

Chapter 2

Public Policy in Environment and Sustainability Strategies: Global & National Scenario



Sweta Baidya and Anil Kumar Gupta

Abstract Policies are the way of bringing change in the system and regulating the behaviour of the allied stakeholders. The idea of policies dates back to the ancient ages of Harappa Civilization 4500 years back. Since then numerous policies have been prepared for saving the nature and environment. United Nations (UN) has taken important roles in environment and climate change related policy intervention, starting from creating awareness to implementing strict laws within the countries. In India, keeping pace with Paris Agreement, several environmental policies have been prepared and implemented, but being a developing country, India is facing challenges in implementing the Nationally Determined Contributions due to economic shortfall. Mobilization of International finance is in need to implement many of India's targeted Green Policies. India has numerous policies and guidelines to safeguard the natural setting and the environment but proper implementation is needed.

Keywords Environmental policies · Sustainability strategy · Climate conference · Climate change adaptation · Disaster risk reduction

2.1 Introduction

Policies are rules those are followed at country level (Sertyesilisik 2019). Policies are guidelines, methods or systematic principles which are implemented or adopted as procedure or protocol by governing body to help in decision making and achieve rational outcomes (Kalu 2021; Alzadjali 2019). Policies are “Defined guideline used to direct and support decisions and actions” (Mayes 2015, www.igi-global.com). Policies can also be termed as “The science and art of employing, a careful plan or method, the art of devising or employing plans or stratagems toward a goal, an adaptation or complex of adaptations (as of behaviour, metabolism, or structure) that

S. Baidya · A. K. Gupta (✉)
ECDRM Division, National Institute of Disaster Management, Ministry of Home Affairs,
Government of India, New Delhi, India

serves or appears to serve an important function in achieving evolutionary success” (Baporikar 2018, www.igi-global.com).

Policies play an important role in citizens’ life and livelihood. As a common practice lawmakers are employed by Government, to set policies to be followed by government workers and all citizens of the country (Point Park University Online 2021). Sometimes the policies can be made in international level by coalitions of Governments of various countries to achieve some common goals and those policies are implemented worldwide, like for example, climate policies and policies on green growth. The cycle of policy making starts with the setting of the agenda. At this very first stage normally the public problems or challenges those are impacting the livelihood or associated things like environment etc. are identified and on the basis of this agenda is set. Agenda could be of four different types viz., Systemic agenda, Institutional agenda, Discretionary agenda and Decision agenda. In systemic agenda, all public issues are considered for addressing whereas in Institutional agenda, policymakers pick few of the challenges for working on When lawmakers themselves prepare the agenda is known as Discretionary agenda and the ultimate list of issues which the policy makers are going to address are known as the Decision Agenda. The next step of the policy cycle is Policy formation, involves the development of policy options and debate on the justification and possibilities of the proposed policies. Then comes the decision making stage, where the course of action is decided by the government for benefiting maximum people. After that the implementation of policies come, which is the most important step, where the government puts the chosen policy into effect either for some particular region or entire country. The last step of one policy cycle is policy evaluation where the impact of a particular policy is scrutinized to understand whether the policy is able to achieve the intended goal (Point Park University Online 2021; Benson and Jordan 2015).

2.2 Policy Implementation

There are various approaches for policy implementation. Research shows that the enactment of the legislation happens successfully if “Making it happen”, – strategy is taken up (Fig. 2.1). “Making it happen”-strategy is proposed by Dean L. Fixsen, which aims towards enabling with the help of systematic training, supervision and follow up. Implementation through capacity building is another way where adequate capacity building within the organization is taken care of. Implementation of any new policy means change in the already existing procedures and practices which requires individual and organizational capacity building. In the word of Pekka Sundman (Director of the City Development Group, the City of Turku, Finland), “Implementation is about enabling-instead of liner implementation. The key is changing attitudes”. irrespective of the quality or intention of the policy, it normally faces resistance. Figure 2.2 explains various types of resistance faced by the policies.



Fig. 2.1 Making it happen strategy for policy implementation. (Source: Figure adopted from Ejler et al. 2016)

MANAGEMENT BARRIERS, E.G.:

- Lack of focus, prioritisation and articulation
- Fear of time and resources
- Lack of clarity of the objective

