# Developing an approach to assess the influence of integrating disaster risk reduction practices into infrastructure reconstruction on socio-economic development


## Abstract

**Purpose –** Disasters provide physical, social, economic, political and environmental development windows of opportunity particularly through housing and infrastructure reconstruction. The reconstruction process should not be neglected due to the opportunistic nature of facilitating innovation in development. In this respect, post-disaster '*infrastructure'* reconstruction plays a critical role in development discourse and is often essential to sustain recovery after major disasters. However, reconstruction following a natural disaster is a complicated problem involving social, economic, cultural, environmental, psychological, and technological aspects. There are significant development benefits of well-developed '*Disaster Risk Reduction (DRR) Strategies'* and, for many reasons, the concept of DRR can be more easily promoted following a disaster. In this respect, a research study was conducted to investigate the effects of integrating DRR strategies into infrastructure reconstruction on enhancing the socio-economic development process from a qualitative stance. The purpose of this paper is to document part of this research study; it proposes an approach that can be used to assess the influence of the application of the DRR concept into infrastructure reconstruction on socio-economic development.

**Design/methodology/approach –** The research methodology included a critical literature review.

**Findings –** This paper suggests that the best way to assess the influence of integrating DRR strategies practices into infrastructure reconstruction on socio-economic development is to assess the level of impact that DRR strategies has on overcoming various factors that form vulnerabilities. Having assessed this, the next step is to assess the influence of overcoming the factors that form vulnerabilities on achieving performance targets of socio-economic development.

**Originality/value –** This paper primarily presents a framework for the concept of socio-economic development and a modelled classification of DRR practices.



**Key words:** Disaster risk reduction, Socio-economic development, Infrastructure reconstruction, Millennium development goals


## 1.0 Background

The infrastructure stock of a country makes a significant contribution to the social and economic aspects of that country when they are formed, operated and managed effectively. The construction industry plays a vital role in the formation, operation and management of infrastructure and is often involved in new construction as well as renewal, reconstruction following disasters, and retrofitting of existing infrastructure. There has been a significant increase in reconstruction, in both the housing and infrastructure sectors, due to the unprecedented scale of increase of natural disasters in the recent past. In this context, 'reconstruction of infrastructure' needs more attention than ever before particularly within poor third world countries.

## 2.0 Problem statement

It is said that gross indirect costs of disasters are partly offset by the positive downstream effects of the rehabilitation and reconstruction efforts, such as increased activity in the construction industry (UNDP, 2004). Although reconstruction is considered as a tool to help reduce future disaster risks by paying particular attention to various vulnerabilities, and to boost up general development the developing countries would not normally use these opportunities during reconstruction. Specifically focusing on infrastructure reconstruction, Duryog Nivaran (2005) identified a key weakness with respect to the post-tsunami infrastructure reconstruction plans in Sri Lanka in terms of lack of articulation of issues of varying vulnerabilities, people's needs and access to infrastructures within such plans. Shaw (2006: p.6) highlights the fact that "*the reconstruction of the Indian Ocean Tsunami has posed a tremendous challenge: how to turn the reconstruction into development opportunities, and use the experiences of this reconstruction process in future pre-disaster mitigation activities in other parts of the world*". On the other hand,

reduction of disaster risk has become a 'must do' with regards to the increase in natural disaster losses, and disaster risk reduction (DRR) initiatives are considered to have generated many development concerns. Hence, integration of DRR into post-disaster reconstruction can be presumed to be a strategy that makes the maximum use of opportunities created by disasters. The focus of this research, on which this paper is based, is to investigate the contribution that DRR could have on socio-economic development within the context of post-disaster infrastructure reconstruction.

Most of the studies undertaken to explore the relative costs and benefits of DRR at the project level take a quantitative approach by measuring the pros and cons in financial terms. Establishing a precise qualitative approach to examine this relationship is difficult as most of the socio-economic development indicators are quantitative. This research endeavours to investigate the effects of integrating DRR strategies into infrastructure reconstruction to enhance the socio-economic development process from a qualitative stance. As a part of the main research, this paper presents the qualitative approach adopted to assess this relationship. The research deals with economic infrastructure, which is generally formed as network-oriented systems; for example, transportation services, water supply and sanitation services etc.

