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CASE REPORT

# ‘Eco-city’ to ‘disaster-resilient eco-community’: a concerted approach in the coastal city of Puri, India

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**Abstract** The need for environmental and urban planning reached a critical point in the year 2007, when one-half of the world’s population could be defined as living in cities. Urbanisation in India is also increasing at a fast rate. Urban chaos in India, emanating from the continuous ignorance of fragile ecosystems, calls for the reshaping of existing cities as ‘eco-cities’. The ‘eco-city’—a well-known concept in the western world—is new to the Indian context. While western connotations of eco-cities should not be discarded outright in the context of India, core concerns vary significantly for obvious reasons. Recognising two facts—firstly, eco-city development is altogether a fresh approach to human settlement development in India, and, secondly, the manifold increase in the vulnerability of cities—this paper discusses documented good practice, reinforcing evolution towards the eco-city vision. Lessons drawn from the examples cited are further deconstructed in the light of their contribution to urban risk reduction, which provides direction to appreciating the ‘disaster-resilient eco-community’ concept in Puri, a coastal city in India. Further, this paper attempts to unravel existing community-based practices in Puri, which are boon to the local environment and invariably reduce disaster risk. These seemingly modest neighbourhood initiatives symbolise immense societal wealth, which can be calibrated appropriately for reducing urban environmental risk as well. This paper also illustrates how a ‘disaster resilient eco-community’ approach is inevitable in the present and future contexts not only to preserve sustainable development gains but also to secure human well-being.

**Keywords** Eco-city · Eco-community · Urban environmental risk · Traditional knowledge and practices · Local environment

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## Background

“A collection of apparently disconnected ideas about urban planning, transportation, health, housing, energy, economic development, natural habitats, public participation, and social justice all comprise a single framework: the ‘eco-city’” (Roseland 2001). “A long line of paradigms/movements, which were precursors to this concept, includes appropriate technology, healthy communities, community economic development, social ecology, the green movement, bioregionalism, eco-feminism, and sustainable development” (Roseland 2000). The need for environmental and urban planning reached a critical point in the year 2007, when one-half of the world’s population could be defined as living in cities. As the population of the world becomes more urbanised, cities will continue to expand, unknowingly igniting the multi-dimensional vulnerability of human settlements. Today, when the heat of global warming is discussed by the global community more intensely than ever before, urban ecological planning requires serious manifestation in the form of ‘eco-cities’. Surprisingly, there is no universally accepted definition of ‘eco-cities’ or ‘sustainable communities’. Taking the case of Boston city as an example, Kline (2000) suggests, “an eco-city encompasses four basic community characteristics, i.e., ecological integrity, economic security, quality of life and empowerment with responsibility”. Much of the literature and most

international agencies completely recognise that communities must be involved in defining sustainability from a local perspective. Defining an ecological city, OECD (1996) notes "in an ecological city, people would be conscious of their local and global responsibilities for the environment, environmental problems would be addressed continually and proactively, environmental considerations would be integral to a wide range of policies and sectoral activities, and greater attention would be given to providing a better quality of life for all urban citizens".

Despite the challenge of how local action can be encouraged within a framework of global sustainability, numerous examples of citizen and community initiatives exist that demonstrate that "creative, transferable solutions to seemingly intractable social and environmental challenges are being initiated by citizen organisations and municipal bodies in cities and towns around the world" (Roseland 1999). However, with clear evidence of extreme climate events made obvious by erratic changes in weather patterns, all ecosystems of the world and, more specifically, coastal human settlements are at larger risk. "The pursuit of sustainability will always take place in a climate of uncertainty"; hence, priority must be given to those factors that enhance the capacity of cities to adapt over the years to come (OECD 1996). The city belongs to its inhabitants, and represents a heterogeneous, multilayered society with diversified functions and structure. This paper attempts to unfold community-based practices, which are boon to local environments and invariably reduce disaster risk. These seemingly modest neighbourhood initiatives symbolise immense societal wealth, which can be calibrated appropriately for reducing urban risk as well. This paper also illustrates how a disaster-resilient eco-community approach is inevitable in the present and future contexts, not only to preserve sustainable development gains but also to secure human well-being. This paper presents a brief review of the eco-city vision in the context of India by citing case examples, describes the concept of a 'disaster-resilient eco-community', discusses an eco-city project with specific reference to Puri city and its disaster vulnerabilities, analyses other contemporary initiatives and makes a case for the strong presence of resilient eco-communities in Puri. Emerging issues and future possibilities are explored in the concluding sections.

## 'Eco-city' vision: the development perspective

Roseland (2001) mentions that the term "eco-city" is relatively new, but is based on concepts that have been around for a long time. The idea of creating an eco-city is enticing, but very complex to realise even in the developed world. It is worthwhile examining the experiences and appreciating the differences in eco-city initiatives in western countries compared to the Indian situation. A closer look at such western initiatives usually reflects priorities, as summarised in Fig. 1. These aspirations, although also relevant to the Indian context, vary significantly with regard to core