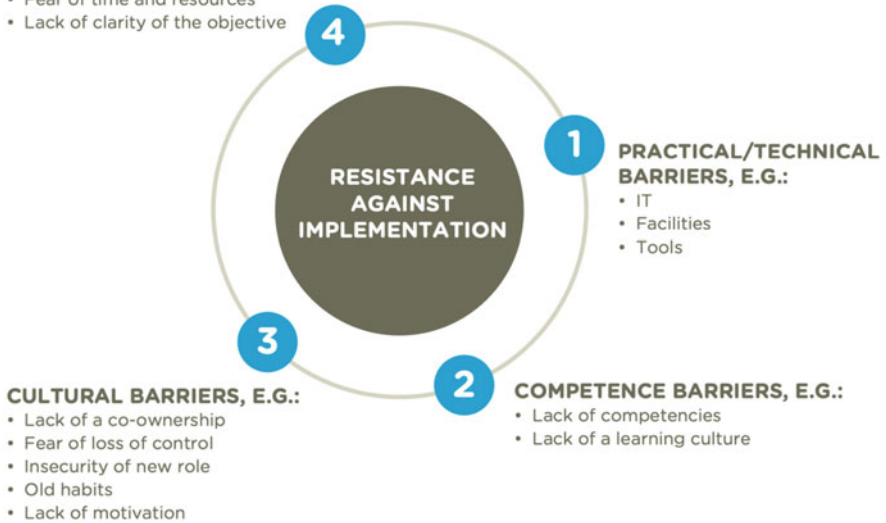


Fig. 2.2 The resistance against the implementation of policies. (Source: Figure adopted from Ejler et al. 2016)

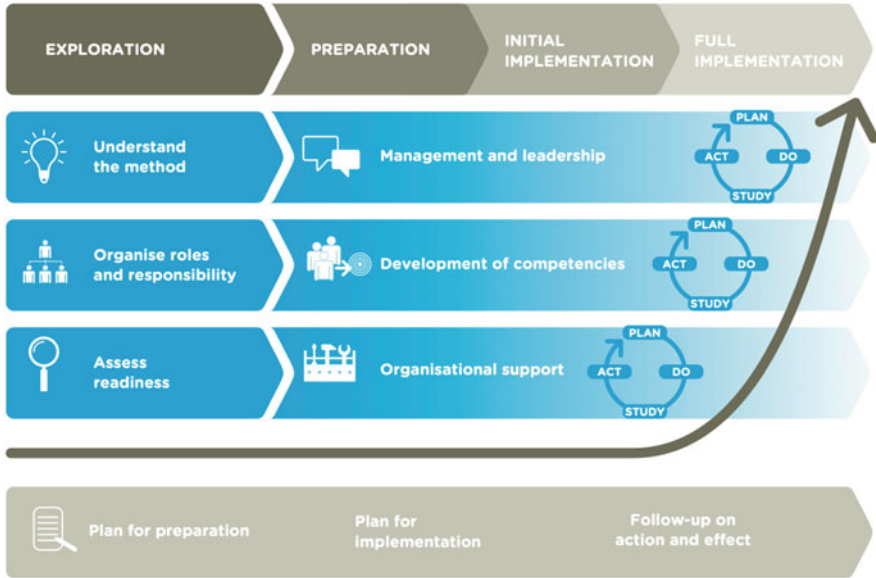


Fig. 2.3 The four stages of policy implementation. (Source: Figure adopted from Ejler et al. 2016)

Normally, there are four phases of policy implementation, viz. Exploration, Preparation, Initial Implementation and Full implementation. These four stages of policy implementation is explained in Fig. 2.3. During the exploration phase it is analysed whether the new policy is going to fit in the existing competencies or workflows. In the preparation phase organizations slowly modifies themselves to fit in the new policy environment. The initial implementation is the most demanding phase, where new batches of approaches, structures and practices are introduced in place of former well-accustomed practices. In the final phase, i.e., the full implementation phase, implemented policies start reaching its goals (Ejler et al. 2016).

2.3 History of the International Environment Policy

Any measure taken by Government or other organization towards reducing the human impact on the environment, is known as the environmental policy. Most of the organizational decision making does not consider the environment into account. Environmental resources are always underrated as nature is considered as the infinite source of resources. American Ecologist Garret Hardin in 1968 brought in the idea of “the tragedy of commons” where natural resources are the commons being used by people. Environmental public policies dates back to 4500 years, when the sewerage system were constructed in *Indus Valley Civilization* at *Mohenjodaro*. This was followed by similar steps taken in *Roman Civilization* 2700 years ago. Laws for

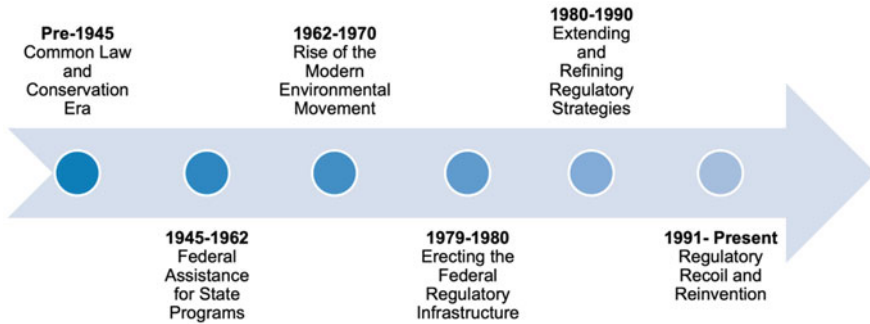


Fig. 2.4 Six Stages in the history of US Environmental Law. (Source: Figure adopted from Myers 2013)

