

Chapter 2: Natural Disasters and Sustainable Development

This Chapter deals with the importance of the link between disaster reduction frameworks and development initiatives, as well as frameworks based on the 2004 disaster trends. As we know, the UN organizations, various international institutions, and governments have placed importance on natural disasters and sustainable development. Hence, it is of paramount importance to analyze disaster trends in relation to variables of sustainable development, mainly human development and economic factors of countries, especially the disaster affected ones. The following sections will discuss these trends using appropriate graphs.

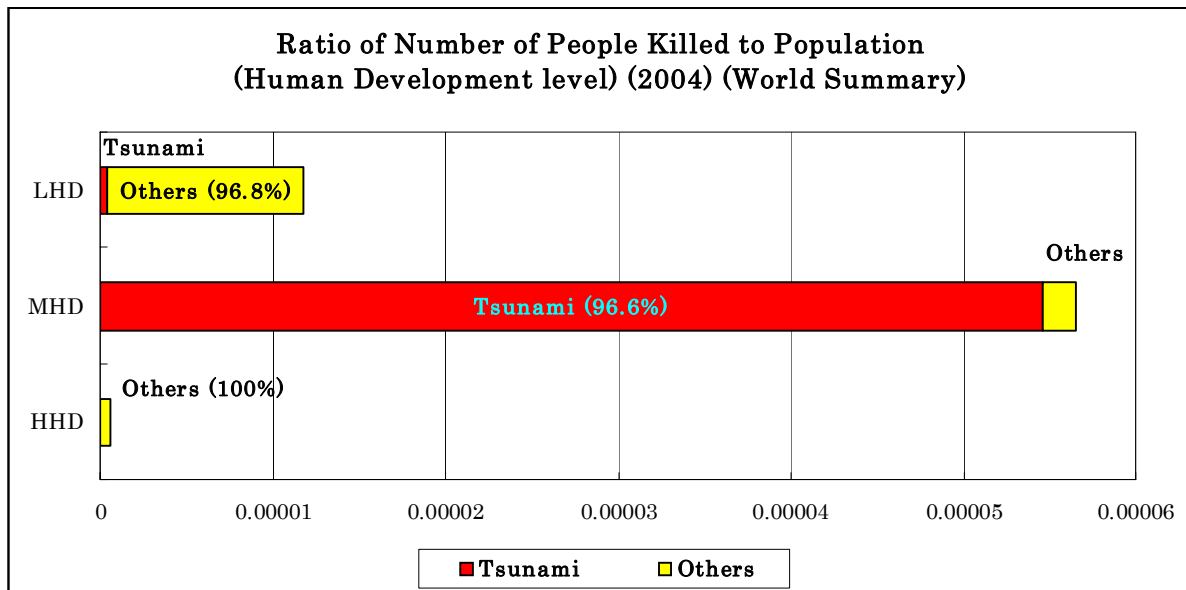
2.1 Human Development and Natural Disasters

The Human Development Level of a country refers to the literacy rate and gross school enrolment rate, per capita income, and health quality of that country. These variables are significant to disaster mitigation, preparedness planning, and disaster reduction and management strategies. Higher Human Development Levels will make these planning and management strategies and follow-up activities easier even in post disaster periods. Human Development Levels are categorized as high (Human Development Index; HDI above 0.8), medium (HDI between 0.5 and 0.79) and low (HDI less than 0.5), in accordance with UNDP specifications. In this section, disaster characteristics are subsequently calculated according to these Human Development Levels.

Income levels are also categorized as high (per capita income US\$ 9,266 and above), upper middle (per capita income US \$2,996~US \$9,265), lower middle (per capita income US \$756~US \$2,995) and lower (per capita income less than US \$755) according to the World Bank definitions. Disaster characteristics are identified in accordance to these income level specifications. The following figures illustrate these factors at World and Asian regional levels.