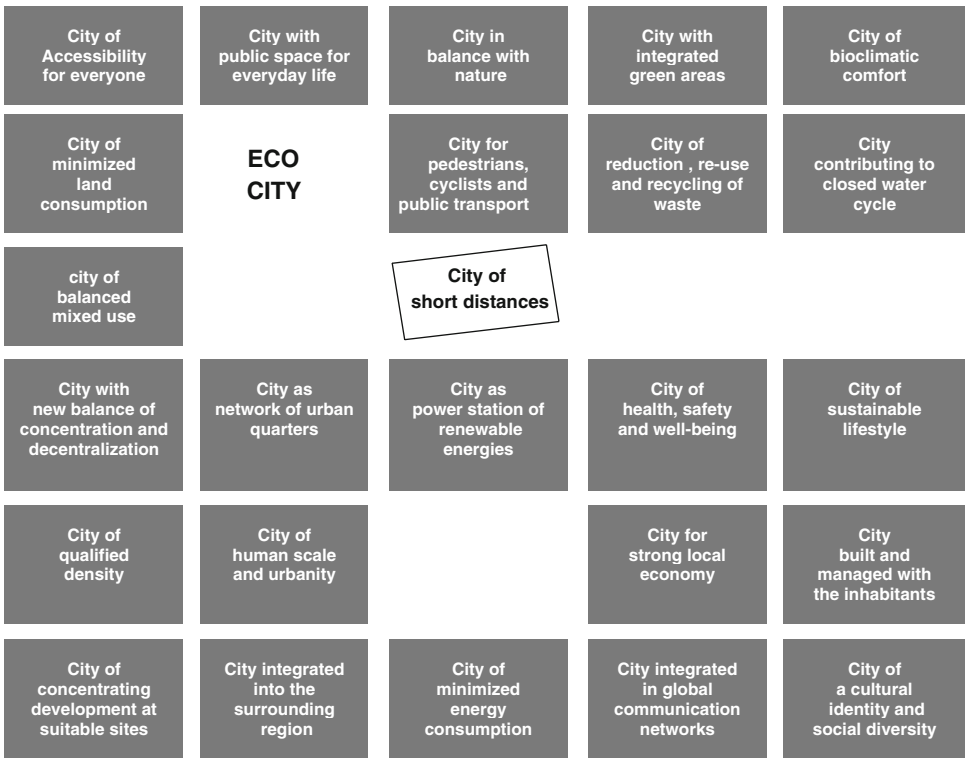


**Fig. 1** Developed countries' aspirations for an 'eco-city' (source: http://www.ecocityprojects.net/index_public.php)

**Table 1** Summary of community-led environmental improvement success stories from four Indian cities

| City | Major problem | Other problems | Intervention | Impact |
|---|---|---|---|---|
| Surat | Epidemic (pneumonic plague)<br>Flooding<br>Large-scale water logging | Faulty drainage system<br>Overflowing drains<br>Garbage deposits in drains<br>Dead cattle/ animals | Government, civil society, private sector and community partnership<br>Priority to environmental cleanliness<br>Cleaning of dirt, debris, disposal of carcasses<br>Streamlining of garbage collection and disposal through ward level planning consulting locals<br>Privatisation of certain services for efficiency | Garbage collection increased from 50 to 94% a day<br>Garbage segregation<br>Public health mapping<br>Citizens sense of belonging<br>Significant reduction in disaster and environmental risks |
| Chennai | Deteriorated neighbourhood environment | Negligible cleanliness<br>Dirty lanes<br>Ugly cityscape | Concerned citizens club—EXNORA started cleanliness drive<br>Awareness programs<br>Involvement of rag-pickers<br>Garbage containers at convenient locations<br>Financial contributions from local residents | Community participation in municipal services<br>Socially vulnerable Rag-pickers became dignified 'street beautifiers'<br>Direct community involvement in civic functions<br>Similar success repeated in other cities |
| Indore | Slum proliferation<br>Extremely poor living conditions | Unhygienic conditions<br>Unpaved slum lanes<br>Negligible water and sanitation facilities | Slum-networking program with slum community involvement<br>Physical upgrades of existing slum infrastructure<br>Underground sewage system, paved lanes and water posts<br>Landscaping and beautification | Slums looked at as integral part of city<br>Slum dwellers took active role in provision of facilities<br>Shared concerns among residents due to networking of all the slums |
| Namakkal | Dirty and noisy conditions<br>Poor municipal services | Reckless small scale industries<br>Poor civic sense<br>Garbage on streets | Administrative will combined with community concerns<br>Resolve to develop city as 'zero waste town'<br>Training for garbage collection and segregation<br>Vermi-composting and recycling of waste introduced<br>Training to local industries<br>Technical and social solutions combines | City received ISO 14001 certification for solid waste management<br>Almost 100% garbage removal achieved, proud citizens<br>Lower noise and pollution levels |

concerns for obvious reasons. In a country like India, which is predominantly defined by vastness and diversity, an eco-city vision should reflect an awareness of history and society, relate the human, built, and natural environments, and respect the cultural and social use of space.

Recognising the fact that eco-city development is altogether a fresh approach to human settlement development in India, examples of documented good practice have been summarised in Table 1, reinforcing their evolution towards a vision of an eco-city. These paradigms or success stories provide further directions to appreciate the 'disaster-resilient eco-community' concept in Puri. From this broad base, it is easier to explore the growing interest in how these ideas can be applied at the local level, and consider the links between various dimensions of the eco-community vision. The experiences compiled briefly in Table 1—derived from successful interventions towards urban environment improvement in Indian cities—also reflect the potential of community-driven approaches. The City of Surat is an excellent example of a local government–community-led initiative towards enhancing disaster resilience of the city through the mitigation of local environmental risks ( (MoEF 2002; USA Today 2006). In the case of Chennai, a citizens' movement to improve municipal services not only enhanced the visual appeal of clean neighbourhoods, but also helped significantly in reducing health risks, preventing choking of storm water drains and thus local flooding or water logging, reducing the burden on local bodies and providing livelihood to the urban poor, hence building up overall resilience with sustained proactive participation. The slum-networking project in Indore further epitomises prudent efforts towards reinforcing resiliency among vulnerable slum communities in the urban area. The model 'zero garbage-town' approach in Namakkal shows how a public–private partnership to improve urban services not only builds up resilience in communities but also in the system as a whole (Sujatha 2006).

## 'Disaster-resilient eco-community': an introduction

Demographic trends claim that the majority of the future population growth in the world is likely to be experienced in small and medium size cities in the developing countries of Asia and Africa, many of which are prone to various kinds of disasters. A United Nations (UN) study (UN/ISDR 2004) revealed that 75% of the world's population lives in areas that have been affected at least once by earthquake, tropical cyclone, flood, or drought between 1980 and 2000. A recent UN report (United Nations 2007) entitled *Disaster Risk Reduction—Global Review* mentions that the number of climate-related disasters is increasing far faster than the number of geological disasters, particularly since the late 1970s. At the same time, the number of small- and medium-scale disasters is growing much faster than large-scale disasters. The increase in urban population clearly means that geographically concentrated urban communities face more vulnerability through not only large-scale, but also frequent moderate-scale, disasters.

The local effects of global environmental change are threatening development efforts in general, and human and environmental systems in particular, by posing greater uncertainty. This makes it necessary to understand people's perspectives, social processes and the human–environment interaction to explain why some cities exhibit better resilience while others remain vulnerable to shocks. Resilience of communities is generally perceived as a 'response to disaster'. However, research suggests that urban resilience can be correctly depicted as a 'society that is flexible and able to adjust in the face of uncertainty and surprise and also be able to capitalise on positive opportunities the future may bring' (Resilience Alliance 2007).

The 'eco-city' approach advocates balancing the economic, environmental and social dimensions of development, and aims at improving environments on the local and regional scale. However, disaster risk reduction is not clearly discernible in present eco-city practices in the West. The 'eco-community' approach has its origin in the 'eco-city' itself. The ultimate objective of both approaches remains the same: 'working together for better social, economic, and environmental outcomes'. An 'eco-city' idea maintains city-level local government and institutions at the centre, whereas the 'eco-community' approach aims to achieve the same objective while strongly advocating the common citizen's causes and concerns evolving through community aspirations.

Experiences gathered by NGOs, citizen's organisations, humanitarian agencies and government departments working in disaster-struck areas of Asia suggest that community-based disaster risk management (commonly referred to as CBDRM) is very effective in risk reduction. It was felt that top-down approaches to disaster risk management alone fail to address the specific local needs of vulnerable communities, often ignoring local capacities and resources, or at times further increasing the vulnerability of the community (ADPC 2004).

The 'disaster-resilient eco-community' approach used in this paper is based on the premise that disaster and environment management practices are inseparable in the development context. The strengths of CBDRM and eco-city helped conceive the idea of synergising both with greater emphasis on enhancing a community's coping capacities, thereby building resilience.

## Eco-city in India: a project-based approach

Robust economic growth has brought immense benefits to the people of India—incomes have increased, poverty has fallen and industrialisation has accelerated. However, this remarkable progress creates significant challenges for managing the pressure on natural resources and the environment (World Bank 2007). In the last decade, unplanned development of small and medium towns vis-à-vis large urban agglomerations accentuated degraded conditions in cities. A number of efforts have been made through various programs by national and provincial governments (sometimes with support from international agencies) to address urban problems. Many of these initiatives have been influenced by concurrent international themes such as sustainable cities, healthy cities, safer cities, cities without slums, smart cities, energy-conscious cities, clean cities, and green cities, etc.

One such proposal is the eco-city program (ECP), which emanated through the 10th Five Year Plan (2002–2003 to 2006–2007) of the Government of India, for which German Technical Cooperation has provided technical support. ECP was conceptualised to improve the environment and achieve sustainable development through a comprehensive urban improvement system employing practical, innovative and non-conventional solutions, and delivering visible environmental improvement to small and medium towns (CPCB 2005). Keeping in mind the fact that environmental improvement is a comprehensive, continual exercise, ECP is focussed on bringing about a visible difference through demonstrative projects. "In the long-run, ECP is expected to help create the needed awareness and local dynamics for decreasing environmental burden/stress, improving living conditions and helping in achieving sustainable development through an integrated planning and management of land and its resources and implementation of environmental improvement measures" (ASEM 2004).

In the first phase, the project was initiated in six towns, namely Vrindavan, Puri, Ujjian, Tirupati, Kottayam, and Thanjavour, geographically spread across India. ASEM (2004) mentions that the towns were selected on such criteria

as: size of the city (less than 500,000 population), environmental improvement needs, scope of public–private partnerships and private investment, generators of economic momentum/urbanisation, public participation in decision-making processes, and regional distribution. Each of these towns carries a very unique and special imprint among the Indian populace, which goes far beyond merely a name for these cities. Widely believed sagas from ancient texts characterise the meta-morphology of these towns. Cultural identity, historical background, religious/tourism importance, rich heritage (including social, cultural, and built heritage), discernibly distinctive demographic patterns, and legacy of the past stand out uniquely in these cities that are to be developed as eco-cities. This is further emphasised by the fact that, in the Indian context, these cities emanate enormous faith and belief, not only among their own city residents, but also in people throughout the country at large. The specific objectives of the ECP include (ASEM 2004):

1. Identification of environmental problems/hotspots in the identified towns/cities and priority environmental improvement projects through a participatory approach;
2. Designing and detailing the prioritised environmental improvement projects meeting state-of-the art designs and specifications; and
3. Creation of environmental landmarks that show visible environmental improvement.