governing the forest harvest were implemented in ancient Greece 2300 years ago. The emergence of *Minamata Disease* in 1956, caused by the mercury discharge of a closed by the chemical company and the publication of “*Silent Spring*” by Rachel Carson in 1962 drove in public awareness regarding the environmental issues (Surak 2018). In 1970, *National Environmental Policy Act* (NEPA) was signed (Kepner 2016). From late 1980s, the idea of sustainable development became the most important idea in the filed Standardization (ISO) issued its first standard protocol. Environmental Impact Assessment & *Ecolabeling* are other important steps towards saving the nature (Sharma and Goyal 2018; Shivam and Sarma 2017). The United Nations (UN) has provided platform, for all kinds of International Negotiations and agreement on the environmental issues and policy making. The *Stockholm Conference* is the first such conference to discuss environmental challenges. In 1992, The *United Nations Conference on Environment and Development* (UNCED) in Rio de Janeiro and in 2002 at Johannesburg are other notable global summits for discussing environmental issues. Similar kind of conferences on climate change were also organized in 1996 in *Kyoto* and in 2009 in *Copenhagen*. The Rio conference agreement was a soft law for environmental protection but the Kyoto Protocol was a hard law with distinct targets of Green House gas emission reduction target (Surak 2018). Significant International Environmental Legislations are listed in Figs. 2.4 and 2.5. In 1997, The *Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation* (BIMSTEC) was constituted including seven member states viz. Bangladesh, Bhutan, India, Nepal, Sri Lanka, Myanmar and Thailand. BIMSTEC was created to bridge the gap between SAARC and ASEAN Countries. This alliance aims towards shared and accelerated growth in several sectors like agriculture, counter-terrorism, climate change, culture, environment, trade, technology, energy, fisheries, transport, tourism, public health, poverty alleviation and people to people contact (<https://bimstec.org>).

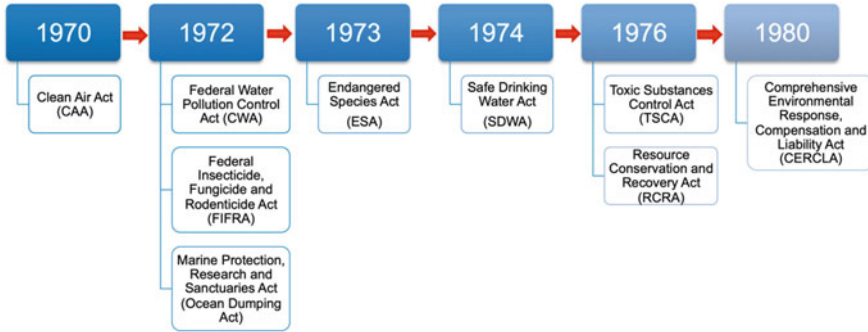


Fig. 2.5 Significant Environmental Legislations during 1970–1980. (Source: Figure adopted from Myers 2013)

2.4 Policy Initiatives by The Government of India

Government of India has adopted a holistic approach and launched various schemes towards achieving the *Sustainable Development Goals* (SDGs) by 2030. The economic survey 2018–2019 states that India will maintain its targeted economic growth by the means of various policies related to air pollution, climate change, resource efficiency and sustainable development. India’s SDG Index score ranges between 42 and 69 for the states and 57 and 68 for Union Territories. Kerala and Himachal are the highest ranker among the States with the score of 69 and Chandigarh (68) among the UTs (Press Information Bureau Report 2019).

Government of India has taken many initiatives for the sustainable futures, which includes *Beti Bachao Beti Padhao*, *Deen Dayal Upadhyay Gram Jyoti Yojana*, *Pradhan Mantri Awas Yojana*, *Pradhan Mantri Jan Dhan Yojana*, *Pradhan Mantri Ujjwala Yojana*, *Swachh Bharat Mission*, *Smart Cities*, *Doubling Farmers Income*, *Ease of Living*, *Five Trillion Economy and Global Power House by 2024–25*, *Ten Trillion Economy by 2030* etc. The *Namami Gange Mission* is a key policy initiative to achieve SDG 6 which ensures access to water and sanitation for all. The *Namami Gange Mission* includes ecosystem conservation and Clean Ganga Fund, sewerage project management, urban and rural sanitation, tackling industrial pollution, water use efficiency and quality improvement etc. To fight India’s air pollution problem, a comprehensive action plan called *National Clean Air Programme* was launched in 2019. To increase the optimum use of resources *National Policy on Resource Efficiency* has been proposed (Press Information Bureau Report 2019).

There are few National Flagship Programmes taken up by The Government of India to increase sustainability like *Per Drop More Crop*, which is a part of the *Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)*. *Per Drop More Crop* promotes the water efficiency in agriculture through sprinkler and drip irrigation, the lesser use of fertilizers, etc. PMKSY also provides a Micro Irrigation Fund for resource mobilization and micro irrigation (<https://pmksy.gov.in>).