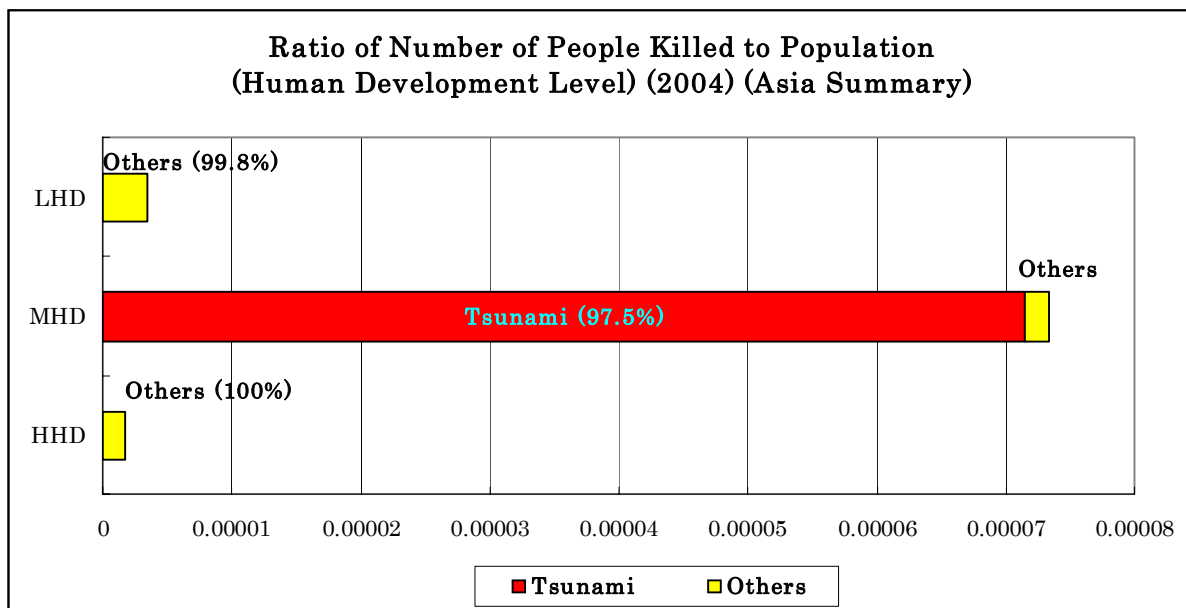
Figure 12 to 15 indicate the relationship between the Human Development Level of the country and the impact of human suffering due to disasters on society. According to the disaster trends in 2002, it was quite evident that human loss and suffering were considerably higher in countries with low human development (LHD) as the ratio of those killed and affected by disasters to the total population in LHD countries was considerably higher than medium human development (MHD) or high human development (HHD) countries. But in 2003, this trend changed drastically around the World. Due to the unexpected heat wave in the HHD countries in Europe, there were huge human sufferings in those countries in 2003. The 2004 disaster trends once again underline the importance of the disaster reduction in the context of development in the low development countries. Since the human development index is considered for literacy rate, life expectancy, and the per capita income, improvements, these variables could contribute immensely to reducing the impact of natural disasters in a country. Though there was considerable disaster damage in HHD countries, the impact of disasters in terms of human and economic losses in relation to human development levels and income classification were severe in the MHD and LHD countries. Since developing and least developed countries (LDCs) which mostly possess low and medium Human Development Levels in Asia and throughout the world, causing elevated levels of human and economic loss in these countries, severely affect their development initiatives and ability to compete with the global development scenario, thus urging better disaster management approaches in these regions. It is also quite evident from the following figures that the ratio of killed and *totally* affected people to population is high in the MHD and LHD countries stressing the importance of mainstreaming the disaster reduction issues into national policy. Though the real damage is high in the High Income countries, ratio of damage to the GNI is high in the Low and Middle income countries.