Taking into consideration the tourism/religious character of the identified towns, the environmental improvement projects taken up in the core areas relate mainly to sewerage and drainage, solid waste management, traffic and transportation, and plantation and landscaping. Funding for the projects is sought on an equal cost-sharing basis between the municipality concerned and an agency of the Indian government (SPA 2005).

In India, the eco-city is clearly conceptualised as a 'short-term demonstrative project' to be implemented in selected cities. It may be noted that post-independence development in India remained biased towards rural areas because the majority of the population still lives in villages. Urban problems recognised from time to time, and addressed in a piecemeal manner, were given cosmetic treatment rather than treating the city as a holistic entity. The eco-city project is also designed on similar lines with prevailing short-sightedness. There is no doubt that, with burgeoning urbanisation, India needs eco-cities, but in the present circumstances short-term demonstrative projects fall convincingly short of basic eco-city tenets. With the dynamic role being assumed by Indian cities on a day-to-day basis, the eco-city concept needs to be a resolve of the city and its communities for the longer duration, possibly forever. In its present form, the handful of projects identified through ECP is not even able to address a city's pressing needs, quite apart from the fascination to 'influence the future city development'. Further discussion in this paper will revolve around the city of Puri, which has been studied in detail from the 'disaster resilient eco-community' perspective. In-depth examination of various aspects of the Puri project are set out in the following parts of the paper.

## Coastal city—Puri (India): an introduction

Puri, a town believed to be over 1,000 years old, is an important centre of pilgrimage located on the east coast of India, in the Indian state of Orissa, overlooking the Bay of Bengal bounded at the south as shown in Fig. 2. Puri harbours one of the four major temples of Hindu worship in India. The main temple attracts millions of devotees throughout the year on different occasions and hence dominates the town in every sphere—physically, socially, culturally, and economically.

Understandably, the economy of Puri depends directly on tourism, which provides a livelihood for almost 80% of the town's population (PCDP 2006). The built form of Puri has grown over centuries, with temple precincts in its centre. There are many ancient settlements—known as sahi—around the temple precinct, which are engaged in temple activities. These traditional communities are interwoven in a lifelong relationship with the temple, and are responsible for providing various materials and services for the management of daily rituals as well as annual ceremonies. Surprisingly, in recent years, a significant non-native population, mostly aged (after retirement), started settling in this auspicious city to spent their last few years there with the hope of attaining moksha (relief from the cycle of birth and death). This resulted in a change in the real-estate scenario as well as in the cityscape. The city today functions as a religious town as well as a recreational town (due to the enchanting beach), functions that Puri has acquired over time.

Millions of pilgrims and tourists visit Puri every year. According to the 2001 census, the population of the city is 157,610. However, the daily average floating population (i.e. visitors) stands as high as 40,000 persons, i.e. about 25% of the permanent population. During June–July each year, the biggest ceremony, known as car-festival, is celebrated in Puri, which attracts over 1 million people. Accommodating such a high floating population as well as providing safe water and sanitation and managing waste is the core environmental concern in Puri. Due to the rapid transformation of residential areas and expansion of commercial activities in all dimensions, tremendous pressure has been exerted on the fragile urban eco-system. In particular, high density in the core areas has led to the deterioration of the physical environment and living conditions. Vulnerability is also accentuated due to the filling

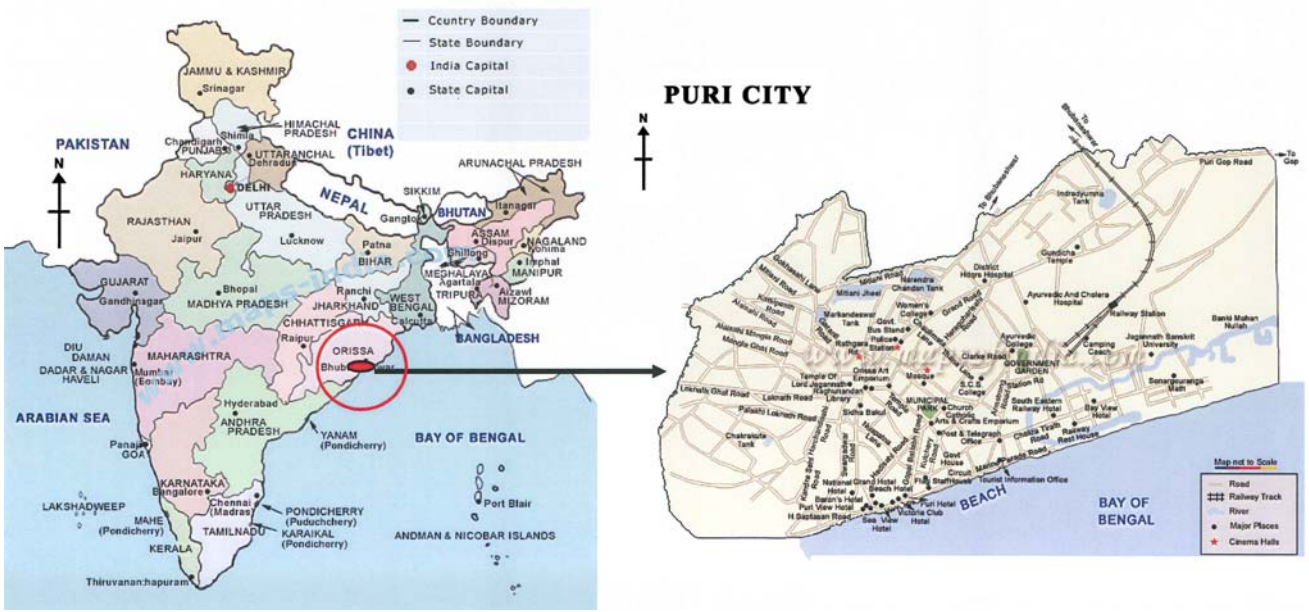


**Fig. 2** Location of Puri in India (sources: http://puri.nic.in/puritown.htm; http://maps-india.com/india/india-political-map.html)

up of low-lying areas and wetlands to accommodate more buildings in the vicinity of core areas. Hotels and guest-houses also discharge wastewater directly into the sea, resulting in people getting infected with various skin and other infectious diseases.

As many as 24 festivals are celebrated in Puri each year in all pomp and grandeur. The daily and yearly cycle of activities of the temple are still important components of the city's economic, social and cultural life (SPA 2005). The grand car-festival is arranged by the combined efforts of the State Government of Orissa and the Temple Management Trust. Preparation for the grand festival starts months in advance, hence an eco-city discussion would be incomplete without taking into consideration these intrinsic aspects of the communal life of the people of Puri. Even the well-articulated long experience of festival management is put to the test every year during the 10 day long celebration of the car-festival. Since the car-festival is held annually during the south-eastern monsoon of the Indian sub-continent, Puri experiences local flooding, flash flood, water logging, and an increase in water borne diseases due to insufficient sanitary conditions, posing a serious health threat to over a million devotees.

The municipal area of Puri is 16.84 $km^2$ (including the seashore, which measures about 6.59 km) with a gross density of 7,435 persons per square kilometre. Puri falls under the coastal regulation zone of India, entailing that all construction activities in the town must adhere to the coastal zone management plan of the area in addition to local town and country planning regulations (MoEF 1991), i.e. the master plan. It is very important to note that the master plan-led spatial development of Puri neither received recognition in the political and social arena nor was fully implemented. Although the master plan is a legal document, in practice most decisions relating to land-use, housing and infrastructure are taken on an ad-hoc basis and are influenced either politically or by malpractice (including corruption). An inquiry into the administrative and decision-making system is beyond the scope of this paper however, so a cursory mention will suffice as it is also important in the understanding of community aspirations and perception.