2.4.1 Indian Policies Towards Environmental Protection

In India, a few important policy initiative regarding safeguarding the environment and checking the air pollution includes *The Indian Forest Act, 1927*, *Wildlife (Protection) Act, 1972*, *Water Prevention and Control of Pollution Act, 1974*, *Water (Prevention and Control of Pollution) Cess Act, 1977*, *Forest Conservation Act, 1980*, *Air Prevention and Control of Pollution Act, 1981*, *Environmental Protection Act, 1986* (www.coursehero.com), *National Forest Policy, 1988*, *The Public Liability Insurance Act, 1991*, *The National Environment Tribunal Act, 1995*, *The National Environment Appellate Authority Act, 1997*, *2002* and *Biological Diversity Act 2002* (Fig. 2.6) which provides a strong legal framework for natural and environmental protection. Similarly, many notifications were issued time to time for establishing a rule for towards environmental protection. Some of the notifications (Fig. 2.7) are *Doon Valley Notification 1989*, *Revdanda Creek Notification*



Fig. 2.6 Indian Acts for safeguarding the natural set up and environment

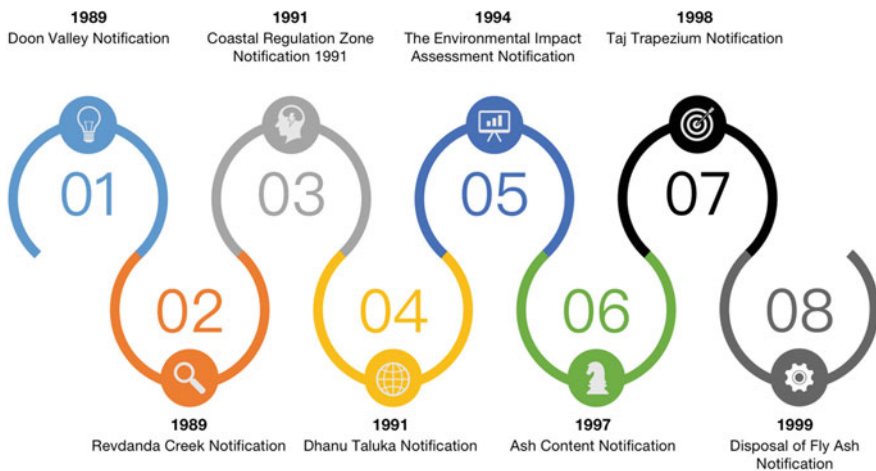


Fig. 2.7 Regulatory Notifications issued by Indian Government

1989, *Coastal Regulation Zone Notification 1991*, *Dhanu Taluka Notification 1991*(nidm.gov.in), *The Environmental Impact Assessment Notification 1994*, *Ash Content Notification 1997*, *Taj Trapezium Notification 1998*, *Disposal of Fly Ash Notification 1999* (Gupta et al. unpublished data, www.ukessays.com) (Andrew 2015).

2.5 Indian Policies Towards Disaster Management

India was one of the significant signatories of the International Policy Frameworks like the *Sustainable Development Goals*, *Paris Climate agreement on Climate Change* and *Sendai Framework for Disaster Risk Reduction 2015–2030*. the importance of these international agreements lies in the fact that these not only provides the opportunity for refurbishing the existing policies and plans to create a coherence among the climate change issues with Disaster Risk Reduction (Lovell and Mitchell 2015), Environmental policies and developmental policies, but also helps in achieving the already-set goals for DRR through addressing the basic problems like poverty, hunger, sanitation pollution etc. Sendai Framework also highlights the role of sub-national and local governments in reducing disaster risks at their level (<https://cdkn.org>) (Carabine and Jones 2015). In 2015, Government of India also started implementing three crucial International agreements viz. in March *Sendai Framework for Disaster Risk Reduction* (SFDRR), in September, *Sustainable Development Goals* (SDGs) and in December, at the 21st *Conference of Parties* (COP 21), under the *United Nations Framework for Convention on Climate Change*, *Paris Agreement on Climate Change*. Towards disaster management, the Government of India had prepared a National Disaster Management Plan in 2016 and a revised plan in 2019. The international agreements cannot be implemented in isolated manner. Therefore, the revised plan has advised towards interconnecting these three agreements along with the Ten Point Agenda on DRR which was established by the Honorable Prime Minister at Asian Ministerial Conference on DRR (AMCDRR) in November 2016 in New Delhi (National Disaster Management Plan, 2018). Scenarios of India and International conventions ate listed in Tables 2.1a and 2.1b.

2.5.1 Hydro-meteorological Domains and Public Policy

In 2018, the Government of India has formulated *Hydro-meteorological Data Dissemination Policy* in 2018 which is to be implemented by *Central Warehousing Corporation* (CWC) and *Central Ground Water Board* (CGWB), the Ministry of Jal Shakti (Sharma and Goyal 2018). This policy supersedes previous related orders or guidelines of the Ministry of Water Resources, River Development and Ganga