## 3.0 Developing a framework for socio-economic development

### *3.1 What is socio-economic development?*

Socio-economic development is the process of social and economic development in a society. From a policy perspective, 'economic development' can be defined as efforts that seek to improve the economic wellbeing and quality of life of a community (Hayami and Godo, 2005). Social development refers to "*policies to improve the livelihood of the individual through a lens of poverty-reduction and empowerment*", when it is looked at from a macro-perspective (Hasmath and Hsu, 2007: p.127). The UN recognises poverty reduction as a key component of social development because economic 'success' does not necessarily affect poverty levels; furthermore the issue of employment, the overall wellbeing with proper access to public services, and the concern of social integration are also recognised as dimensions of social development (Hasmath and Hsu, 2007). The World Bank defines social development from a more pragmatic perspective as "*social development begins with the perspectives of poor and marginalised people and works towards positive and sustainable changes to make societies more equitable, inclusive and just*" (The World Bank Operations Evaluation Department, 2005: p.2). However, there are no precise indicators developed by anyone to measure social development (The World Bank Operations Evaluation Department, 2005).

Based on a range of literature that present a variety of indicators for economic and social development, it is worth establishing a combined set of indicators that facilitates measurement of the entire socio-economic development concept. The key indicators among those are: GDP per capita, life expectancy, literacy rates, poverty, levels of employment, quality of infrastructure, and access to safe infrastructure (Hayami and Godo, 2005; Meier and Rauch, 2000; Sen, 1998). Table 1 presents various indicators identified from different researches.

**Table 1: Indicators of socio-economic development**

| Mehrotra and Peltonen (2005) | UN-Water/Africa (2006) | Harkness (2004) | biz/ed (2009) |
|---|---|---|---|
| • Gross domestic product (GDP)<br>• Carbon dioxide emissions<br>• Primary school enrolment<br>• Tertiary school enrolment<br>• Infant mortality rate<br>• Immunisation DPT (% of children under 12 months) | • Population growth rate<br>• Growth rate of GDP<br>• Growth rate of per capita GDP<br>• Growth rate of agricultural output<br>• Growth rate of manufacturing output<br>• Growth rate of investment<br>• Savings - GDP<br>• Growth rate of exports<br>• Growth rate of imports | • Access to services, housing<br>• Environmental degradation<br>• Income<br>• Social participation<br>• Inequalities | • Poverty<br>• Inequality<br>• Progress<br>• Sustenance<br>• Self esteem<br>• Freedom<br>• National income<br>• Gross domestic product (GDP)<br>• Real GDP versus nominal GDP<br>• Gross national product (GNP)<br>• Life expectancy - longevity<br>• Literacy rates - knowledge<br>• Standard of living (purchasing power parity) |

| | | | |
|---|---|---|---|
| • Air passengers carried<br>• Railway passenger kilometres<br>• Telephone main lines in use | | | • Number of doctors per head<br>• Number of fridges per head<br>• Number of TVs per head<br>• Number of cars per family<br>• Disease indicators<br>• Economic activity per sector<br>• Health care data |

### *3.2 Socio-economic development needs following disasters*

The nature of the post-disaster socio-economic needs of communities depends on the nature of the impact of disasters experienced and their pre-existing living standards. According to Oloruntoba (2005), varied socio-economic and cultural conditions of different countries influence the differing needs of the affected communities. In economic terms, disasters do trap people in poverty. It is always the poor communities and countries who are the main victims of disasters. Their livelihood needs force them to live in unsafe areas. The needs of these people during the immediate humanitarian relief/early recovery phase are mainly for immediate medical help, food, clothing, safe shelter and water while assessments are made for their current and future needs (Oloruntoba, 2005). Gender related researches raise the issue of the socio-economic needs of women within the disaster context and highlight the challenges they face in the post-disaster phase (Enarson, 1998; Jones, 2000; UN/ISDR, 2002). Women are highly vulnerable during disaster eventsbecause of their reduced access to resources, the different roles they play and the diverse responsibilities they hold in daily life (Ariyabandu and Wickramasinghe, 2003; Corotis and Enarson, 2004; Jones, 2000).