The preparation and revision of the master plan for Puri is the responsibility of the town planning department, whereas its implementation is vested upon the Puri-Konark development authority. The District Disaster Management Plan is prepared by the Revenue Department, which focuses on rural areas, and hence urban risks do not get due recognition. No practice of preparing an 'environment management plan' exists for urban areas. However, for the first time, the Orissa State Pollution Control Board has recently drafted a plan for the neighbouring city of Bhubaneshwar, which is the capital city of Orissa state. Urban local bodies offer most urban environmental services but lack the capacity, as well as the resources, to effectively provide even the minimum basic services in the cities. Therefore, in Puri, environmental risks as well as disaster-related vulnerabilities grow hand-in-hand with chaotic physical development. This further underscores the need to develop Puri as an eco-city with appropriate risk reduction strategies engraved into it.

## Disaster vulnerabilities of Puri

A growing body of literature over the past decade has examined India's vulnerability to natural hazards, including climate-change, and confirms that Orissa is among the most vulnerable states of the country (TERI 2001). The vulnerability Atlas prepared by an Indian government agency considered the multiple hazards faced by different regions and gave an account of various natural hazards an area is prone to. Figure 3 shows the level of hazard exposure of various districts of Orissa including Puri. Orissa, due to its geographical location, is prone to various types of natural hazards such as cyclones, floods, earthquakes, and tsunami. Being situated on the Bay of Bengal makes Orissa one of the most vulnerable regions to violent tropical cyclones in the world (Thomalla and Schmuck 2004).

> "The socio-economic vulnerability of the people turns these natural hazards into disasters. With nearly 90% of the population living in disaster-prone areas and about 66% below poverty line, the coping mechanism of the state and its people are continuously under severe strain. Several initiatives have been taken to prepare the community to meet the challenges posed by natural disasters, but there is hardly any time left to complete the process. The frequency and gravity of the disasters give little scope to reap the benefits of these initiatives" (RDMD 2006).

An analysis for vulnerability to climate-change using data on the frequency of occurrence of extreme events in the Eastern coastal districts of India suggests that districts in the state of Orissa are highly vulnerable compared to other states (Patnaik and Narayanan 2005). Furthermore, the latter study compares the district-wise distribution of the frequency of depression, storm and severe storm from 1877 to 1990 in the 14 most vulnerable districts of two coastal states; the study finally ranked the district of Puri at the top of the list of most vulnerable districts, with maximum numbers (total 84) of cyclones (of different types) experienced over the 100-year period.

In October 1999, Orissa experienced a severe cyclonic storm (commonly known as a super-cyclone), with wind speed of 350 km $h^{-1}$, enough to devastate most of the coastal area including Puri. The District Disaster Management Plan-2005 prepared by the office of the District collector (DC 2005) identified the disasters listed in Table 2 in Puri district.

Interestingly, tsunami was not recognised as a possible disaster in India despite its 7,500 km long coastline. However, the Indian Ocean Tsunami in 2004 dispelled this myth. Now, the Orissa State Disaster Management

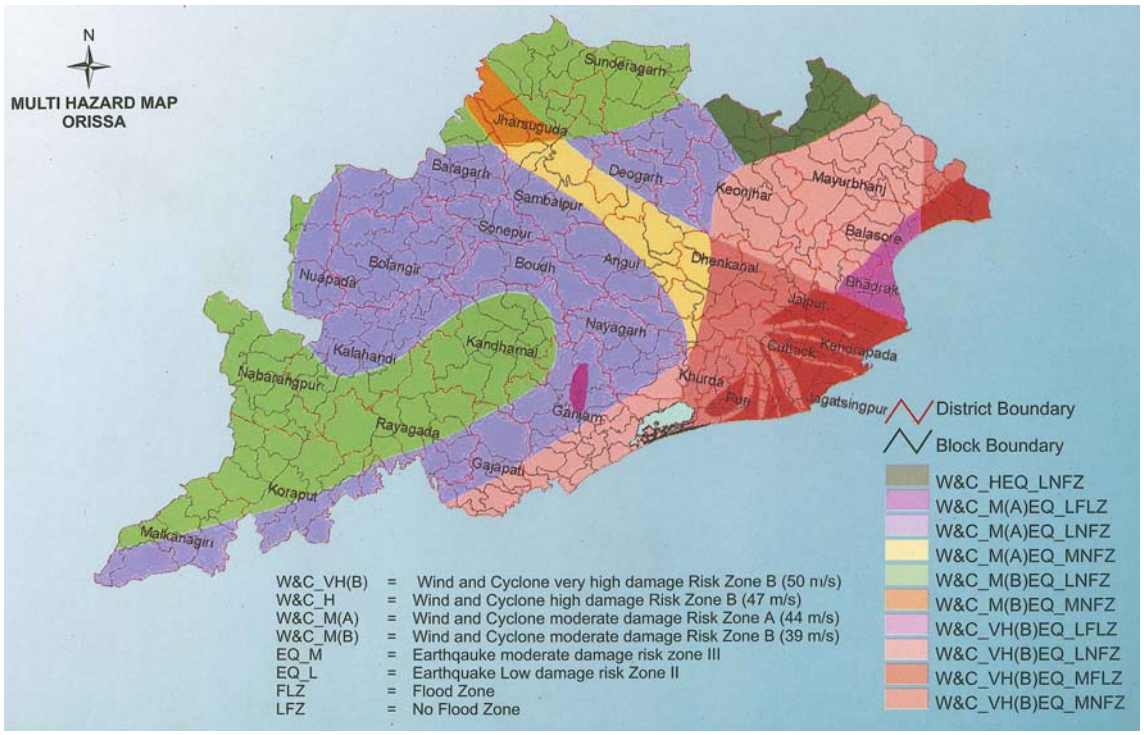


**Fig. 3** Multi hazard map of Orissa (source: http://www.osdma.org)

**Table 2** Disasters identified in the District Disaster Management Plan of Puri

| Common natural disasters | Man-made disasters |
|---|---|
| Flood | Fire accident (house fire or industrial fire) |
| Cyclone | Communal riot |
| Heavy rain (sometimes leading to landslide) | Road/rail accident |
| Hail storm | Industrial and chemical accidents |
| Drought (also scarcity of drinking water in towns) | *Rasta Roko* (road blocks/protests, sometimes destroys roads and vehicles) |
| Heat wave/sun stroke (urban heat island effect) | Building collapse (due to heavy rain) |
| Cloud burst (casualties due to lightning) | Stampede (real or due to false-rumours during mass congregations) |
| Earthquake (zone-III, moderate damage risk zone) | Vector-borne diseases (epidemics—especially during festivals, animal disease) and pest attacks |

Authority (OSDMA 2007a) has recognised 165 places in Orissa that are vulnerable to tsunami. Six coastal blocks in Puri district, including Puri city, are also vulnerable to tsunami (OSDMA 2007b).

Following the super-cyclone in the state, a large number of initiatives were taken, mainly through support from international agencies. To institutionalise disaster preparedness at different levels, a Disaster Risk Management (DRM) program is being implemented as a joint UNDP–Government of India program in 145 blocks of 16 districts of the state, including Puri district. Under the program, a District Disaster Management Committee (DDMC) has been formed, its members trained, and District Disaster Management Plans prepared. The above discussion shows that, although disaster management weighs heavily on the government agenda, its focus remains in rural areas and therefore urban disaster management has not received due attention. One official mentioned that "Orissa has prepared thousands of village disaster management plans but not a single city disaster management plan is attempted yet".