Figure 12



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2004

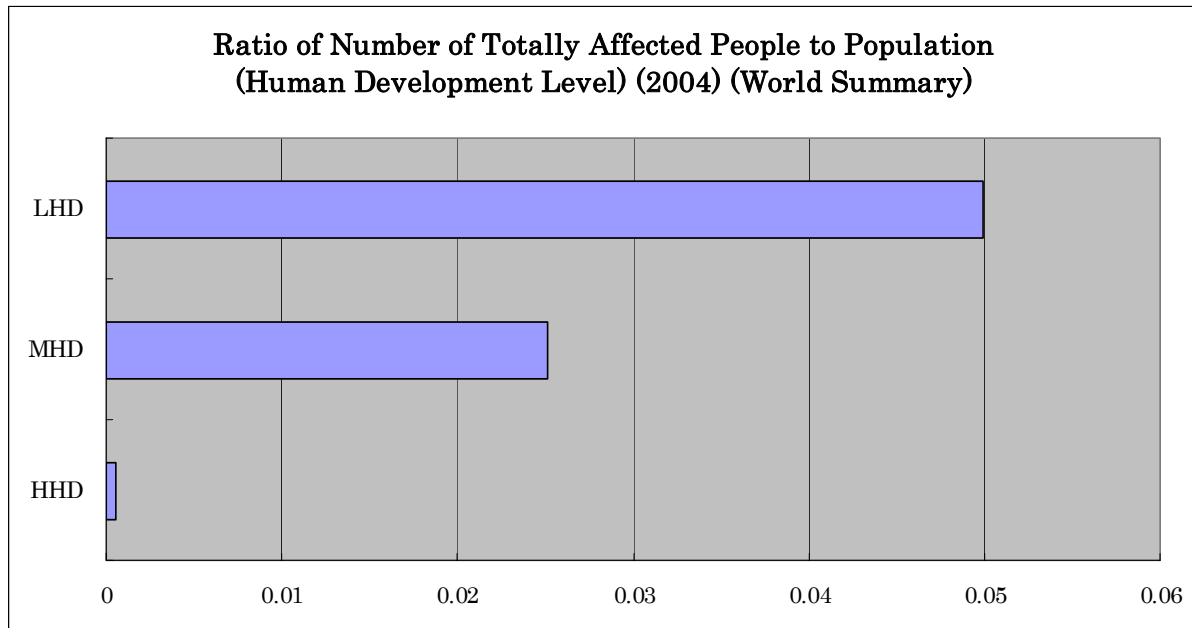
Figure 13



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2004

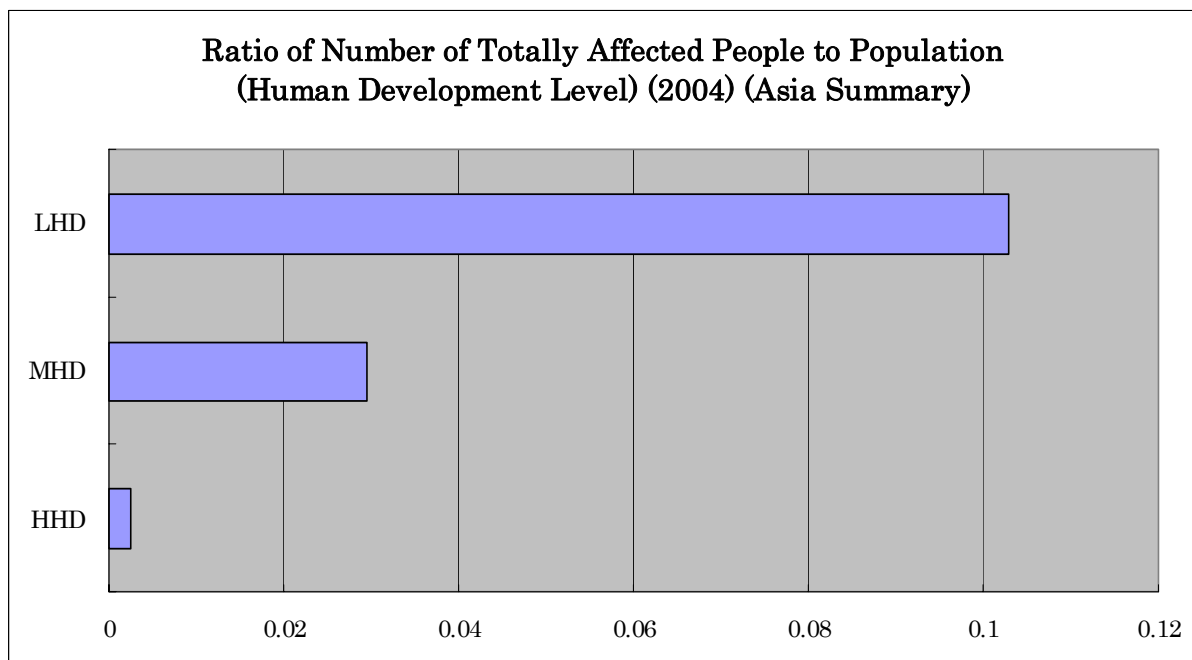
These Figures clearly show that majority of the human loss in the countries with medium level of human development was due to the historic Indian Ocean Tsunami disaster, in terms of World as well as Asia.

Figure 14



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2004

Figure 15



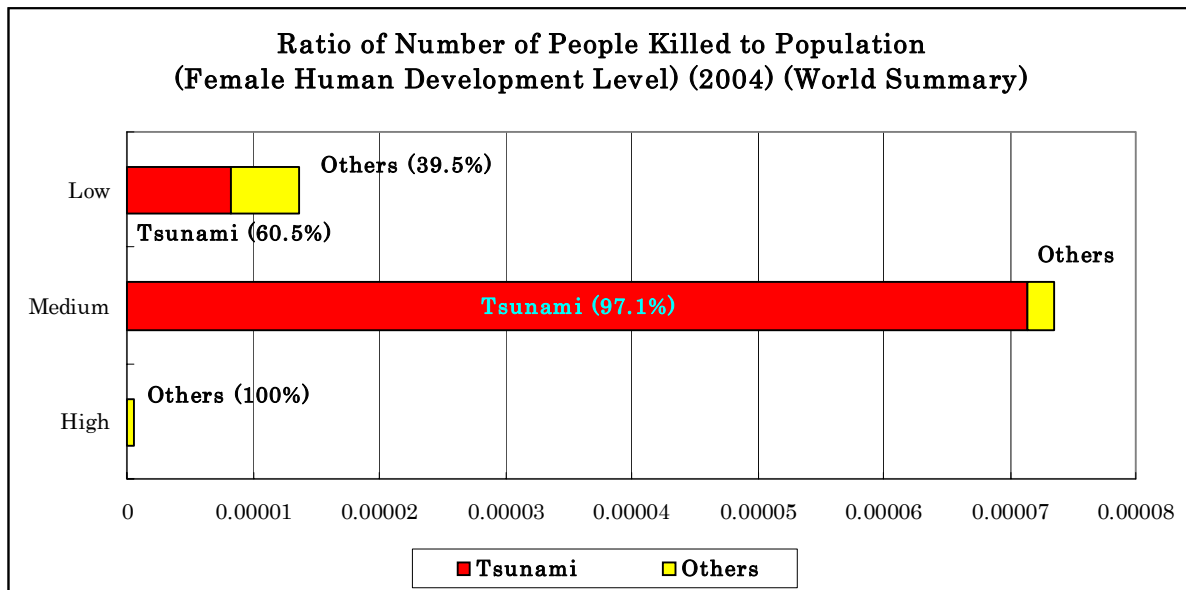
Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2004

2.2 Gender Issues and Natural Disaster Impact

In addition to what we have seen above with respect to overall human development and the impact of natural disasters, it is also of paramount importance to observe the relationship between gender issues and the impact of natural disasters. Here we have observed the trend of Female Human Development Index, which was extracted from the general Human Development Index, in relation to disaster characteristics. Generally it is understood that countries with lower female human development report the most human suffering, as the ratios of *totally* affected and killed people to the total population is respectively very high in comparison with countries with higher female human development levels. The trend is very similar to the trend in general human development. But in 2004, the ratio of the number of killed and *totally* affected people to the population was high in the Low and Medium Female Human Development countries due to the earthquake, flood and tsunami disasters that struck many countries in Asia, especially because of the Indian Ocean Tsunami (Figure 16 & 17). Moreover, the ratio of *totally* affected people to the population was high in the Low Human Development Countries as shown in the Figures 18 and 19. These figures point out and stress the importance of gender related planning and mitigation strategies and approaches in the field of disaster management, especially in the Low and Medium Female Human Development countries.