When the immediate needs of the population have been met and people have settled down after the 'initial trauma' of the event, they begin to exhibit the need to return their lives to the conditions that existed prior to the disaster with minimum standards such as temporary housing and the restoration of facilities (Kim and Lee, 1998). Reconstruction activities continue until all systems return to normal or better (Warfield, 2008). As far as these gradually evolving socio-economic needs of communities are concerned, the Millennium Development Goals (MDGs) form a better framework of actions to support disaster affected governments in directing their post-disaster efforts towards enhancing socio-economic development. The following section is therefore aimed at identifying MDGs.

### *3.3 Millennium Development Goals as a framework of actions for socio-economic development*

The indicators in Table 1 form the basis for critical success factors (CSF) of socio-economic development. For example, 'eradicating poverty' is a CSF of sustainable socio-economic development. As shown in Table 1, the indicators of socio-economic development consist of more quantitative indictors and only a few of them are qualitative in nature. Many of the indicators are sourced from different points and each reflects the Millennium Development Goals within them. Thus, it was realised that MDGs make much economic and social development sense and form an effective framework of actions for planning and implementation of so-called development and essential socio-economic needs to be achieved following disasters. The eight (8) MDGs comprise: (UN, 2007).

- Goal 1: Eradicate extreme poverty and hunger
- Goal 2: Achieve universal primary education
- Goal 3: Promote gender equality and empower women
- Goal 4: Reduce child mortality
- Goal 5: Improve maternal health
- Goal 6: Combat HIV/AIDS, malaria, and other diseases
- Goal 7: Ensure environmental sustainability
- Goal 8: Develop a global partnership for development

### *3.4 Integrative framework for socio-economic development*

Based on the issues emerged in section 3.1, 3.2 and 3.3, an integrative framework for socio-economic development was developed. The framework comprises two classifications called CSF and performance targets of socio-economic development.

Table 2 presents the selected set of CSF and performance targets of the socio-economic development process. Successful achievement of CSF can be realised by establishing the relevant performance targets. Performance targets are specific, well-defined targets to be aimed for in the course of a programme or project and its implementation. The performance targets listed in Table 2 were arrived at based on the 'targets of the MDGs' and the critical literature review, for example as identified by Freeman (1999).

**Table 2: CSF and performance targets of socio-economic development**

| CSF of socio-economic development | Performance targets of socio-economic development |
|---|---|
| Poverty | • Improving access to infrastructure<br>• Improving quality of infrastructure<br>• Full and productive employment and decent work for all, including women and young people<br>• Reducing people who suffer from hunger |
| Universal education | • Children everywhere will be able to complete a full course of primary schooling |
| Gender equality and empowerment of women | • Eliminate gender disparity<br>• Empowering women |
| Child mortality | • Reducing mortality rate among children under five |
| Maternal health | • Reducing the maternal mortality ratio<br>• Achieve universal access to reproductive health |
| HIV/AIDS, malaria and other diseases | • Reducing incidence of malaria and other major diseases<br>• Halting and begin to reverse the spread of HIV/AIDS |
| Environmental sustainability | • Improving access to infrastructure<br>• Integrating the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources |
| Global partnerships for development | • Developing international partnerships for construction /reconstruction projects |

These CSF and performance targets were identified with the aim of assessing the influence integration of DRR into infrastructure reconstruction will have on socio-economic development. The influence is assessed firstly through the impact that this integration could have on performance targets and then on critical success factors of socio-economic development.

## 4.0 Integration of DRR into post-disaster infrastructure reconstruction

Disasters are opportunities to realise particular areas of vulnerability, such as the general level of under-development (Stephenson and DuFrane, 2005). Reconstruction can, therefore, be used as a development opportunity or as a tool to help reduce disaster risks by paying particular attention to various vulnerabilities (Shaw, 2006). Christoplos (2006) asserts that the concept of DRR can be more easily promoted after a disaster than before for many reasons such as, new awareness of risk after a disaster that leads to broad consensus and disclosure of fault lines in development policies.