## Developing Puri as an 'eco-city'

### Background

The municipality of Puri and an agency of the Indian government mutually resolved to develop Puri as an 'eco-city' and agreed to share the costs towards this. The School of Planning and Architecture (SPA) in New Delhi prepared the 'Eco-city Development Plan for Puri' (SPA 2005). This plan is outlined in terms of a set of policies and strategies along with a conceptual land-use plan. A list of potential projects to be taken up within and beyond the priority action areas, together with promotional and administrative measures, were included in the plan. This plan identifies the main environmental and heritage spots, which define the basic character of the city not only in terms of major holistic landmarks but also in terms of natural heritage, where immediate intervention is needed to avoid further deterioration of the built and natural environment. The eco-city concept followed by SPA takes into account the carrying capacity of the urban area, land-use planning and landscaping, aesthetic quality, housing, education, recreation, health, and communication within the city. The plan notes that:

> "Considering the severely lacking or inadequate infrastructure facilities, deteriorating environmental quality and living conditions on one hand and lack of finances, awareness, adequate technical competence and organizational set up on the other, there is a need for looking into *custom-made non-conventional* solutions for application".

### Analysis of the 'Eco-city Development Plan'

The Eco-city Development Plan (EDP) identifies the following emerging issues in Puri:

- Due to the rapid transformation of residential areas because of commercial activity, mixing of land-uses is taking place indiscriminately and, as a result, the intensity of use is increasing along with this friction for space. This incompatibility of land-uses has transformed the physical fabric and increased congestion of the city's various networks.
- The role of the religious core has shifted from a social and cultural centre to that of a commercial core. The effect is a clash between religious and commercial activity.
- The high density in the core areas has led to the deterioration of the physical environment and living conditions.
- Haphazard development has led to the deterioration of the city fabric along with the filling up of low-lying areas and wetlands.

- The tourism sector forms a major component of the city's economy, but if this sector is not developed in a planned fashion then sustainability will be a problem.
- The overall development of the city lacks planned recreational and open spaces.
- Stricter enforcement of regulations related to coastal zones is one of the major issues that must be addressed immediately.

The EDP recognises that the active participation of the public in the improvement of the city has to be encouraged right from the stage of planning through to implementation. The plan finally identified five projects in priority zones according to four major areas of concern, viz. (1) conservation of cultural heritage, (2) improvement of traffic flow, (3) improvement of infrastructure, and (4) landscape treatment. The following points provide a brief analysis on these projects to give a deeper insight into the 'ecocity vision' of Puri:

1. *Rejuvenation of Markendeya Tank:* This is one of the five religious tanks closely associated with the rituals of the temple. The water in the tank is becoming increasingly polluted due to bathing activity, usage of oils, soaps and detergents, throwing of ritualistic material, viz. rice, grains, flowers, and defecation in and around the tank, etc. Disturbance in the natural drainage connecting the drain led to diminished freshwater inflow, further degrading water quality. The EDP proposes to revive the drainage system in the area to re-establish freshwater inflow, to desilt the mud, and to repair the tank structure including landscaping around the tank. Despite recognition of the problem, there is no mention of tourists and local community involvement either to improve their habits (which causes the pollution in the tank) or seek their voluntary contribution in proposed rejuvenation.
2. *Improvement of storm water drains around the temple:* These drains in the core area are stagnant with silt and garbage. Moreover, small structures are haphazardly raised over these drains to act either as roadside shops or to provide entry into houses. These choked drains not only pose severe sanitation problems and health risks but also lead to overflowing and flooding during the rainy season. The EDP proposes to cover these drains. Earlier similar 'strictly engineering' approaches have failed completely because community-friendly solutions were not worked out in such projects. In this proposal, it was essential to establish a dialogue with the communities involved to arrive at a consensus so that citizens do not face inconvenience but neither do drains get choked.
3. *Renovating public toilets and drinking water facilities*: Existing public toilets near the temple are in a deplorable condition, with a lack of proper plumbing, flushing arrangements for urinals, and ventilation as well as poor internal layout. Similarly, drinking water facilities for tourists are insufficient as well as being in a dilapidated state. The EDP proposes a complete renovation of these facilities. Certainly, there is a need for better toilets and drinking water facilities in this area. However, experience shows that, in a place like Puri with a very high tourist inflow, daily routine maintenance of such facilities is even more critical, and 'pay and use' schemes involving voluntary organizations can provide enough incentive for the upkeep of these facilities. However, the EDP is silent about exploring such a mechanism.
4. *Development of eco-automobile park*: There are a number of automobile workshops, repair shops and service stations along the main road in Puri, causing pollution as well as traffic blocks. The EDP proposes to relocate these to an ecologically suitable place, somewhere away from town. The fact is that it is convenient to park tourists' vehicles near the temple so that visitors can minimise exhaustion by avoiding the walk up to the temple in hot-humid weather. At the same time, vehicles also get tuned up for the return journey with the service available at existing automobile workshops. There is already a very organised resistance to this relocation plan and citizens are demanding that the space of existing automobile workshops be better planned rather than evicting them to far-off places with very limited conveyance options.

Although the EDP is emphasising the adoption of context-based, innovative, non-traditional models to develop Puri as an 'eco-city', the projects identified, however, focus merely on selective infrastructure development or upgrading. This piece-meal approach appears highly inadequate and thus jeopardises the 'eco-city' vision. Understanding community dynamics to recognise existing city and neighbourhood level interactive practices, strengths and resilience has not been studied under this EDP.

Since the finalisation of the eco-city project report in April 2005, there have been many rounds of meetings between the Indian government's agency and the municipality of Puri to actually begin implementation of the project, which failed miserably. Like many other urban local bodies in India, the municipality of Puri faces serious budget constraints, and there have been incidents where the municipality was unable to pay staff salaries for months at a time. Due primarily to these extremely constricted financial capabilities, the municipality of Puri could not make its share of finances for the eco-city project available until December 2006.

## Urban renewal mission in Puri

"To sustain the momentum of growth to fulfill the aspirations of people residing in urban areas, the Government of India announced the Jawaharlal Nehru National Urban Renewal Mission (JNNURM)", which was launched in December 2005, for integrated planned development of 63 selected cities in India, including Puri (The Orissa Gazette 2006). The Mission period is 7 years, with a total additional central assistance of US $12.5 billion to JNNURM cities to address improvements in infrastructure development, urban poverty and urban governance in these cities. Financing of these projects under the Mission is more favourable to some of the municipalities like Puri, as 80% of the funds will be provided by central government and another 10% will be the share of state government, thus enabling the municipality to contribute only the remaining 10% towards identified infrastructure development (JNNURM 2005). The municipality of Puri moved ahead to receive JNNURM support and is expected to implement several projects identified through a much detailed study known as the 'Puri City Development Plan' (PCDP). The priority projects identified by the EDP have also been included in PCDP to some extent.

At this juncture, it is too early to comment on the success of the JNNURM initiatives. Nonetheless, a closer look at the ambitious PCDP provides better insights into the stakeholder's aspirations:

1. The tremendous pressure on land within city limits is recognised. There is a special mention of the reduction of neighbourhood level recreation spaces that belong to traditional communities (discussed in detail below).
2. Tourism is considered as the backbone of the city's livelihood, with 80% of the population depending solely on income from this single largest industry.
3. The plan exclusively details various aspects of the temple and symbolises the temple as the identity of the city.
4. The plan gives a detailed account of Puri's urban environmental infrastructure and services. This is done through the analysis of the current situation and comparison with performance indicators to identify issues and problems. Solid waste management, preservation of water bodies, beach development, public toilets, and air and water quality are discussed in detail, whereas disaster management receives only a cursory reference.
5. Water supply, sewerage system, storm water drainage, street lighting, roads and transport are also analysed as hardware components of urban infrastructure.
6. Urban poverty and slums are discussed in the light of ongoing programs related to slum development, housing for the poor, urban employment schemes and development of women and children.

Finally, various projects have been identified with the vision to develop Puri as a 'vibrant sustainable city with unique heritage and rich legacy' around four major themes envisioned for the city, viz.:

1. *Connected and accessible city*: by developing integrated transport systems and networks;
2. *Environmentally responsible city*: through greenhouse gas reduction, wise use of water resources, reduction of air- and noise-pollution, protection of biodiversity, and creation of sustainable built form;
3. *Inclusive and engaging city* : by enabling citizens to equitably participate in city life; and
4. *Innovative heritage tourism business city*: by ensuring business development and job growth through heritage tourism.

