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Zentrum für Entwicklungsforschung

Center for Development Research

Universität Bonn

# Flood Management and Development Planning

*The Allocation of Risk in the Mekong Delta, Vietnam*



Picture sources: [www.channel4.com](http://www.channel4.com), [www.davifo.dk](http://www.davifo.dk), [www.cfsc.org.vn](http://www.cfsc.org.vn), [www.seafoodfromvietnam.com.vn](http://www.seafoodfromvietnam.com.vn)

Nadine Reis

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# 1 Introduction

Due to the increasing threats by human disasters caused by natural hazards worldwide, a series of institutions, forums and programmes has been established on the international level in order to reduce the negative social, economic and environmental consequences of such events. The process has been accompanied by a discussion in social sciences on the mechanisms that lead to the growing vulnerability of societies to natural disasters. Among scientists, as well as on the international political level, it has been widely acknowledged that disaster management is not only about improving relief and rehabilitation activities after the occurrence of a disaster, but also about reducing the vulnerability to disasters by addressing the preparedness and resilience of societies to natural disasters. Within the latter, the management of *risk* is an essential element and includes “the necessity to recognise risk and make people aware of and prepared to live with risk”<sup>1</sup>. The Geneva Mandate on Disaster Reduction calls for risk management to become “essential elements of government policies”<sup>2</sup>. This paper deals with the management of flood risk in the Mekong Delta, Vietnam.

## 1.1 Problem identification

Social and economic life in Vietnam’s Mekong Delta has always been characterised by the seasonality of water flows, and local livelihood strategies have adapted to the annual flooding of vast parts of the Delta. In the last two decades however, people and political authorities have been confronted with the increasing frequency and severity of extreme flood events causing tremendous human and economic losses.

## 1.2 Aims and scopes of this paper

In response to the environmental changes of the last decades, the Vietnamese government is now considering the mitigation and management of natural disasters as “one of the most important items” on its development agenda<sup>3</sup>, and has implemented a series of measures in order to reduce the negative impacts of floods. This paper aims to review current flood management in relation to the long-term development planning in the Mekong Delta. By drawing on the boundary concept of ‘risk’, it assesses how institutional arrangements and

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<sup>1</sup> BOGARDI 2006: 1

<sup>2</sup> ISDR 1999

<sup>3</sup> CCFSC 2001: 8

regulations deal with risk, and which perceptions of risk form the basis for flood management policy. It is shown that the dominant and policy-shaping perception of risk as a threat to the socio-economic development goals leads to the creation of new risks, which challenge the social and environmental sustainability of economic growth.

The first chapter after the introduction addresses the question, how the perception of flood risk has changed during the last decades, and how this has influenced the risk coping strategies. Chapter 3 consists of a review of the strategies and measures that currently govern flood management in the Mekong Delta. Chapter 4 will then comment on the shortcomings and new risks that the current strategies create. In the last chapter, I will build three hypotheses on the reasons that may stand behind the current allocation of risk.

### 1.3 Methodology

The assignment is based on the review of relevant literature and internet sources on disaster management, as well as the assessment of key government documents for disaster management and development planning in the Mekong Delta that are available on the internet. Moreover, information generated during a group meeting of the WISDOM PhD-students is incorporated.

## 2 The changing perception of 'risk'

### 2.1 Floods in the past: Responding to risk at the local level

The water cycle in Vietnam's Mekong Delta is characterised by a hydrological seasonality with rather predictable periods of water surplus and deficit, and less predictable episodes of extreme surpluses and deficits<sup>4</sup>. The annual water cycle makes the water level rise with the beginning of the Southwest Monsoon in May or June, from which point on the Mekong water inundates an area of up to 55,000 km<sup>2</sup> for several months. The first peak of the flood usually occurs in July, the second and highest water level is normally reached in September. When the river discharge decreases again at the end of the monsoon season, the water returns to the Mekong River and discharges into the South China Sea. The river reaches its normal level in late December or early January.<sup>5</sup> In the past, the flooding was

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<sup>4</sup> SNEDDON/NGUYEN 2001: 236, cited after KOPPEL, B. 1990. Old water, new rice: field notes on agrarian change and Vietnam's *doi moi*. In: The Rural Sociologist, Fall 1990, 2-13.

<sup>5</sup> NGUYEN 2000

not perceived as a natural hazard by the Delta's inhabitants: The annual floods deliver a series of ecosystem services like the exchange of water, sediment, nutrients and fish between the river channels and the floodplains<sup>6</sup> as well as the flushing of salinity and acidity caused by seawater intrusion<sup>7</sup>. Farmers have adapted to the seasonality of water flows by specific technologies and production patterns, like the seasonal variation between rice cultivation and fisheries in the streams and flood plains. Large floods therefore often even resulted in additional crop yields and fish catches.<sup>8</sup> The adaptation of local livelihoods to the seasonality of the ecosystem is reflected in the local saying 'shaking hands with the floods' and can be seen as the central approach for managing the environmental risk.<sup>9</sup>