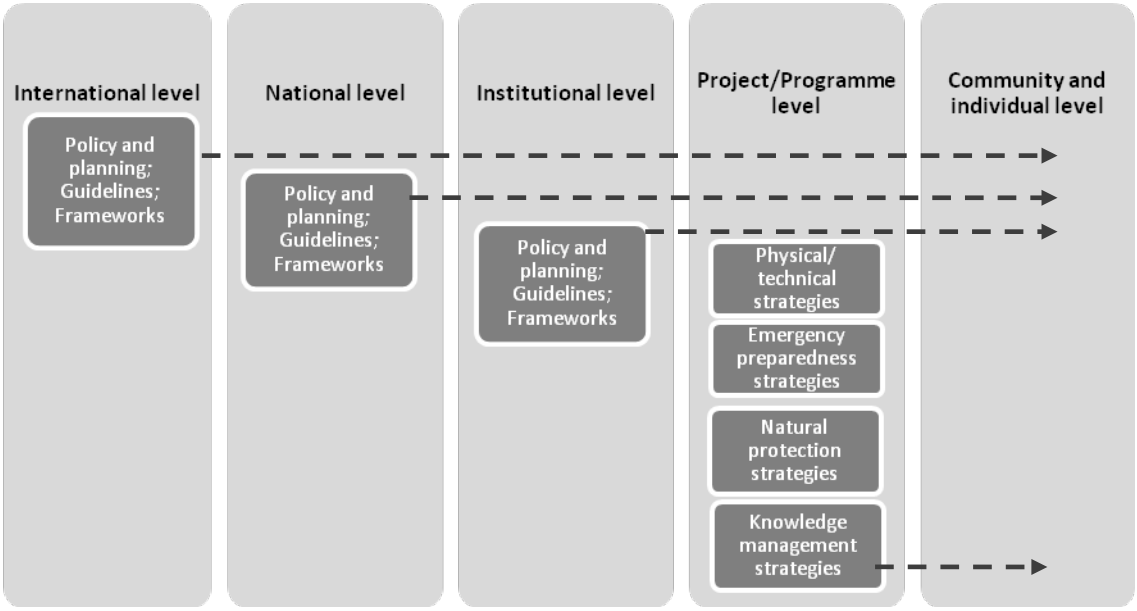
DRR is aimed at tackling the fundamental elements of disaster risk: vulnerability and hazards (DFID, 2006). UN/ISDR (2009) defines DRR as a "*systematic development and application of policies, strategies and practices to minimise vulnerabilities and disaster risks throughout society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development*". There is a wide range of DRR strategies which are categorised differently by many scholars and practitioners. Table 3 summarises some of those classifications.

**Table 3: Existing classifications of DRR strategies**

| Nateghi-A, (2000) | Concern Worldwide (2005) | DFID (2005) |
|---|---|---|
| Engineering and construction measures:<br>o Engineering measures that result in stronger individual structures that are more resistant to hazards.<br>o Engineering measures that create structures whose function is primarily disaster protection, including earthquake shelters | Mitigation measures:<br>o Infrastructural measures<br>o Non-infrastructural measures that reduce the frequency, intensity, scale and impact of hazards | Policy and planning measures:<br>o National plan for protection against disasters, including preparedness and contingency planning<br>o Land-use planning<br>o Integrated management of Flooding and water supply<br>o Integrated warning and response system<br>o Improving networks/links with local governments |
| Physical planning measures:<br>o Measures that result in proper selection of sites for settlements and structures to avoid hazardous areas | Preparedness measures:<br>o Knowledge based capacity building. This includes early warning systems that monitor and predict the occurrence of hazards, and contingency plans for effective response | Physical preventative measures:<br>o Flood defences (e.g. dam, multipurpose, seaborne) and sea walls<br>o Natural protection against floods (e.g. reforestation of watersheds)<br>o Installation of drainage pumps |
| Economic planning measures:<br>o Measures that enable communities to become economically stable to withstand losses and measures that make it possible for communities to afford higher levels of safety, for example diversification of economic activities | Advocacy measures:<br>o Advocacy seeks to favourably change policies and practice by networking and influence | Physical coping and/or adaptive measures:<br>o Resilient roads and infrastructure (e.g. raised roads)<br>o Resilient water supply systems (e.g. boreholes, raised hand-pumps)<br>o Design and building of contingency mechanisms for coping with disasters (e.g. escape roads) |
| Policy guidance measures:<br>o Organisational and procedural measures<br>o Measures such as education, professional training of engineers, planners, economists, social scientists and other managers to include risk reduction within their normal area of competence, political will, which results in institutionalisation of disaster mitigation | | Community capacity building measures:<br>o Train communities for disaster preparedness; public warning systems |
| Public response measures:<br>o Measures that result in a disaster 'safety culture' in which the general public are fully aware of potential hazards and their vulnerabilities, to protect themselves as fully as they can and fully support efforts made on their behalf to protect them | | |