One important feature of PCDP is that its formulation involved stakeholder consultations at various levels. Starting from the project kick-off meeting, a number of workshops and meetings have been held with state, district and municipal authorities to grasp, analyse and negotiate various issues. Interestingly, a dialogue was also established at municipality ward level to map the 'nightmares and dreams' of the citizens of Puri.

## Discussion on JNNURM proposals

Discussion with city authorities during one of the author's month-long field visits in December 2006 revealed that the decision-makers of Puri, including politicians and bureaucrats, are very receptive to the JNNURM program and feel that this will prove to be a major contributor, especially in upgrading the existing environmental infrastructure. A long list of overambitious projects has been mentioned in PCDP, making it a 'dream wish list' for the city. Total estimated investment at the present rate (US $1 = 40 Indian Rupees) equates to the astronomical sum of US $457 million, of which about 55% is estimated to be invested in inner city revitalisation, conservation and development. The identified projects are linked with heritage preservation and promotional infrastructure; provision, enhancement or upgrading of city level environmental and tourism infrastructure; basic services to the poor; and better urban governance. Improved governance is also expected to boost disaster management mechanisms. A diagnostic review of PCDP, along with personal interviews with political and bureaucratic officials, reveal that Puri is facing infrastructure deficiency due, in particular, to the extremely poor

financial capacities of both municipal as well as state government. JNNURM is being recognised more as a '*jackpot*' rather than a holistic city development opportunity. Although the Mission has been designed for infrastructure development linked to a reform agenda, there is a strong bias towards projects related to infrastructure development. Experience from earlier similar programs shows that this process often leads to very poor quality infrastructure development by compromising various structural safety and risk factors, making this investment vulnerable to further disaster and environmental risks. This compromise will have very serious repercussions as Puri is prone to storm surge, cyclonic winds and coastal flooding. It is important to ensure the implementation of the projects in a transparent manner as there is a wide scope for corruption and the installation of low quality infrastructure.

PCDP also notes that, despite the fact that the city is prone to natural and man-made disasters, it does not have a disaster management plan, has no system to safeguard sea-beach areas, and has no disaster management centre to act as a repository of data. It thus proposes to set-up a Disaster Management Center within local government. Towards this goal, one of PCDP's objectives is to 'strengthen preparedness for city's disaster management' (PCDP 2006), with the municipality of Puri and the district administration sharing institutional responsibility. A summary of sector-wise investment demands estimates US $1 million (0.22% of total demand) from JNNURM funds to prepare community-based disaster management plans as well as to strengthen the city's infrastructure needs to appropriately address disaster response. Disaster and environmental risks are neither assessed or analysed nor given due importance in the list of PCDP projects or in the reform agenda. The onus of excluding risk component may not be placed solely on Puri, as currently no independent JNNURM sub-component addresses either urban vulnerability or risk mitigation, and a climate-change related response is not in sight (Revi 2008).

### Community participation fund

In October 2007, almost 2 years after the JNNURM came into existence, the urban development ministry of the Indian government (which is also the coordinating body for JNNURM) announced the 'Community Participation Fund' (CPF). A total of US $125 million corpus fund will be made available for the present fiscal year, which will be channelled through urban local bodies (Economic Times 2007). Although belated, this is a very encouraging decision in the history of urban India (after independence), making government funding is directly available to communities for local needs. Citizens have to identify and prioritise projects in their localities and form the node of the civic body. It is reported that most cities seeking JNNURM funding for mega infrastructure projects like mass transport schemes, sewage disposal plants, roads, etc., do not offer enough scope for citizen participation in urban governance. As per CPF provision, a maximum of US $25,000 can be made available to small budget projects (e.g. locality-based urban waste management plan implementation) at the neighbourhood level. It is important to note that the PCDP was finalised before this fund was announced, and hence there is a missing link as to how community-level projects to be implemented through this fund will be mainstreamed with city-level large-scale projects.

## Recognising resilient capacities

Apparently, the eco-city project looks like a piecemeal approach to provide limited infrastructure in very selected pockets of the city. According to detailed project reports prepared by the municipality of Puri and approved by an Expert Committee, a few projects have slowly been executed. Remaining projects have been incorporated in the PCDP due to the existance of the JNNURM funding possibility. However, this half-hearted eco-city development process has provided many lessons. Eco-city literature, as well as evidence from cited examples of Indian cities in this paper, clearly calls for grass-roots level involvement. A 'city' cannot become an 'eco-city' merely by infrastructure provision or upgrading of existing facilities. Especially in the context of densely populated countries like India, community-capacities need appropriate recognition and augmentation in order to sustain any physical development activity. This paper strongly recommends recognising the inherent inbuilt strengths of the communities in Puri, which are neither identified nor acknowledged in either the EDP or PCDP reports. The authors conducted month-long visits in Puri in both 2005 and 2006. This paper is based on information collected during this period from a number of sources, including government reports, NGO literature, scientific and media publications, etc. In addition, interviews were conducted with representatives of national, state, district, and local government agencies responsible for environment and disaster management, including the Orissa State Disaster Mitigation Authority (OSDMA); Orissa State Pollution Control Department, School of Planning and Architecture, municipality of Puri; and District Disaster Management Committee of Puri. The authors also interviewed local people, social workers, eminent socio-political/charity groups, businesses, religious and philanthropic trusts. The following 'community-capacities' were observed as having tremendous potential to bring about sustainable

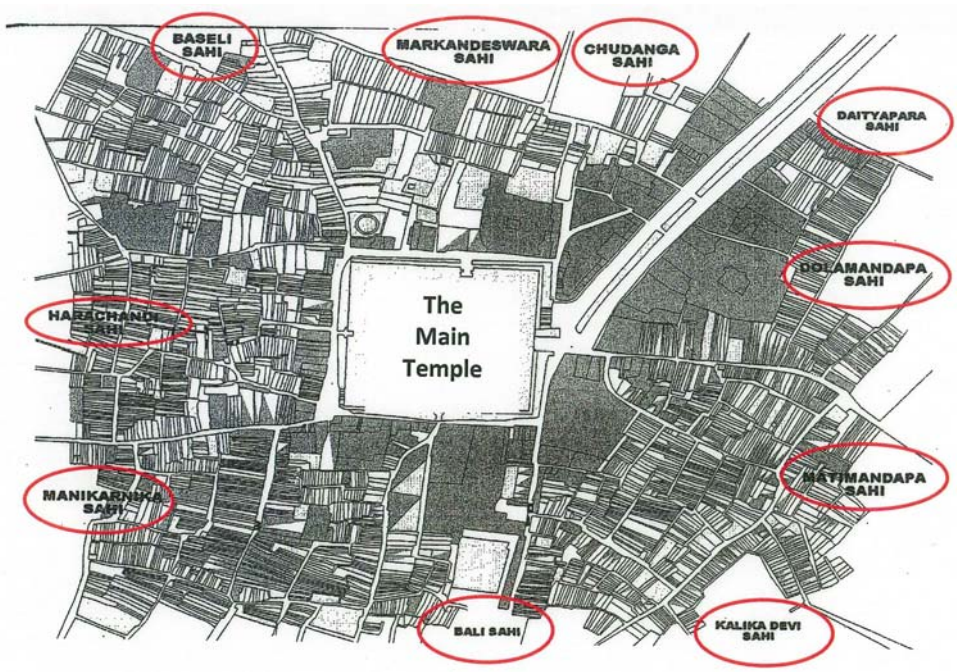


**Fig. 4** Location of *Sahis* around the temple (source: Patnaik 2005)

environmental risk reduction and thus enhance community resiliency in Puri.