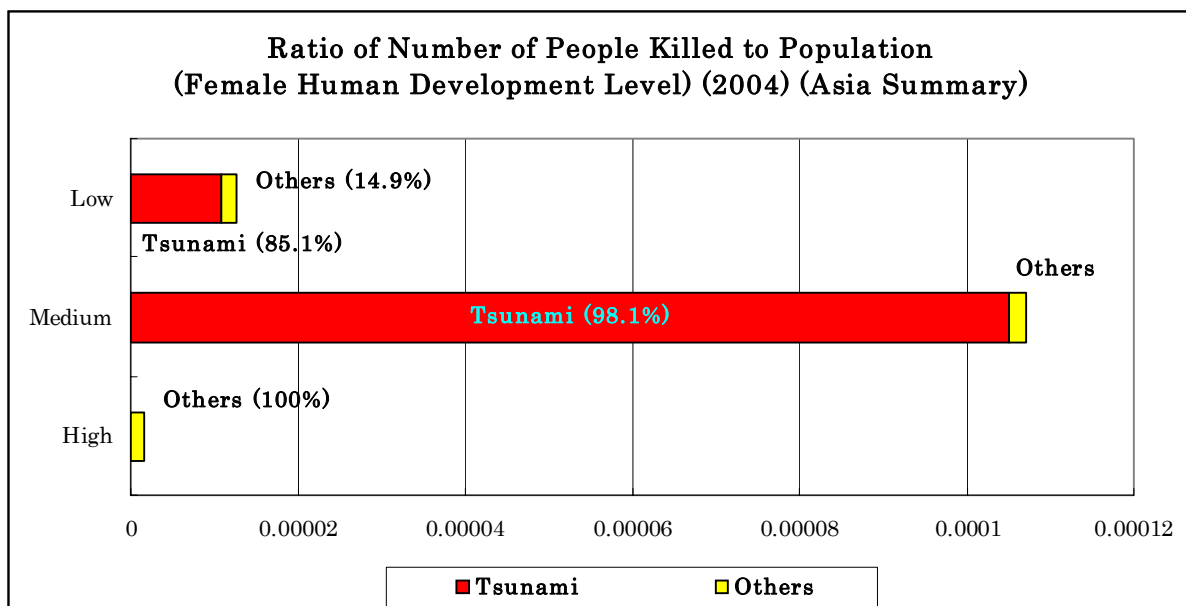
It is known that gender powerfully shapes human response to disasters, both directly and indirectly. Also, it has been found that women are hit hard by the social impacts of disasters. From these analyses we could say that women should play a major role in post disaster activities if proper integration of gender issues into disaster management is achieved. The fact is that women are always identified as active and resourceful disaster respondents but are often regarded as helpless victims. Since disaster mitigation and risk management activities should be incorporated into development strategy, it is imperative to prevent gender bias and ensure women participation.