Table 3 is evident that the concept of DRR includes not only physical and technical strategies but also a wider array of strategies involved in solving much more complex political, social, economic, cultural, environmental challenges (Hamilton, 2005). It was further realised that the application of this concept into infrastructure reconstruction sector can be done at different levels. Accordingly, this research proposes an integrated model, based on all previously tabulated strategies and their classifications; the possible levels/areas to link infrastructure reconstruction with DRR are at the international, national, institutional, project/programme and community/individual level as modelled in Figure 1. Project level DRR strategies can be categorised into physical/technical strategies, emergency preparedness strategies, natural protection strategies and knowledge management strategies. Policy and planning, guidelines and frameworks are higher level strategies which exist at international, national and institutional levels. All these higher level strategies have a direct effect on each other from top to bottom as well as at project/programme and community/individual level DRR strategies.

**Figure 1: Modelled classification of DRR strategies**




## 5.0 Proposed approach to assess the influence of integrating DRR into infrastructure reconstruction towards socio-economic development

Infrastructure (re)construction, socio-economic development and DRR are issues frequently discussed in isolation or in relation to each other in the current literature, but the exact relationship between the three of them is not adequately established. Establishing the exact relationship between these three areas would require development of an approach to assess the influence of integrating DRR strategies into infrastructure reconstruction on socio-economic development. An approach to assess this influence was able to be developed based on the understanding gained through the critical literature review and the research gap identified through the same. Before adopting the proposed approach to achieve the overall aim of this study, it was piloted among three construction professionals involved in the post-tsunami infrastructure reconstruction sector in Sri Lanka. The rest of this section describes how the literature review was helpful in developing this approach.

Literature suggests that '*development'* and '*disaster management*' are both aimed at vulnerability reduction, i.e. vulnerability reduction plays a central role in both the development and disaster managemnt (Stenchion, 1997; Weichselgartner, 2001). Although the terms '*development'* and '*disaster management*' used here emerge with broader meanings, they symbolise '*socio-economic development*' and '*disaster risk reduction*' concerns respectively. Moreover, Jigyasu (2002) suggests that reconstruction must take into account the implications of reducing disaster vulnerability in the long-term because lack of DRR practices within post-disaster reconstruction results in major failures in reconstruction projects, exposing them to extreme vulnerability even in future small scale disasters. Therefore, it can be presumed that the reconstruction process can be improved by the integration of DRR strategies that may result in vulnerability reduction and ultimately improve the process of development.

Substantiating this argument, McEntire *et al*. (2002) emphasise the importance of considering vulnerability reduction through development and disaster management activities, i.e., both DRR and socio-economic development should be aimed at vulnerability reduction as depicted in Figure 2. This implies the need for effective DRR strategies for vulnerability reduction where they might affect a reduction in different vulnerabilities at various levels. Having identified that socio-economic development also stands for vulnerability reduction, the influence of DRR strategies on socio-economic development can be assessed through the potential contribution of DRR strategies on vulnerability reduction.