Table 2.1a Scenario of Indian and international conventions

| Convention | Effective | Year signed and enforced |
|--|--------------|--------------------------|
| International Convention for the prevention of Pollution of the Sea by Oil (1954) | 1974 | 1974 |
| The Antarctic Treaty (Washington, 1959) | 1998 | 1983 |
| Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (Ramsar, 1971) | 1982 | 1 October 1981 (ac) |
| Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972) | 1978 | 1977 |
| Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, 1973) | 1976 | 1974 |
| Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979) | 1982 | 1979 |
| Convention on Early Notification of a Nuclear Accident (1986) | 1988 | 1986 |
| United Nations Convention on the Law of the Sea (Montego Bay, 1982) | 1995 | 1982 |
| Protocol on Substances that Deplete the Ozone Layer (Montreal, 1987) | 1992 | 19 June 1992 (AC) |
| Convention on the Control of Trans Boundary Movements of Hazardous Wastes and Their Disposal (Basel, 1989) | 24 June 1992 | 5 March 1990 |
| Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer (London, 1990) | 1992 | 19 June 1992 (ac) |
| Protocol on Environmental protection to the Antarctica Treaty (Madrid, 1991) | 1998 | 1992, 1996 |
| United Nations Framework Convention on Climate Change (Rio de Janeiro, 1992) | 1994 | 1 November 1993 |

Source: Gupta et al. (2013)

Rejuvenation. As per this policy all data collected by CWC and CGWB will be publicly available through the online portal.

2.5.2 Climate Finance and India's Nationally Determined Contribution

Paris agreement has highlighted the importance of Climate Finance in fortifying the global response towards climate change. Nationally Determined Contributions are the integral part of the Paris Agreement which helps the countries in determining and communicating post 2020 climate actions and this will ultimately help in achieving the long term goals of Paris Agreement. Consorted global efforts are needed to build resilience towards climate challenges (Goyal and Ojha 2011; Goyal et al. 2012). India needs sizable investments to implement India's Nationally determined contributions which indicates that over and above domestic budgets, mobilization of International Public Finance and Private Sector Resources are needed. India has

Table 2.1b Scenario of Indian and international conventions

| Convention | Effective | Year signed and enforced |
|---|-----------------|--------------------------|
| Convention on Biological Diversity (Rio de Janeiro, 1992) | 18 Feb. 1994 | 5 June 1992 |
| Convention to Combat Desertification in those Countries Experiencing Serious drought and/or Desertification, Particularly in Africa (Paris, 1994) | 17 Dec. 1996 | 14 October 1994 |
| International Tropical Timber Agreement (Geneva, 1994) | 1997 | 17 October 1996 |
| Rotterdam Convention on the Prior informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, (1998) | 2004 | 2005 |
| Protocol to the United Nations Convention on Climate Change (Kyoto, 1997) | 2005 | 1997 |
| Cartagena Protocol on Biosafety (Nairobi, 2000) | 23 January 2001 | 17 January 2003 |
| Stockholm Convention on Persistent Organic Pollutants (2001) | 2004 | 2006 |

Source: Handbook on International Environment Agreements: An Indian Perspective. Accessed at http://awsassets.wfindia.org/downloads/mea_handbook_cel.pdf

taken great steps towards Sustainable Finance initiatives which has resulted in India's rank in the 11th Position in global country ranking, also India accounts for 33% of the *Certified Climate Bonds* (Press Information Bureau Report 2019).

2.5.3 One Health Approach

As per definition given by *One Health Initiative Task Force* (OHITF), the concept of *One Health* is “the collaborative efforts of multiple disciplines working locally, nationally, and globally, to attain optimal health for people, animals and our environment”. One health approach emphasizes on the fact that the human health depends on the health of surrounding environment and animals (Fig. 2.8).

With the growing population pressure more and more people are living in close contact with animal which is mostly domestic but also wild animals in some cases. People come in contact with the animal for food, fiber, livelihoods, travel, sport, education or companionship etc. Close human contact with animals increases the chances of zoonotic diseases, which includes Anthrax, Brucellosis, Ebola, Lyme disease, Rabies, Ringworm, Salmonella infection, West Nile virus infection, Q Fever, etc. Susceptibility to some of the diseases and natural disasters are shared both by humans and animals. Therefore, sometimes animals can act as the early warning system for upcoming health or natural hazards. Through One health approach, inter-disciplinary experts monitor and control public health issues and do research on the pathways of spreading the diseases among the environment, animal and Human. It will be helpful if the community, law enforcement policy