Figure 16



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2004

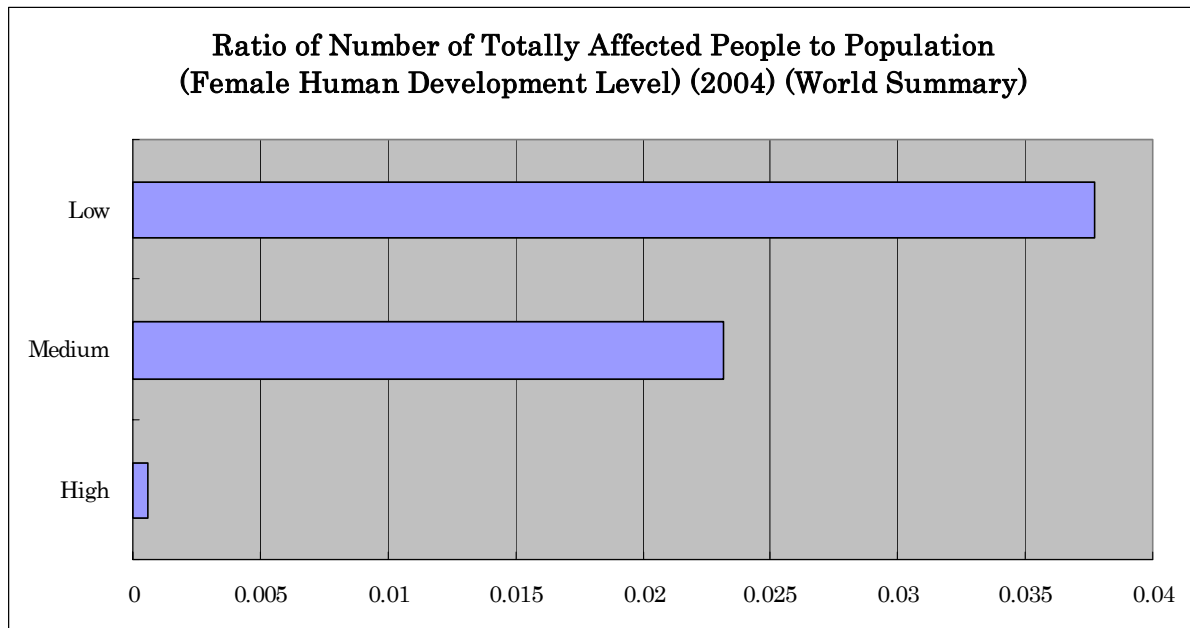
Figure 17



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2004

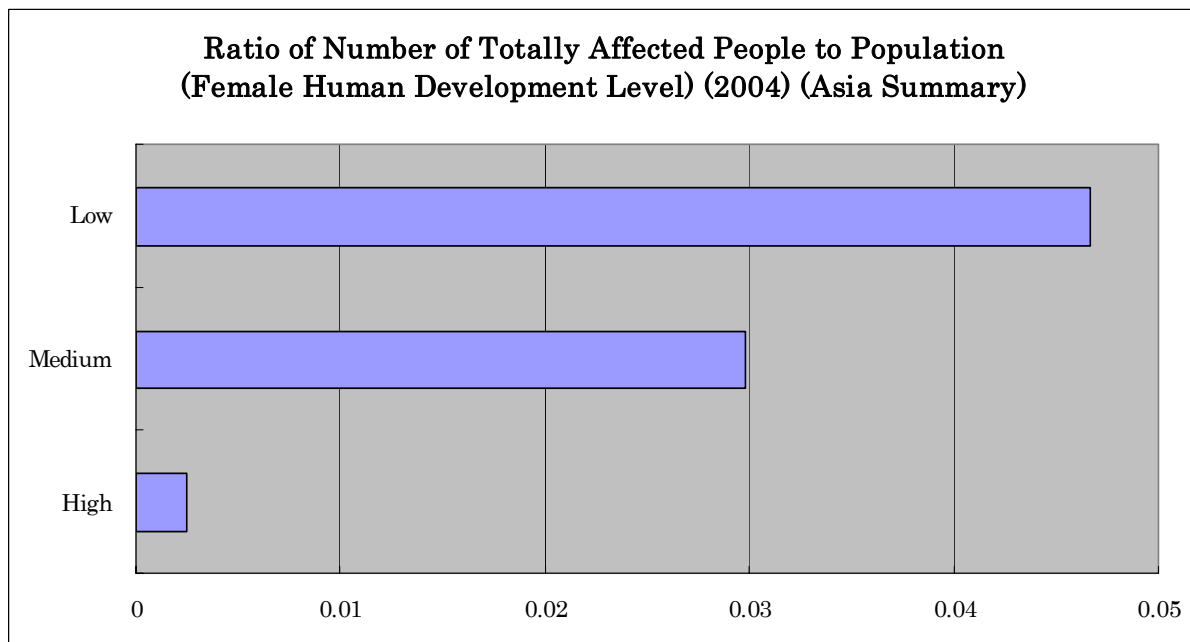
The above Figures also point out that majority of the human loss was in the countries with low and medium level of female human development due to the historic Indian Ocean Tsunami disaster, in terms of World, as well as Asia.

Figure 18



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2004

Figure 19



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2003

2.3 Economies of Natural Disaster Impact

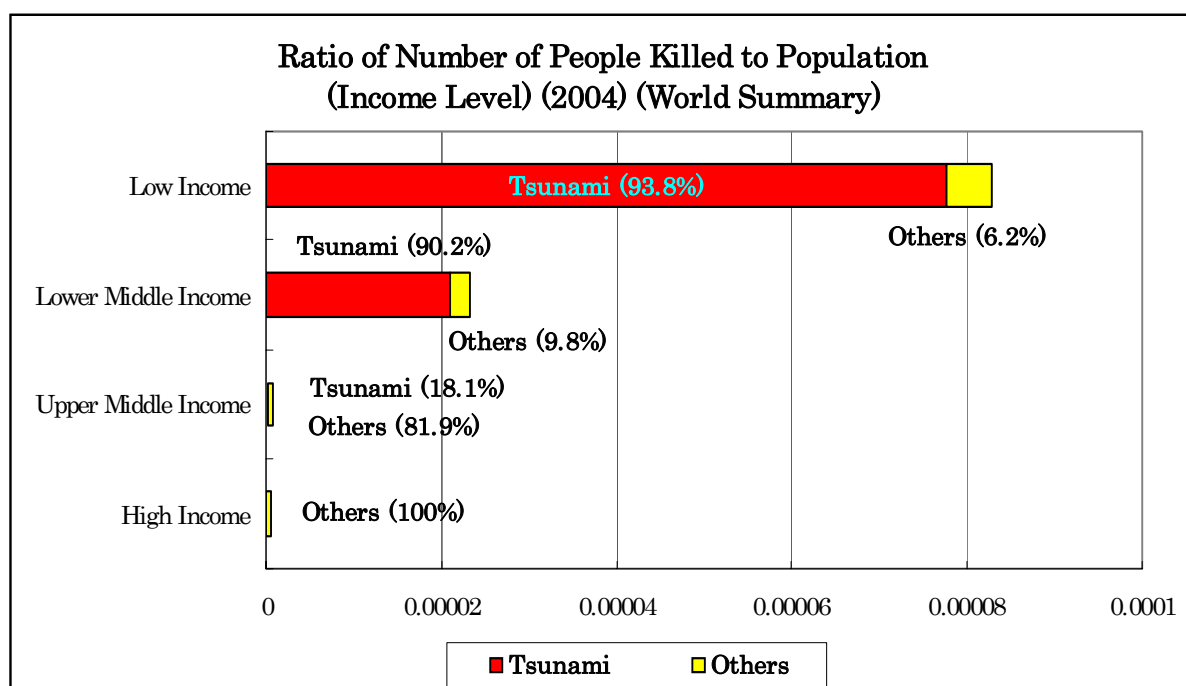
In this section, the analysis focuses on the country's income level as related to disaster impact based on the disaster trend in 2004. A country's income level is determined by the per capita GNI of a country and is here analyzed in relation to the disaster characteristics. The following figures (Figures 20-23) show this relationship and it is once again evident that the majority of the human losses and affected people come from low and lower middle income countries. Though this could be attributed to the Tsunami disaster impact in the low income and least developed Asian countries, this trend is similar to the general phenomenon for the longer period.