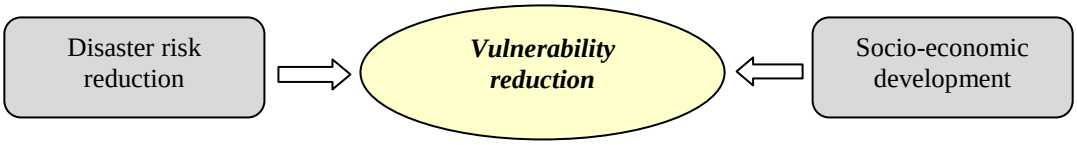



**Figure 2: Conceptual relationship between DRR, vulnerability reduction and socio-economic development**

Vulnerability represents a series of resultant states of social, economic, political, cultural, environmental, physical, and technological underdevelopment processes, before, during and after disaster situations (Jigyasu, 2004; McEntire, 2001). Based on a similar argument, Wisner *et al*. (2003) claim that vulnerability involves a combination of factors that determine the degree to which someone's life, livelihood, property and other assets are put at risk by a discreet and identifiable event. Eshghi and Larson (2008) note that vulnerability is influenced by factors such as location, state of housing, level of preparedness and ability to evacuate and carry out emergency operations. Different societies have differing levels of vulnerability; this is one reason why hazards of a similar type and intensity can have quite varied effects on different populations (Eshghi and Larson, 2008). McEntire (2001) claims that there are innumerable variables interacting to produce a future of increased vulnerabilities that in turn have been categorised under physical, social, cultural, political, economic and technological headings as depicted in Table 4.

**Table 4: Factors forming vulnerabilities**

| Type of vulnerability | Variables which interact to produce vulnerabilities |
|---|---|
| Physical vulnerability | Proximity of people and property to triggering agents<br>Improper construction of buildings<br>Inadequate foresight relating to the infrastructure<br>Degradation of the environment |
| Social vulnerability | Limited education (including insufficient knowledge about disasters)<br>Inadequate routine and emergency health care<br>Massive and unplanned migration to urban areas<br>Marginalisation of specific groups and individuals |
| Cultural vulnerability | Public apathy towards disasters<br>Defiance of safety precautions and regulations<br>Loss of traditional coping measures<br>Dependency and absence of personal responsibility |
| Political vulnerability | Minimal support for disaster programmes amongst elected officials<br>Inability to enforce or encourage steps for mitigation<br>Over-centralisation of decision making<br>Isolated or weak disaster related institutions |
| Economic vulnerability | Growing divergence in the distribution of wealth<br>The pursuit of profit with little regard for consequences<br>Failure to purchase insurance<br>Sparse resources for disaster prevention, planning and management |
| Technological vulnerability | Lack of structural mitigation devices<br>Over-reliance upon or ineffective warning systems<br>Carelessness in industrial production<br>Lack of foresight regarding computer equipment/programmes |

(Source: McEntire, 2001)

Accordingly, it is suggested that the best way to assess the influence of integrating DRR practices into infrastructure reconstruction on socio-economic development is to assess the level of impact of DRR strategies on overcoming various factors that form vulnerabilities (see Table 4 for factors forming vulnerabilities). Having assessed this, the next step is to assess the influence of overcoming the factors that form vulnerabilities on achieving performance targets of socio-economic development (see Table 2 for performance targets of socio-economic development). All influences can be assessed based on an attitudinal study among (re)construction professionals in order to gather their perceptions/experience of the above mentioned relationships.

## 6.0 Conclusions

Critical infrastructure is regularly subject to physical, technological, social, cultural, political, and economic vulnerabilities. High risks to critical infrastructure due to their vulnerabilities and hazards would result in severe losses to societies. While pre-disaster prevention is a vital part of disaster risk management cycle reconstruction following a natural disaster remains a complicated problem

involving social, economic, cultural, environmental, psychological, and technological aspects. However, significant development benefits of disaster-inspired reconstruction can be further enhanced by integration of DRR strategies. This paper proposed an approach to realise the effects of integrating DRR strategies into infrastructure reconstruction on enhancing the socio-economic development process from a qualitative stance.

The paper reveals that the application of DRR concept into infrastructure reconstruction sector can be done at different levels: international, national, institutional, project/programme, and community/individual levels. Further to that it was realised that policy and planning, guidelines and frameworks are the higher level strategies which exist at international, national and institutional levels. Project level DRR strategies include physical/technical, emergency preparedness, natural protection and knowledge management strategies.

Although developing an integrative framework for the concept socio-economic development is not straightforward, a range of literature that present a variety of indicators for economic and social development, and the CSF and performance targets of MDGs provided a combined set of indicators that facilitates measurement of the entire socio-economic development concept. These CSF and performance targets of socio-economic development were identified with the aim of assessing the influence of integrating DRR into infrastructure reconstruction on socio-economic development. The influence is assessed mainly through the impact that this integration could have on performance targets of socio-economic development.