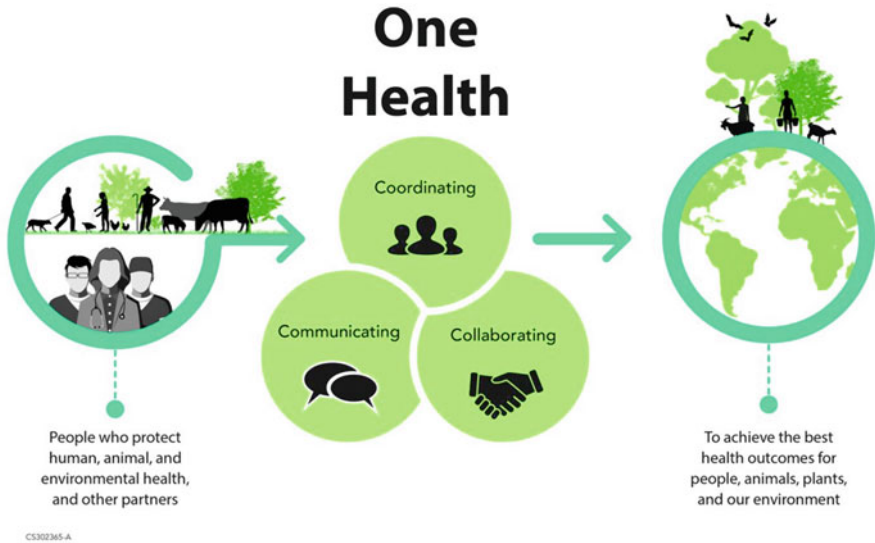


Fig. 2.8 One Health Approach. (Source: Figure adopted from Centers for Disease Control and Prevention)

makers and other stake holders are also included in One health approach (Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases 2018).

2.5.4 Corporate Sustainability Policy

Corporate sustainability is known as “a business approach that creates long-term consumer and employee value by creating a ‘green’ strategy aimed toward the natural environment and taking into consideration every dimension of how a business operates in the social, cultural, and economic environment” (Ashrafi et al. 2019; Purkayastha 2019; <https://www.greerwalker.com/project/white-paper-companys-sustainability-policy/>). Corporate Sustainability Policies include, *Corporate Waste Policy*, *Corporate Water Policy*, *Corporate Energy Policy*, *Environmental Purchasing Policy*, *Stakeholder Policy*, *Supply Chain Policy*, etc. These policies as a whole helps in reducing the carbon foot print of industries and businesses and promotes a sustainable development (<https://www.greenbuoyconsulting.com/blog/do-you-have-these-corporate-sustainability-policies>).

Table 2.2 The differences in objectives and approaches in EIA, SEA and Post-Crisis Integrated SEA

| EIA | SEA | Post-Crisis Integrated SEA |
|--|--|--|
| Applied for specific projects | Applied for strategic decisions such as policies, plans and programs | Applied for strategic decisions in a post-crisis context |
| Aims to do things right | Aims to do the right things | Aims to prevent conflicts and disasters and build resilience |
| Mostly a technical instrument | Mostly a political instrument | Mostly a political instrument |
| Identifies specific environmental and social impacts | Addresses issues of sustainable development | Special attention to disaster risk reduction and climate change adaptation |
| Limited review of cumulative effects | Early warning of cumulative effects | Cumulative effects of multiple reconstruction projects |
| Emphasis on mitigating and minimizing impacts | Emphasis on preventing impacts | Emphasis on preventing new disasters and conflicts |
| Linear and stepwise process | Flexible and iterative process | Flexible and iterative process |

Source: United Nations Environment Programme (2018)

Credit: R. Verheem, Netherlands Commission for Environmental Assessment (NCEA) and Sudmeier-Rieux, UN Environment

2.5.5 Policy Instruments in Environment Concerns

Incorporation of Disaster Risk Reduction Strategies in the *Environmental Impact Assessment* (EIA) and *Strategic Environmental Assessment* (SEA) an important step to reduce the future risks (Gupta and Nair 2012, 2013). Another crucial way out is *Post-Crisis Integrated Strategic Environmental Assessment (Integrated Strategic Environmental Assessments in Post-Crisis Countries, United Nations Environment Programme 2018)*. The following Table 2.2 depicts the differences in objectives and approaches in EIA, SEA and Post-Crisis Integrated SEA.

2.5.6 Present Policy Scenarios in India

Proper implementation and synergies among the policies, are the key to the success to the sustainable development of the society and the sustainable future also depends on the implemented green strategies and policies at present. Synergies among the national plans and the state level plans are of utmost importance. Many of the state Disaster Management Plans have clarity on sectoral and departmental responsibilities but need to determine the instruments and pathways of mainstreaming DRR (Table 2.3). It is also important that the state level disaster management plans are prepared in concurrence with the International guidelines like Sendai Framework

Table 2.3 The synergies among the State Disaster Management Plan and the Annual Development Plan

| State | Disaster contingency plan for various departments | |
|-------------|--|--|
| | State Disaster Management Plans | Annual Development Plans (ADP) and State Level Plans |
| Assam | Assam's SDMP has explicitly identified specific disaster management roles and responsibilities (like developing contingency plans etc.) the guidelines provided in the plan is generic and does not include time specific commitments (Assam State Disaster Management Authority 2013). | Assam's annual development plan does not explicitly explain disaster management in its sectoral and expenditure plan for 2014–2015. |
| Bihar | Bihar has emphasized on mainstreaming of DM into the development plans. Bihar leads in disaster contingency planning as it has prepared disaster management plans for all government offices. It has also identified hazard specific detailed response plans with special emergency functions. | ADP of Bihar has also included disaster management, along with mass awareness, capacity building, early warning mechanisms and emergency operation centres, |
| Gujarat | Gujarat has prepared disaster response and relief plans for each hazards and has identified responsibilities and timelines for line department(s). The plan also provides preparedness guidelines for relevant line departments. | Gujarat's annual development plan also includes 'community-based disaster preparedness Programme,' 'National Cyclone Risk-management Project', regional emergency response centres, and disaster preparedness training |
| Odisha | Each department of Odisha State Government has detailed and prescriptive response plans, which includes timeline for report submission other specific activities. But the SDMP does not include specific guidelines for mainstreaming cross sectoral management activities. | The annual development plan is available for few cities like Bhubaneswar and few villages. Only annual activities Report for 2013–2014 is there, which does not include disaster risk activities. |
| Uttarakhand | Uttarakhand's SDMP highlights mainstreaming of DRR through various project implementation and departmental schemes. It is mandatory for all the projects to go through vulnerability and risk assessments before approval. | Uttarakhand has district and state level development plan. The state also have a 'sectoral outlay and expenditure plan', the 'district disaster mitigation fund', and the 'district disaster management fund'. |