Generally, though the real economic loss from disasters is higher in high-income countries due to their developed infrastructural framework and the economic establishments that have accumulated social capital, loss from disasters in developing and lower income countries is more substantial when compared to the GNIs of those countries. When human loss and suffering are considered, it is once again visible from the following figures that the lower income and lower middle-income countries suffer greatly. This firmly emphasizes the need for a holistic disaster management approach with due consideration of country's disaster vulnerability, the impact and extent of disaster related damage, and the impact of disaster on the human development and economy. Figures 24 and 25 clearly specify this aspect.

The socio-economic impact of disasters varies according to the types of disasters, the disaster period (length), and the post disaster recovery period. A country's income level plays a crucial role in deciding the recovery period of a disaster. In addition, the income level of a country and the magnitude of the socio-economic impact of a disaster are proportionally related to each other, and the ratio of such impact to the country's GNI demonstrates the negative effects of disasters upon low and lower middle income countries. These are the reasons for the shape of Figures 20 to 25 as the human

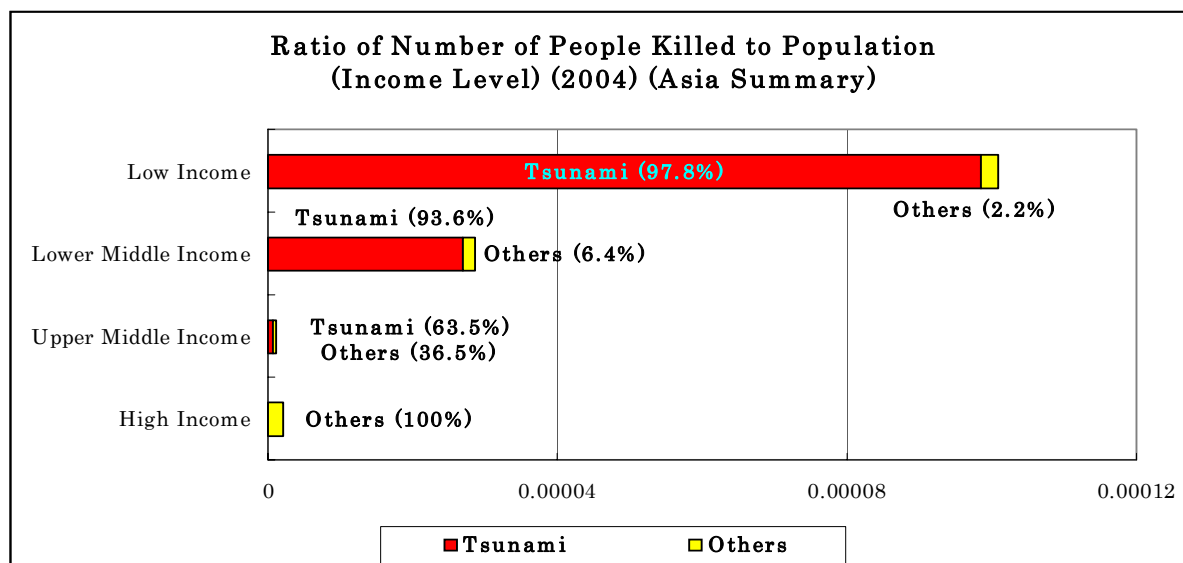
and economic loss in comparison to the population size and income level (GNI) is high in the low income countries and low in the high income countries. The disasters occurred in Indonesia, Sri Lanka, India, Thailand, Myanmar, Bangladesh, and China in Asia and some countries in Africa, immensely contributed to this trend. Especially the disasters occurred in Japan (earthquake, typhoon and flood), and USA (hurricane), Extreme Temperatures in Europe and droughts in Portugal contributed to the heavy damages in the high income countries when compared to their high GNIs. Figure 20—26 portray these trends for the world and the Asian region.