'Development' and 'disaster management' are both aimed at vulnerability reduction which means that vulnerability reduction plays a central role in both the socio-economic development and DRR concepts. Having identified that socio-economic development also stands for vulnerability reduction, this paper suggests that the first step to assess the influence of integrating DRR practices into infrastructure reconstruction on socio-economic development is to assess the level of impact of DRR strategies on overcoming various factors that form vulnerabilities as there are innumerable variables interacting to produce increased vulnerabilities. The second step involves assessing the influence of overcoming the factors that form vulnerabilities on achieving performance targets of socio-economic development.

## 7.0 References


Ariyabandu, M.M., Wickramasinghe, M. (2003), *Gender Dimensions in Disaster Management – A Guide for South Asia*, Colombo, ITDG South Asia.

biz/ed, (2009), *Indicators of Economic Development - Mind Map*, Available from: http://www.bized.co.uk/educators/16-19/economics/development/presentation/indicators_map.htm, (Accessed on 10/09/2007).

Christoplos, I. (2006), The elusive 'window of opportunity' for risk reduction in post-disaster recovery, *Provention Consortium Forum 2006: Strengthening Global Collaboration in Disaster Risk Reduction*, *Session 3 Discussion Paper*, 2nd-3rd February 2006, Bangkok.

Concern Worldwide - Emergency Unit. (2005), *Approaches to Disaster Risk Reduction*, Concern Worldwide.

Corotis, R.B., Enarson, E. (2004), Socio-economic disparities in community consequences to natural disasters, *International Forum on Engineering Decision Making*, December 5th-9th December, Stoos, Switzerland.

Department for International Development (DFID). (2006), Reducing the risk of disasters – Helping to achieve sustainable poverty reduction in a vulnerable world, *A DFID Policy Paper*, London: DFID.

Department for International Development (DFID). (2005), *Natural Disaster and Disaster Risk Reduction Measures: A Desk Review of Costs and Benefits, Draft Final Report*, London: DFID.

Duryog Nivaran. (2005), Tackling the tides and tremors, *South Asia Disaster Report 2005,* Rawalpindi, Pakistan: Duryog Nivaran Secretariat and Practical Action - South Asia Programme, Colombo, Sri Lanka

Enarson, E. (1998), Gender and disaster: What are the issues, *Conference Proceedings and Recommendations on 'Women in Disasters'*, 5th-6th May, Vancouver, British Colombia.

Eshghi, K. and Larson, R.C. (2008, Disasters: Lessons from the past 105 years, *Disaster Prevention and Management*, Vol. 17(1), pp. 62-82.

Freeman, P.K. (1999), Infrastructure, natural disasters and poverty, *The Euro-Conference on Global Change and Catastrophic Risk Management: Flood Risks in Europe*, IIASA, 6th -9th June 1999, Laxenburg, Austria.

Hamilton, R.M. (2005), Evolution in approaches to disaster risk reduction, *In*: *Know Risk,* Geneva: United Nations, pp. 31-32.

Harkness, S. (2004), Social and political indicators of human well-being, *UNU-WIDER Project on Social Development Indicators (Measuring Human Well-being)*, Research paper No. 2004/33, Helsinki: UNU-WIDER.

Hasmath, R. and Hsu, J. (2007), Social development in the Tibet autonomous region: a contemporary and historical analysis, *International Journal of Development Issues*, Vol. 6 (2), pp. 125-141.

Hayami, Y. and Godo, Y. (2005), *Development Economics: From the Poverty to the Wealth of Nations*, 3rd ed., New York: Oxford University press.

Jigyasu, R. (2004), Sustainable post disaster reconstruction through integrated risk management – the case of rural communities in South Asia, *International Conference and Student Competition on post-disaster reconstruction "Planning for reconstruction",* 22nd -23rd April, Coventry University, Coventry, UK.

Jigyasu, R. (2002), From Marathwada to Gujarat – emerging challenges in post-earthquake rehabilitation for sustainable eco-development in South Asia, *1st International Conference on Post-Disaster Reconstruction: Improving Post-Disaster Reconstruction in Developing Countries*, 23rd-25th May, Universite de Montreal, Canada.