Source: Adopted from Bahadur et al. (2016), reliefweb.int

(Table 2.4). Therefore, to achieve the goal of all climate related National and International agreements and policies, synergies at the top and the local level is the need of the hour.

Table 2.4 Synergies among the State Disaster Management Plans and Sendai Framework

| Priority for action | Alignment |
|---|--|
| Understanding the DRR | State disaster management plans highlights disaster risks for specific regions but lacks socioeconomic vulnerabilities. More scientific and socioeconomic data should be used for giving a composite analysis about the interaction of hazard exposure and vulnerability, to better understand the disaster risk. |
| Fortifying disaster risk governance to achieve DRR | India has a great structure for supporting disaster risk governance and highlight roles and responsibilities for different stakeholders across the country. As per the Disaster Management Act 2005, the state Disaster Management Plans should include a ‘Complete Disaster Management Cycle’ into the disaster risk governance structures and activities. This will help the Sectoral Development Plans to include disaster risk reduction for effective disaster risk management |
| Investment for DRR | Funds and investments for disaster risk management and DRR are limited. Due to lack of understanding resilience should be included in investment planning. Mainstreaming of disaster risk reduction among development policy and planning can be achieved through inter-sectoral engagement, investment in various ministries and stakeholders and public–private partnerships |
| Increasing disaster preparedness for effective response recovery, reconstruction and rehabilitation | SDMPs include disaster response, but need to include recovery, rehabilitation and reconstruction options Disaster preparedness and risk mitigation should be clearly mentioned within the SDMPs to make DRR approaches more holistic across different scales and sectors. |

Source: Adopted from Bahadur et al. (2016), reliefweb.int

2.5.7 Way Forward

In India, the basic problem with the environmental laws are implementation issues. India, ranks 141st among 180 countries in terms of environmental governance as per *Environmental Protection Index (EPI) 2016*. Central Pollution Control Board and State Pollution Control Board are two authorities for pollution control in India, which do not have enough power to effectively penalize the creator of water or air pollution as per report 21 of Comptroller and Auditor General (CAG) of India on ‘*Performance Audit of Water Pollution in India*’ (2011–2012). The polluter pays

principle is not followed in India as the penalty cost is cheaper than the compliance cost. An independent Environmental Regulatory Body is needed to step up the penalty and liability mechanism and effectively implement the water and air Pollution Control Act. Not only the independent regulator but also a legal framework for environmental law is needed for risk regulation (Prasad 2017).

References

- Alzadjali AHH (2019) Policies and initiatives for the internationalization of higher education in Oman (Near East University, Cyprus). In *Policies and Initiatives for the Internationalization of Higher Education*, p 20. <https://doi.org/10.4018/978-1-5225-5231-4.ch002>
- Andrew DB (2015) Environmental policy: protection and regulation. In: *International Encyclopedia of the Social & Behavioral Sciences*, 2nd edn, p 778–783
- Ashrafi M, Acciaro M, Walker TR, Magnan GM, Adams M (2019) Corporate sustainability in Canadian and US maritime ports. *J Clean Prod* 220:386–397
- Assam State Disaster Management Authority (2013) Op. cit. p. 109
- Bahadur A, Lovell E, Pichon F (2016) Strengthening disaster risk management in India: A review of five state disaster management plans
- Baporikar N (2018) Current scenario of youth entrepreneurship in India (Namibia University of Science and Technology, Namibia & University of Pune, India). In: *Encyclopedia of information science and technology*, 4th edn, 9p. <https://doi.org/10.4018/978-1-5225-2255-3.ch261>
- Benson D, Jordan A (2015) Environmental policy. In: Wright J (ed) *International encyclopedia of social and behavioural sciences*, 2nd edn. Elsevier. https://www.researchgate.net/publication/273667795_Environmental_Policy
- Carabine E, Jones L (2015) Early warning systems and disaster risk information, Briefing: Target 7. Overseas Development Institute, London. www.odi.org/sites/odi.org.uk/files/odiassets/publications-opinion-files/9478.pdf
- Ejler N, Ostersen J, Graff D, Dyrby T (2016) New approaches to policy implementation. <https://www.activeimplementation.org/wp-content/uploads/2018/12/Ramboll-PolicyImplementationEU-2016.pdf>
- Goyal MK, Ojha CSP (2011) Evaluation of linear regression methods as downscaling tools in temperature projections over the Pichola Lake Basin in India. *Hydrol Process* 25(9):1453–1465
- Goyal MK, Ojha CSP, Burn DH (2012) Nonparametric statistical downscaling of temperature, precipitation, and evaporation in a semiarid region in India. *J Hydrol Eng* 17(5):615–627
- Gupta AK, Nair S (2012) Environmental impact assessment: elucidating policy-planning for natural disaster management. In: Gupta AK, Nair S (eds) *Ecosystem approach to disaster risk reduction*. NIDM, New Delhi, pp 164–186
- Gupta AK, Nair S (2013) Applying environmental impact assessment and strategic environmental assessments in disaster management. In: *The role of ecosystems in disaster risk reduction*, 1st edn. United Nations University, Tokyo
- Gupta AK, Nair SS, Singh S (2013) *Environmental Legislation for Disaster Risk Management*, National Institute of Disaster Management & Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) 108p. M/s Rouge Communications, S-185, Greater Kailash Part 2, New Delhi, February, 2013
- <https://online.pointpark.edu/public-administration/policy-making-cycle/>
- <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1577014>
- <https://sustainabledevelopment.un.org/memberstates/india>
- <https://www.greenbuoyconsulting.com/blog/do-you-have-these-corporate-sustainability-policies>
- <https://www.greerwalker.com/project/white-paper-companys-sustainability-policy/>
- <https://www.indiawaterportal.org/articles/environmental-regulation-india-need-move-beyondprocedures>