## The Sahi as a cohesive community structure

The 'Sahis' of Puri are characterised as cohesive communities with very distinctive settlement patterns. As close-knit community units, the sahis are spread out somewhat in the shape of a fan, with the main temple in the centre as shown in Fig. 4. Each of these sahis consists mostly of old houses, open spaces, water harvesting and storage elements, concentration of heritage buildings and complexes, and streetscapes and street network with vibrant '*Chhakas*' (road intersections). The congregation points are usually these *chhakas*, which are marked by the '*Choupal*'' (a platform) or religious building (like a temple), and are sometimes accompanied by overly decorated gates. These elements are a vital part of the heritage character of Puri. These sahis have preserved their original character for many centuries due to the collective wisdom and shared vision of the residents. These sahis represent a robust community bonding nurtured through many generations. Citizens discuss local problems and issues among themselves and try to search for acceptable solutions through mutual cooperation. The mutual trust among the people is further harnessed by the spirit of working together for community religious or environmental concerns. There exists a very potent sense of belonging to the place, which is exemplified by the preservation of the neighborhood heritage identity, water harvesting elements, gardens, open spaces, etc. Irrespective of differences in economic status or social position (caste), community participation for a larger cause in response to calamities (like the Orissa supercyclone, Gujarat earthquake, etc.) in these areas of Puri was high. However, recent pressures of urbanisation and population have resulted in the densification of existing buildings and reduction of open spaces. Community preserved gardens and open plantation spaces have started to shrink or deteriorate in some cases. The traditional neighbourhood concept is increasingly threatened by inadequate infrastructure. These sahis truly reflect the spirit of active, committed and involved community, and their role needs to be redefined with changing contexts. Coastal communities need extraordinary involvement to mitigate, or adapt to, risks arising from increasing hazards (also emanating from climate change), and Sahis could be the starting point to take the lead toward becoming 'disaster-resilient eco-communities'.

## Jagaghars as indigenous community institutions

Jagaghars are old traditional community-based indigenous institutions in Puri. It is believed that, in ancient times, these jagaghar were established to integrate the community. A typical jagaghar has a temple, a pond (acts as a swimming pool), coconut and other medicinal herbal trees, a sand pit, and a gymnasium, enclosed within a boundary wall. Puri is a small city with limited recreation facilities and hence most of the jagaghars are like recreation centres for the community. They are very relevant even today, and help local people congregate and enjoy community interaction among old and young people alike. Today, there are

56 jagaghars in the town. Functionaries of jagaghar from seven sahis around the temple are closely associated with various rituals of the main temple.

Jagaghars in Puri play the role of a multifunctional institution with respect to the social, cultural and religious life of the town. During the process of cultural transition, the history and cultural ethos of jagaghars were found to be decaying and in need of immediate attention. For example, the land available with the jagaghar can be developed as gardens and parks for the use of the neighbourhood, and ponds can be renovated and may be used for pisci-culture for maintenance of the jagaghar. This paper identifies the jagaghar as a resilient institutional mechanism that is purely democratic, community-owned, and non-political yet pro-active. They not only maintain environmentally friendly recreation facilities but also exhibit a constant concern to protect these open spaces, which function as 'lungs' amidst densely populated settlements. Indigenous knowledge emanating from the jagaghar shows a remarkably deep understanding of conservation of natural resources like water, flora and fauna, etc., by the communities. Water ponds in the jagaghar not only provide a swimming facility but also contribute significantly to ground water recharging and maintenance of natural drainage channels as well as keeping the water table high even in the long dry seasons. The presence of a religious structure (temple) at the corner of the jagaghar shows an understandable linkage of faith with science. This also adds value to continued environmental conservation at the community level with heightened yet hidden environmental consciousness among the common man. As indigenous neighborhood establishments with rich environmental concern, Jagaghars are true reflections of the spirit of 'eco-community' in Puri. It is important to involve jagaghar community groups in the formal community participation structures being proposed under JNNURM and the 74th Amendment of the Indian constitution.

### *Nirmal Shreekshetra* (community-based waste management)

*Nirmal Shreekshetra* is a community-based solid waste management program jointly implemented by three community-based organisations (CBOs) in Puri. The overall goal of the project, which is supported through a national level NGO and CPCB, is to identify and implement environmentally and economically sustainable strategies for municipal waste management (MoEF 2006).

Pilot activities for door-to-door segregated waste collection are being carried out in three zones that have a predominance of commercial, residential, and hotel and guest house activities. Even during the demonstration stage, the project was able to achieve a 60–70% success rate in waste segregation and collection at the grass-roots level. A series of surveys, awareness campaigns, sensitisation programs, rallies and street plays was organised in the project areas as well as in schools and colleges. Looking at the positive results of this project, even the temple administration and political groups support this initiative. This effort also encourages tourists to follow better civic sense. Self-sufficiency, sustainability, responsible partnership and consensus building are some of the attributes that make this project workable and acceptable even in the heavily traditional localities of Puri. This example convincingly shows the communities' willingness to change attitudes and habits, and cooperate in civic functions to make neighbourhoods clean and healthy. Local medical dispensaries register fewer cases of malaria and other vector- or water-borne diseases from project locations. Clearly, initial hand-holding by CBO in the process was very effective. An attempt to keep the immediate environment clean also reduces health risks and increases resilience. However, it is very important to integrate such efforts into the citywide solid waste management system, which includes not just the collection but also the transportation and disposal of wastes.

### Preparation for Rath Yatra—managing the extraordinary

*Rath Yatra,* the 10-day long *car-festival*, is in many ways the most important activity of Puri. The festival attracts an influx of over a million tourists, which is unusually difficult to manage. Months of detailed and well-laid preparation is required to create the social and physical infrastructure required for such a large population. Deployment of extra staff including specialist doctors for medical care; special task squads for epidemic outbreak control; decentralised provision of first aid services; temporary health check-up camps and mobile (ambulance) intensive care unit; extra quantities of blood in blood banks and blood donation camps; a smooth bulk supply of emergency medicines locally, creation and reservation of hospital beds; stocks of water; quantity and quality monitoring, purification, treatment and disinfection; measures for preventing food adulteration; security arrangements through police and community volunteers; creation of temporary fire-stations; arrangements for distribution of food and water to visitors; maintenance of temporary toilets, etc., are some of the commendable measures the administration is taking with very active civil society and community participation. The municipality undertakes special measures to collect waste from hotels, guest houses and temporary congregation places. Special cleanliness drives are usually organised by drawing volunteers from various locations and across income groups, mobilised mainly through civil societies.

The significance of these efforts has a considerable impact on disaster preparedness. Conducting city-wide mock-drills for disaster preparedness has long been underlined in disaster literature. However, organising such a drill to assess preparedness or emergency readiness of the public–private community is very difficult even in developed parts of the world.

In this respect, Puri represents an excellent example of a city putting its emergency management system through a rigorous cycle of planning, prevention, mitigation, preparedness, and response checks every year. Since this practice has existed for many centuries in Puri, this understandably helped develop a certain degree of disaster preparedness and response capacity at all levels including government, non-government and community stakeholders.

## 'Disaster-resilient eco-community' in Puri: epilogue

The environmental improvement initiatives briefly discussed through selected case studies of Indian cities clearly highlight the fact that the community is the key to the success of such efforts. These studies exhibit varying degrees of success, which may be ascribed to a wide range of factors. However, the world over, recognition is growing that the process of improving the environment will not be easy. However difficult it may be, cities are at risk to both deteriorating local environment and increasing disasters. The choice to remain unbiased on these issues has already started causing havoc, as has been observed in recent urban environmental disasters. Devastating urban floods, increased cases of deaths due to pollution, problems of access to even the most basic amenities like potable water, sanitation and housing are spiralling phenomenally. Existing traditional community structures are under continuous threat and, in many cases, have been wiped-out due to emerging challenges to sustain livelihoods. The cases clearly recognise that government, civil society and communities must all take appropriate action and establish partnerships even to make a small difference in current living conditions in their respective cities. But the adjustments and changes involved should not dissuade governments or the public from further expanding efforts to gradually evolve present cities into 'disaster-resilient eco-cities'. Academics and practitioners share the "common view that measures taken to improve the urban environment will generate jobs, reduce the costs and risks of environmental problems, strengthen the capacities of the governments to meet the needs of the future, and develop more cohesive communities" (OECD 1996).

