Planet*. John Wiley and Sons: USA.

Bullock, H., Mountford, J., and Stanley, R. 2001. *Better Policy-Making*. Center for Management and Policy Studies. London: UK.

Chapagain, D. P. 2001. *Nepal: Land and Agriculture*. World Conservation Union (IUCN) Nepal. National Strategies for Sustainable Development. Available at: http://www.nssd.net/country/nepal/nep02.htm

Cheng, A.S. 2006. Build it and they will come? Mandating collaboration in public lands planning and management. *Natural Resources Journal*, 46(4): 841-858.

Chhatre, A. and Agrawal, A. 2008. Forest Commons and Local Enforcement. *PNAS*, 105(36): 13286-13291.

Clemons, R.S. and McBeth, M.K. 2009. *Public Policy Praxis: A Case Approach for Understanding Policy and Analysis (2nd ed.)*. Pearson Longman: USA.

Cobb, R.W. and Elder, C.D. 1971. The politics of agenda-building: An alternative perspective for modern democratic theory, *The Journal of Politics*, 33(4): 892-915.

Cohen, M. D., March, J.G., and Olsen, J.P. 1972. A Garbage Can Model of Organizational Choice, *Administrative Science Quarterly*, 17 (1): 1-25.

Dahal, M.K., Acharya, K.P., Dahal, D.R., Bhattachan, K.B., and Nepal, M.K. 2000. *Development Challenges for Nepal*. Nepal Foundation for Advanced Studies (NEFAS). Embassy of Finland, Kathmandu: Nepal.

DNPWC/MoFSC/GoN. 2007. *Tiger Conservation Action Plan for Nepal*. Kathmandu; Government of Nepal, Ministry of Forest and Soil Conservation, Department of National Parks and Wildlife Conservation.

DSCWM. 2007. Department of Soil Conservation and Watershed Management, Ministry of Forest and Soil Conservation, Government of Nepal. Available at: http://www.dscwm.gov.np/

Fisher, R.J. 1998. *Devolution and decentralization of forest management in Asia and Pacific*. Available at: http://www.fao.org/docrep/x3030e/x3030e03.htm

Friedrich Elbert Stiftung. 2001. *Nepal: Gateway to Nepali Politics and Civil Society*. Available at: http://www.nepaldemocracy.org/institutions/bilateral_donors.htm

Gaur, V. 2007. Mountain Conservation through Accelerated Climate Change. *Sustainable Mountain Development*, 53:15-18.

Gautam, K.H. 2006. Forestry, politicians and power – perspectives from Nepal's forest policy. *Forest Policy and Economics*, 8:175-182.

Gerlak, A.K. and Heikkila, T. 2006. Comparing collaborative mechanisms in large-scale ecosystem governance. *Natural Resources Journal*, 46(3): 657-707.

Grindle, M.S. and Thomas, J.W. 1991. *Public Choices and Policy Change: The Political Economy of Reform in Developing Countries*. Johns Hopkins University Press: Baltimore.

Hua, O. 2009. The Himalayas: Water Storage Under Threat. *Sustainable Mountain Development*, 56: 3-5. ICIMOD: Kathmandu.

Kafle, M. R. 2008. Electric Power in Nepal: History, Experiences & Possibilities. *2007 IEEE Conference on the History of Electric Power May 2, 2008*, 130-139. Available at: http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?tp=&arnumber=4510261&isnumber=4510249

Kenneweg, J. 2008. Climate Change in the Hindu Kush-Himalayas: A Case for International Awareness, Solidarity and Cooperation. *Sustainable Mountain Development*, 54:7-10.

Kingdon, J. W. 1995. *Agendas, Alternatives, and Public Policies* (2nd edition). Harper Collins College Publishers: New York.

Larsen, H.O., Smith, P.D., and Olsen, C.S. 2005. Nepal's conservation policy options for commercial medicinal plant harvesting: stakeholder views. Oryx, 39(4): 435-441.

Ligal, P.R. 2006. *Policy reform net-working in Nepal: a suggested framework*. Available at: http://www.mof.gov.np/economic_policy/pdf/policy_reform.pdf

Maltsoglou, I and Taniguchi, K. 2004. Poverty, livestock and household typologies in Nepal. *ESA Working Paper*, 04-15. Available at: www.fao.org/es/esa

McKinney, M.L. and Schoch, R.M. 1996. *Environmental Science: Systems and Solutions*. West Publishing Company: St. Paul, MN.

Meier, G. M. 1991. Policy Lessons and Policy Formation. In: Meier G.M. (ed), *Politics and Policy Making in Developing Countries: Perspectives on the New Political Economy*, 3-12. ICS Press: San Francisco.

MOAC. 2010. Ministry of Agriculture and Cooperatives, Government of Nepal. Available at: http://www.moac.gov.np/home/index.php

MOE. 2009. Ministry of Education, Government of Nepal. Available at: http://moe.gov.np/new/index.php?option=CMS&id=56

MOEN. 2010. Ministry of Energy, Government of Nepal. Available at: http://www.moen.gov.np/

MOHP. 2010. Ministry of Health and Population, Government of Nepal. Available at: http://www.moh.gov.np/functions/moh.asp

MOI. 2010. Ministry of Industry, Government of Nepal. Available at: http://www.moi.gov.np/

MOIR. 2010. Ministry of Irrigation, Government of Nepal. Available at: http://www.moir.gov.np/departments.php

MOLRM. 2010. Ministry of Land Reform and Management, Government of Nepal. Available at: http://www.molrm.gov.np/

MOLTM. 2010. Ministry of Labor and Transport Management, Government of Nepal. Available at: http://www.moltm.gov.np/opensection.php?secid=468

MOST. 2010. Ministry of Science and Technology, Government of Nepal. Available at: http://www.moest.gov/np/np/

National Research Council. 1993. *Sustainable Agriculture in the Humid Tropics*. National Academy Press: Washington.