Jones, R. (2000), *Gender and Natural Disasters: Points to Ponder*, International Labour Organisation, Available from: http://www.disasterwatch.net/women_tsunami%20links/Gender%20and%20natural%20disasters.htm, (Accessed on 01/05/2007).

Kim, P.S. and Lee, J.E. (1998), Emergency management in Korea and its future directions, *Journal of Contingencies and Crisis Management,* Vol. 6(3), pp.162-170.

McEntire, D.A., Fuller, C., Johnston, C.W. and Weber, R. (2002), A comparison of disaster paradigms: The search for a holistic policy guide, *Public Administration Review*, Vol. 62(3), pp. 267-81.

McEntire, D.A. (2001), Triggering agents, vulnerabilities and disaster reduction: Towards a holistic paradigm, *Disaster Prevention and Management*, Vol. 10(3), pp. 189-196.

Mehrotra, A.N. and Peltonen, T.A. (2005), *Socio-Economic Development and Fiscal Policy: Lessons from the Cohesion Countries for the New Member States*, Frankfurt am Main, Germany: European Central Bank, Working Paper Series No. 467/April 2005, Available from: http://ideas.repec.org/p/ecb/ecbwps/20050467.html, (Accessed on 10/12/2007).

Meier, G.M. and Rauch, J.E. (2000), *Leading Issues in Economic Development*, 7th ed., New York: Oxford University Press.

Nateghi-A, F. (2000), Disaster mitigation strategies in Teheran, Iran, *Disaster Prevention and Management,* Vol. 9(3), pp. 205-211.

Oloruntoba, R. (2005), A wave of destruction and the waves of relief: Issues, challenges and strategies, *Disaster Prevention and Management*, Vol. 14(4), pp. 506-521.

Sen, A. (1998), The concept of development. *In*: Chenery. H. and Srinivasam, T.N., eds. *Handbook of Development Economics: Volume 1*, Amsterdam, Netherlands: Elsevier Science B.V, pp. 12-23.

Shaw, R. (2006), Indian Ocean tsunami and aftermath: Need for environment-disaster synergy in the reconstruction process, *Disaster Prevention and Management*, Vol. 15(1), pp. 5-20.

Stenchion, P. (1997), Development and disaster management, *Australian Journal of Emergency Management*, Vol. 12(3), pp. 40-44.

Stephenson, R.S. and DuFrane, C. (2005), Disasters and development: Part 2: Understanding and exploiting disaster-development linkages, *Prehospital and Disaster Medicine*, Vol. 20(1), pp. 61-65.

The World Bank Operations Evaluation Department, (2005), Putting Social Development to Work for the Poor: An OED Review of World Bank Activities, Washington, D.C.: The World Bank.

United Nations, (2007) *Millennium Development Goals Report 2007*, New York: United Nations Department of Economics and Social Affairs.

United Nations International Strategy for Disaster Reduction (UN/ISDR), (2009), UN/ISDR *Terminology on Disaster Risk Reduction* (2009), Available from: http://www.unisdr.org/eng/library/lib-terminology-eng.htm, (Accessed on 20/02/2009).

United Nations International Strategy for Disaster Reduction (UN/ISDR), (2002)*, Gender Mainstreaming in Disaster Reduction*, Geneva: UN/ISDR.

United Nations Development Programme (UNDP), (2004), *A Global Report- Reducing Disaster Risk: A Challenge for Development,* Bureau for Crisis Prevention and Recovery, New York.

UN-Water/Africa, (2006), Introduction - Water for Sustainable Socio-Economic Development, *African Water Development Report 2006*.

Warfield, C. (2008), *The Disaster Management Cycle*, Available from: www.gdrc.org/uem/disasters/1-dm_cycle.html, (Accessed on 16/08/2007).

Weichselgartner, J. (2001), Disaster mitigation: The concept of vulnerability revisited, *Disaster Prevention and Management,* Vol. 10(2), pp. 85-94.

Wisner, B., Blaikie, P., Cannon, T. and Davis, I. (2003), *At Risk: Natural Hazards, People's Vulnerability and Disasters,* 2nd ed., London: Routledge.