- <https://www.worldbank.org/en/news/feature/2011/09/22/environmental-management-india>
 Integrated Strategic Environmental Assessments in Post-Crisis Countries, United Nations Environment Programme (2018) https://postconflict.unep.ch/publications/Eco-DRR/ISEA_Guidance_Note_EN_interactive.pdf
- Kalu CO (2021) Research data management in an academic library (National Institute of Construction Technology and Management, Uromi, Nigeria), Esther Ihechiluru Chidi-Kalu (Nigeria Library Association, Nigeria) and Titilola Abigail Mafe (National Library of Nigeria, Nigeria). In: Handbook of Research on Information and Records Management in the Fourth Industrial Revolution, p 18. <https://doi.org/10.4018/978-1-7998-7740-0.ch003>
- Kepner W (2016) EPA and a brief history of environmental law in the United States. International Visitor Leadership Program (IVLP), Las Vegas
- Lovell E, Mitchell T (2015) Disaster damage to critical infrastructure and basic service provision, Briefing: Target 4. Overseas Development Institute, London. www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9472.pdf
- Mayes RJ (2015) Identifying Corporate Social Responsibility (CSR) curricula of leading U.S. Executive MBA programs (University of North Texas, USA), Pamela Scott Bracey (Mississippi State University, USA), Mariya Gavrilova Aguilar (University of North Texas, USA) and Jeff M. Allen (University of North Texas, USA). In: Handbook of research on business ethics and corporate responsibilities, p 17. <https://doi.org/10.4018/978-1-4666-7476-9.ch009>
- Myers R (2013) A brief history of environmental regulation, why you need to understand the past to influence the future. EHS Business Solutions. <http://envirofdok.org/wp-content/uploads/2013/03/Myers-Oklahoma-Presentation-2013v2.pdf>
- Point Park University Online (2021) The five stages of the policy making cycle. <https://online.pointpark.edu/public-administration/policy-making-cycle/>
- Prasad DM (2017) Taking environmental law seriously: an Indian perspective. <https://www.livelaw.in/taking-environmental-law-seriously-indian-perspective/?infinitiescroll=1>
- Press Information Bureau Report (2019) Ministry of Finance, Government of India. <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1577014>
- Purkayastha D (2019) In search of the triple bottom line – case studies in corporate sustainability. IBS Case Research Center. ISBN 978-81-314-2847-4
- Sertyesilisik B (2019) Political economy of the green innovations in the construction industry (Istanbul Technical University, Turkey). In: Handbook of research on economic and political implications of green trading and energy use, p. 20. <https://doi.org/10.4018/978-1-5225-8547-3.ch020>
- Sharma A, Goyal MK (2018) District-level assessment of the ecohydrological resilience to hydroclimatic disturbances and its controlling factors in India. *J Hydrol* 564:1048–1057
- Shivam GMK, Sarma AK (2017) Analysis of the change in temperature trends in Subansiri River basin for RCP scenarios using CMIP5 datasets. *Theor Appl Climatol* 129(3):1175–1187
- Surak SM (2018) Extended producer responsibility. *Encyclopedia Britannica*. <https://www.britannica.com/topic/extended-producer-responsibility>
- United Nations Environment Programme (2018) Integrated strategic environmental assessments in post-crisis countries. In: A guidance note for integrating disaster risk reduction and climate change adaptation in sustainable reconstruction and development planning. https://postconflict.unep.ch/publications/Eco-DRR/ISEA_Guidance_Note_EN_interactive.pdf