Nellemann, C. and Kaltenborn, B.P. 2009. The Environmental Food Crisis in Asia: A 'Blue Revolution' in Water Efficiency is needed to Adapt to Asia's Looming Water Crisis. *Sustainable Mountain Development*, 56: 6-9. ICIMOD: Kathmandu.

NPC (National Planning Commission). 2003. *The Tenth Plan – Poverty Reduction Strategy Paper, 2002-2007*. His Majesty's Government, National Planning Commission, Kathmandu, Nepal.

Ojha, H.R. 2000. Current policy issues in NTFP development in Nepal, Asia Network for Small-Scale Bio-resources (ANSAB), Kathmandu, Nepal. Available at http://www.mtnforum.org/oldocs/169.pdf

Ojha, H., Timsina, N., and Khanal, D. 2007. How are forest policy decisions made in Nepal? *Journal of Forest and Livelihood*, 6(1): 1-17.

Porter, M. E. 1998. *The Competitive Advantage of Nations: with a new introduction*. The Free Press: New York.

Poudel, D.D., Nissen, T.M., and Midmore, D.J. 1999. Sustainability of commercial vegetable production under fallow systems in the uplands of Mindanao, the Philippines. *Mountain Research and Development*, 19(1): 41-50.

Poudel, D.D. 2008. Management of Eight *"Ja"* for Economic Development of Nepal, *Journal of Comparative International Management*, 11(1): 15-27.

Poudel, D.D. 2010. A Strategic Framework for Environmental and Sustainable Development in Nepal, *International Journal of Environmental and Sustainable Development*, [In Press]

Rasul, G. and Karki, M. 2007. *Participatory Forest Management in South Asia: A Comparative Analysis of Policies, Institutions and Approaches*, ICIMOD: Kathmandu.

Regan, K.E. 2004. The need for a comprehensive approach to protecting rare plants: Florida as a case study. *Natural Resources Journal*, 44(1): 125- 162.

Ripley, R.B. 1974. *American National Government and Public Policy*. The Free Press: New York.

Salzman, J. and Thompson, Jr., B.H. 2003. *Environmental Law and Policy*. Foundation Press: New York.

Schild, A. 2007. The Mountain Perspective as an Emerging Element in the International Development Agenda. *Sustainable Mountain Development*, 53: 5-8.

Schild, A. and Banskota, K. 2008. Changes and challenges in the Hindu Kush-Himalayas: Implications for ICIMOD. *Sustainable Mountain Development*, 54: 4-6.

SDC (Swiss Agency for Development and Cooperation). 2009. *Swiss Cooperation Strategy for Nepal 2009-2012*. Swiss Agency for Development and Cooperation, Swiss Cooperation Office Nepal: Kathmandu.

Sharma, G.N. 2009. *National Development Strategy Paper*. Nepal Development Forum Stakeholders' Consultation Meeting, Kathmandu.

Smith, Z.A. 2009. *The Environmental Policy Paradox* (5th ed.). Pearson Prentice Hall: New Jersey.

Somanathan, E., Prabhakar, R., and Mehta, B.S. 2009. Decentralization for cost-effective conservation. *PNAS*, 106(11): 4143-4147.

Stone, D. A. 1988. *Policy Paradox and Political Reason*. Harper Collins: USA.

The National Academies. 2009. *Ecological Impacts of Climate Change*. The National Academies-National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council, USA.

The World Bank. 2010. Working Together in Nepal – World Bank Development Partners. Available at: http://www.worldbank.org.np

Therivel, R., Wilson, E., Thompson, S., Heaney, D., and Pritchard, D. 1994. *Strategic environmental assessment*. Earthscan Publications Limited: London.

UNDP (United Nation Development Programme). 2007. UN Nepal Information Platform. Available at: http://www.un.org.np/

Wagle, M. and Ojha, H. 2002. Analyzing Participatory Trends in Nepal's Community Forestry. *Policy Trend Report 2002*, 122-142.

Wicken, J., Shrestha, R.L., Noor, T.R., Kabir, Z., Swain, B., Kapur, D.S., Calaguas, B, and Menon, G. 2006. Water for All? A study on the effectiveness of Asian Development Bank funded water and sanitation projects in ensuring sustainable services for the poor. *WaterAid*, London, UK. Available at www.wateraid.org

WCED (World Commission on Environment and Development). 1987. *Our Common Future*. Oxford University Press: England.

Zhaoli, Y. 2004. Co-management of rangelands: an approach for enhanced livelihoods and conservation, *ICIMOD Newsletter for Sustainable Development in the Hindu Kush-Himalayas*, 45. ICIMOD: Kathmandu.

Zhen, L., Yang, L., Xie, G., Cheng, S. 2006. Land use dynamics and policy implications in the Jinghe watershed of western China: A critical assessment from local perspectives, *Natural Resources Journal*, 46(4): 859-879.