Narrowing the discussion to the case of Puri as 'eco-city', the vision, which served as a basis for planning the model settlements, on one hand contains appealing and very important concepts, such as maximising people's quality of life and living in harmony with the environment. On the other hand, both EDP and PCDP, by their very nature, seem deficient in addressing a holistic urban development, leaving out crucial elements in appreciating and building on the community's existing 'resilience and capacities' as discussed in the sections above on Sahis, Jagaghars, Nirmal Shreekshetra and car-festival's preparedness. In addition to the innovative practices investigated in Puri, there are a number of concurrent government and non-government programs operating at different levels. Some of these programs include the Disaster Risk Management Program (joint program of the Government of India and UNDP); Orissa Urban Safety Initiative (a program of a national NGO), programs of the Ministry of Environment and Forests (National Environment Awareness Campaign, Eco-clubs, National Green Corps) and the recently launched JNNURM, etc.

Notably, "urban environmental problems today are highly interrelated; they involve everyday routines of households and firms; and they are too big and diffused for government to solve through regulation or legislation" (OECD 1996). This makes it hard to predict, in the context of Puri, whether and to what extent the ongoing programs will contribute towards evolution of a 'disaster-resilient eco-community'. Nevertheless, such visionary ideas and concepts for greater sustainability in urban development and elsewhere are needed to provide inspiration and direction for the development of human society. Unarguably, concerted efforts in these parallel programs will yield far-reaching results in Puri. From Puri experience, it is clear that it is not for government to build the eco-city, but the inherent strength lies in the synergy of activities of the people living and working in cities.

## The path less travelled

The super-cyclone has taught Orissa, as well as India, numerous lessons. The foremost among them is that increased awareness and enhanced preparedness to global environmental challenges is particularly relevant. This paper is also appreciative of the efforts at all levels undertaken in Orissa to reduce risks. It is also clear that Puri city, being bordered by the sea, needs to pay special attention to mitigating risk at city, ward and neighbourhood levels. An NGO worker, responsible for community awareness in the city said "when I informed people that Puri is also prone to tsunami, nobody believed….not even the government and political office bearers". No doubt that a number of factors contribute to the way people respond to threats, but a high level of ignorance also reflects the non-penetration of correct information among the masses.

Although community participation is accepted as an integral component in most urban development approaches and programs in India (including, very recently, JNNURM), its effectiveness and impact remains low. Despite increasing literacy rates and economic growth, even the basic information pertaining to the city and its neighbourhoods are not easily accessible to the common people. The 'right to information' is legislation recently passed by the Indian government to enable citizens to access information. During our visits, government officials refused to share any details regarding either ECP or PCDP, ignoring the fact that these initiatives are for the city and the people. Despite repeated requests, the authors as well as local counterparts were unable to obtain information regarding the exact status of the eco-city projects and, where information was provided, it was incomplete or ambiguous.

Being a city of faith, a strong religious flavour exists in the everyday life of Puri, and the common people deny any possibility of a major disaster in Puri. This mental set-up is understandable; however, it needs to be changed, with the increasing evidence of global environmental change affecting not only other districts but also the areas adjoining Puri's periphery. What is more unfortunate is that, despite the super-cyclone, city authorities are still unprepared for, and hence may be unable to cope with, an event of similar magnitude in the future. The mandate of the Orissa State Disaster Mitigation Authority is to increase community resilience, to promote a culture of preparedness towards disasters and capacity building at all levels—all this is gradually fading, even in villages that were the focus of such initiatives. This could be explained by the fact that people tend to forget the miseries of the past and, as time passes, ignore any possible risk they may have to face again. However, in urban areas, environmental degradation is affecting people in their daily life, and hence environmental improvement concerns are gaining higher priority than ever before. It is the right time in Puri to dovetail risk reduction into environmental infrastructure projects to be executed through the JNNURM. The projects identified in PCDP to be executed through the Mission funds have the potential to transform the present physical shape of the city and provide some of the basic, yet most desired, facilities to the citizens and tourists/pilgrims.

The traditionally strong community structures in Puri discussed in the earlier part of this paper indicate that Puri was always considered environmentally sensitive due to its coastal setting and hence communities have harnessed and maintained a certain balance between the natural and built environment through various coordinated grass-roots practices. However, in the present scheme of things, these positive attributes are neither recognised, nor represented in the PCDP or ECP. During PCDP preparation, rather than establishing continuing dialogue, local meetings were organised as 'one-off' events. The Community Participation Fund requires the consent of local political leaders as well as local government, making it practically difficult for the traditionally strong communities to access these funds without political and administrative support. The documentation required for accessing CPF is complex and beyond the capacities of most urban communities. Experience shows that ad-hoc/'ghost' community structures have been created in the past by the nexus of political and administrative decision makers to siphon off money intended to be used for local needs.

It is suggested that the CPF should be widely publicised among neighbourhoods; a massive awareness campaign should be maintained in partnership with the mass-media; 'town-watching' and 'know your neighborhood' programs may be facilitated involving CBOs, NGOs, and experience sharing by concerned senior citizens. To prepare the masses in understanding the whole concept of city and local development through JNNURM as well as to identify local risks and priorities in tandem with city-wide infrastructure development programs, social workers as 'community facilitators' may be engaged (a similar experience of involving 'housing facilitators' has shown very positive outcomes during post-tsunami reconstruction in Banda-Aceh). Traditional community institutions (like Jagaghar) as well as emerging good practices (like *Nirmal Shreekshetra*) may be facilitated and encouraged to work collectively to engage in more rigorous dialogue between neighbourhoods, formal and informal sectors, residents and businesses, tourists and service providers for providing stewardship to Puri's all-round development. Such partnerships should be well informed and consulted, with the help of academic tie-ups and local volunteers to let local stakeholders know the threats and challenges Puri is facing or might face in future. In addition, civil society organisations, working in the disaster domain, will also be required to promptly advise communities in selecting local risk reduction components to be firmly dovetailed in their proposed projects. This process is expected to take time and requires new thinking among present decision-making institutions, but will provide a rather strong footing for sustainable development of Puri in its true sense. This spirit can be optimally leveraged with the 'disaster-resilient eco-community' perspective in mind.

## The way ahead

Participatory approaches are not new in the development sector. However, their success varies. In order for the impact of urban development initiatives to be really effective, a number of widely accepted, tested and recommended approaches are in practice, particularly in the maintenance and management of urban services.

The 1999 Orissa super-cyclone killed over 10,000 people in the state and also affected Puri district. The city of Puri was fortunate to stay comparatively safe despite its location at the mouth of the sea. However, flooding, cyclones, earthquakes and health risks have already been experienced in Puri. Indian cities are experiencing a population explosion due to both migration and natural increase. The level of education, civic sense, environmental awareness and livelihood options vary tremendously even in a small urban setting like Puri. Hence, technical know-how needs to be stitched onto social systems to sustain and maintain even small initiatives. Recognition of local risks, including everyday risks emanating from environmental degradation, needs a wider understanding by stakeholders at all levels.

Community-based disaster risk reduction initiatives alone are difficult to sustain if they are not linked with local routine concerns. The 'disaster-resilient eco-community' approach may not be the only solution to the present day problems of Puri but might prove instrumental in integrating valuable ideas and supportive actions from both disaster as well as environment perspectives. This study emphasises the fact that, while urban renewal and environmental infrastructure development hold an important place in present cities, community education and awareness programs are equally or sometimes more important for real change to occur. It further indicates that engaging people in local decision-making increases their awareness of risks and vulnerabilities and prompts them to take positive action.

It is clear that the focus of environmental as well as disaster initiatives has to be people-centric and inclusive. This paper concludes that even the most daunting problems have simple solutions. Recognising the complex multi-layered society of a traditional Indian city like Puri, a 'disaster-resilient eco-community' vision is expected to provide effective, long-term and balanced development. The synergy of environmental and disaster disciplines blended with the hidden potential lying within communities needs to be maximised to ultimately achieve the objective of sustainable development.

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