Figure 20



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2004

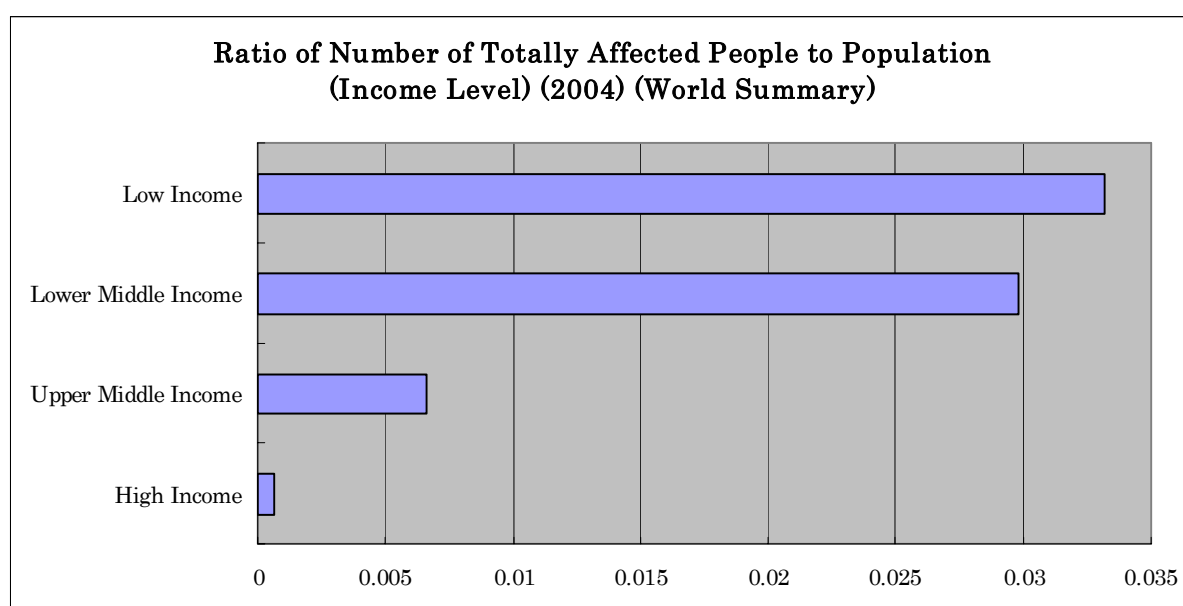
Figure 21



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2004

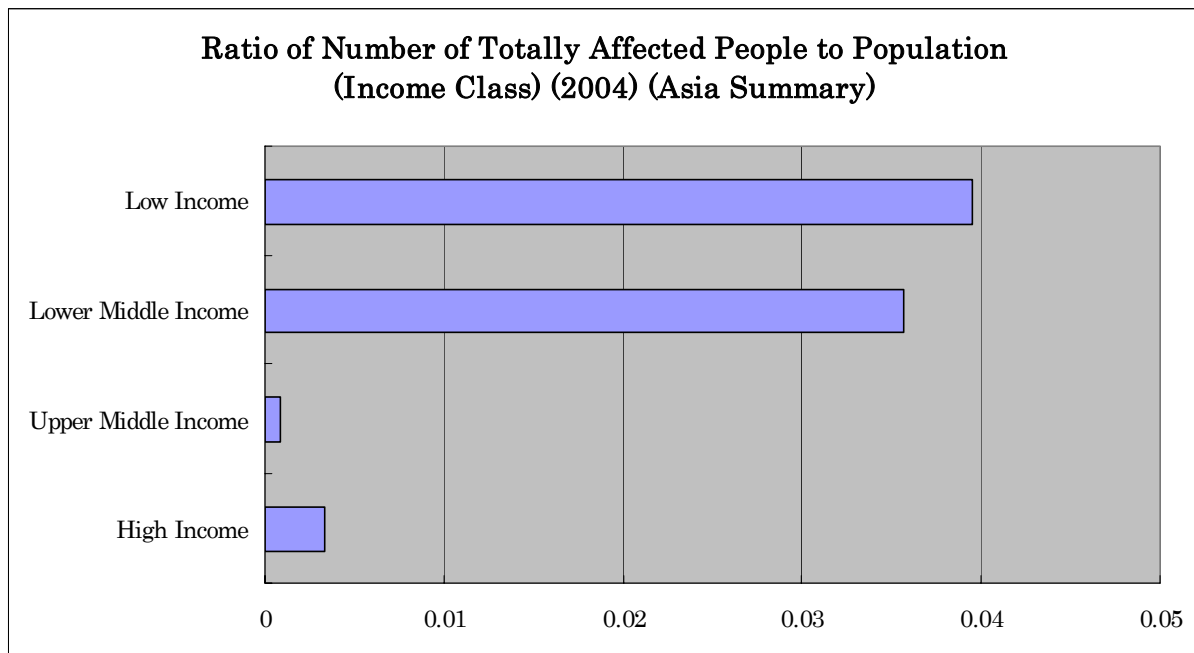
It is clearly known from above Figures that the majority of the human loss was in the low and lower middle income countries in the World as well as in Asia and these are due to the historic Indian Ocean Tsunami disaster.

Figure 22



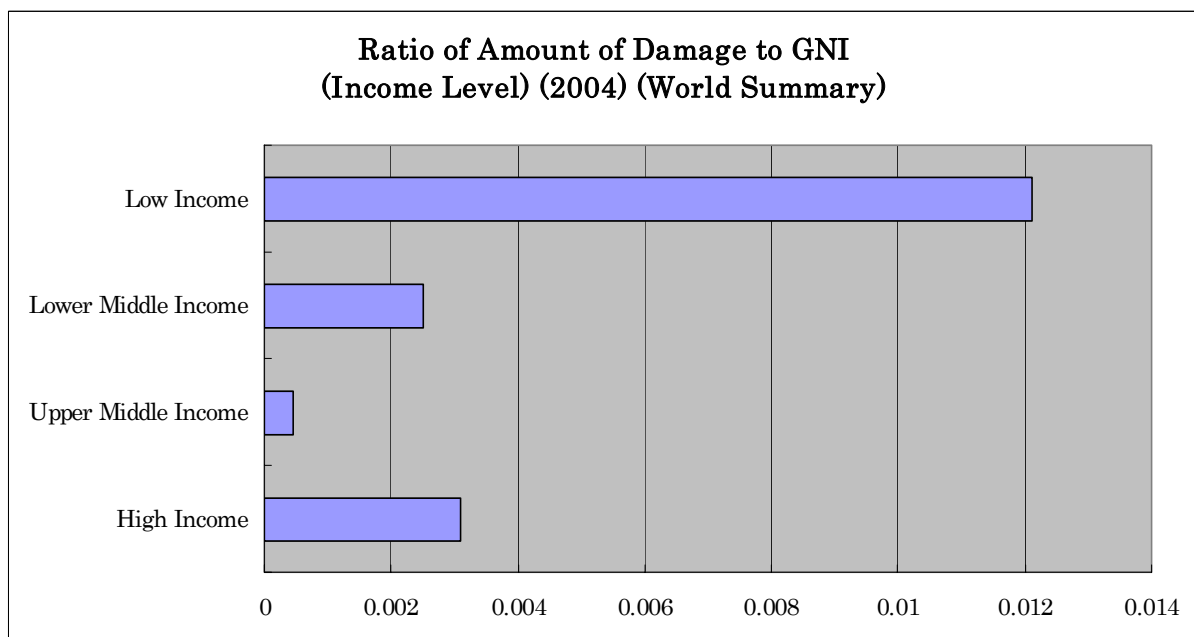
Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2004

Figure 23

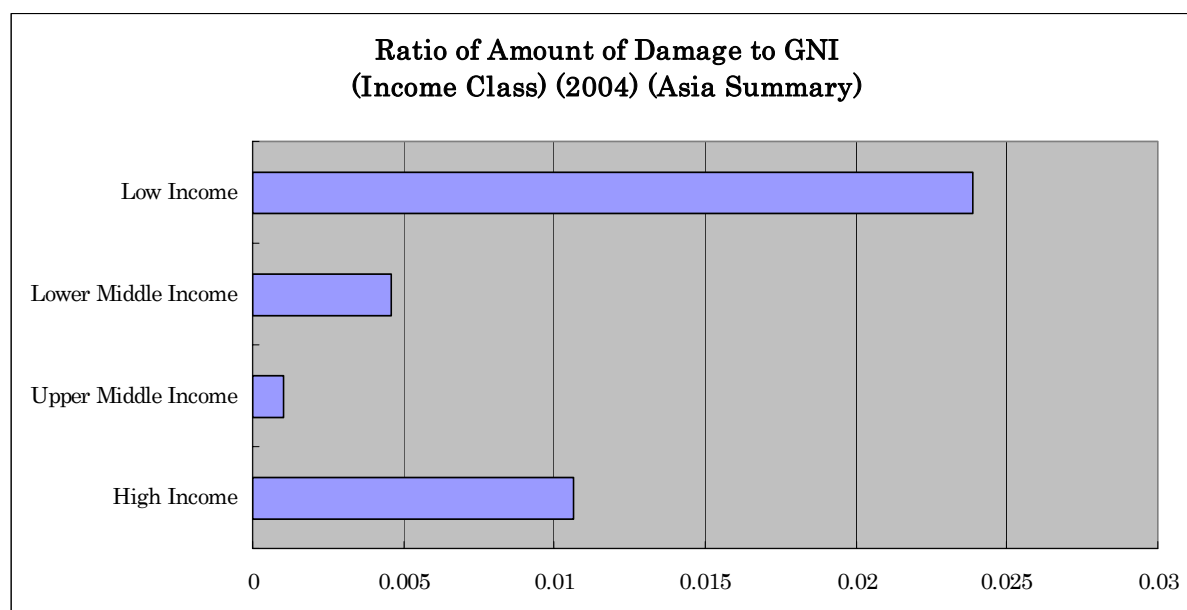


Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2004

Figure 24



Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2004

Figure 25

Source: ADRC, Japan, CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2004

Figure 24 and 25 depict the share of damages amount to the GNI in relation to the income levels of the countries. Accordingly, in the world, it is visible that the share of damage to GNI is high in the lower middle income countries and this is mainly due to earthquakes, Tsunami and floods in Asia and Africa. But in Asia, this share is high in the upper middle income countries and this is mainly due to earthquakes, typhoons and floods in Japan and extreme temperatures in Korea.

It is evident that the extent of damage caused by natural disasters is connected to a country's socio-economic level. As seen in the above figures, disaster management and post disaster activities are crucial to sustainable development based on the 2004 disaster occurrences and trends, as they were in the previous years. It can be said that in 2004, like many previous years, natural disaster impact was closely related to poverty, education, quality of health, gender related issues, and changing policy scenarios in relation to global socio-economic characteristics. Hence, disaster mitigation and management strategies must incorporate these areas into a holistic disaster management approach in line with strategies to ensure sustainable development.