## 2.2 Floods at present: An anathema to modernity?

### 2.2.1 1965-1990: 'Developing' the Mekong

The natural environment of the Delta already began to change at the beginning of the 18<sup>th</sup> century with the construction of canals under the Nguyen dynasty<sup>10</sup>. The construction of ca. 5000 km of canals between 1705 and 1975, mainly for navigation and transportation, can be characterised as an 'opening up' of the Delta. The canals discharged floodwater from some areas and brought it into other areas that were not flooded previously.<sup>11</sup> This process did not affect the natural floodways of the Mekong waters significantly due to the perpendicular position of the canals. Since the mid 1960s however, technical constructions have increasingly altered the floodways of the Mekong. Existing canals have been amplified and a large number of new canals have been constructed in the floodplains aiming at the diversion of the Mekong water, primarily for rice production (see Figure 1).<sup>12</sup> Moreover, the government began with the construction of isolated flood and salinity intrusion control systems. This policy, and the introduction of new technologies<sup>13</sup>, resulted in a shift from the cultivation of floating rice during the flood season to double cropping during the dry season. In spite of this tremendous modification of production patterns,

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<sup>6</sup> FOX/SNEDDON 2005: 4

<sup>7</sup> NGUYEN 2000

<sup>8</sup> MILLER 2005: 175

<sup>9</sup> *ibid.*: 176 et seq.

<sup>10</sup> NGUYEN 2000

<sup>11</sup> MILLER 2005: 176 et seq.

<sup>12</sup> NGUYEN 2000

<sup>13</sup> The introduction of modern technologies was supported by the US until the mid 1970s.

farmers' risk management strategy did not change remarkably as it still consisted in avoiding cultivation during the flood peak:

“...farmers aimed to harvest before the floods arrived, with low dykes protecting their crops until harvest. After harvest, floodwaters overtopped the low dykes, spreading silt onto farmers' fields, and sowing recommenced as floodwaters receded.”<sup>14</sup>

Since then, rice production in the Delta increased manifold and led Vietnam from a situation of famine in the 1970s to being the second largest rice export nation in the world today<sup>15</sup>.



Figure 1: Canal system in the Mekong Delta<sup>16</sup>

<sup>14</sup> MILLER 2005: 178

<sup>15</sup> *ibid.*: 175

<sup>16</sup> Source: Environmental Impact Assessment Centre of Finland ([http://www.eia.fi/wup-fin2/images/delta\\_map.jpg](http://www.eia.fi/wup-fin2/images/delta_map.jpg))

### 2.2.2 From adaptation to resistance and control since 1990

During the last decades there has been a steady change of the perception of floods as a benefit towards their perception as a threat to the social and economic development of the Mekong Delta. Since the mid 1990s, the character of flood management has thus changed in terms of its scale as well as its quality. The strategy no longer consists in ‘opening up’, but ‘closing off’ the Delta. This is demonstrated by the implementation of more and more engineering measures for large-scale, integrated flood and salinity control, like dykes, bunds, sluices, small dams and weirs.<sup>17</sup>

The combination of constructions of the last decades has resulted in a change of natural floodways and the environmental system in the Mekong Delta. Newly constructed canals have formed channels for the Mekong water from Cambodia to flow into Vietnam earlier, faster and at higher rate. In the 1990s, flood travel time had reduced to ca. ¼ of the time needed in the 1970s and 80s. Moreover, the roads, dykes and gates throughout the Delta constitute a barrier for the floodwater to discharge into the sea. As a consequence, flood levels have increased and durations prolonged.<sup>18</sup> Floods have increasingly turned into destructive disasters during the last decade. The flooding of 2000 was the most severe flood of the last 70 years and caused the death of ca. 800 people and high damage to property<sup>19</sup>. It remains unclear, to which extent upstream dam building, downstream technical constructions and/or climatic changes have respectively influenced these recent hydrological changes<sup>20</sup>. But the fact that the floods *are* more and more devastating, in turn led to new and more fortified attempts of the Vietnamese government to control the water on the Delta scale. Thus, after the 2000 flood, a large number of additional high dykes has been constructed in order to protect people’s lives and property<sup>21</sup>.

In the following, I will review the current strategies and measures that govern the management of flood risk at present.

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<sup>17</sup> MILLER 2005: 179

<sup>18</sup> NGUYEN 2000

<sup>19</sup> CCFSC 2001; WEICHELGARTNER

<sup>20</sup> SNEDDON/NGUYEN 2001: 242; MILLER 2005: 183

<sup>21</sup> WISDOM Group Discussion, 9.11.2007

### 3 Flood management and development planning

#### 3.1 Strategies for flood management

According to Decree No. 168/HDTB of 1990, flood risk management takes part on all levels of the government and is carried out by the ‘Committees for Flood and Storm Control’, which are established at each government level as well as in all “ministries and central sectors”. The ‘Central Committee for Flood and Storm Control’ (CCFSC) is the focal point for disaster management at the national level, where all “key ministries” are represented.<sup>22</sup>

The main basis for flood disaster management in the Mekong Delta is the ‘Second National Strategy and Action Plan for Disaster Mitigation and Management’. The preparation of the plan was supported by UNDP and addresses in a rather broad way all sorts of disasters in the country. The strategy puts high emphasis on

- disaster preparedness and forecasting,
- the sustainability of measures with respect to the long-term benefit for the environment and all parts of society, including the poor
- the compatibility of measures with traditional coping mechanisms of local people, and
- the cooperation and coordination between all government institutions and the general public, based on a ‘bottom-up’ approach.<sup>23</sup>

The objectives of flood control and mitigation in the Mekong Delta are

- to protect human life and property,
- to maintain the stability of agricultural production
- to protect infrastructure, and
- to protect the ecological environment.<sup>24</sup>

The strategy for the Mekong Delta is ‘Living with Flood and Flood Control’, which basically aims at establishing residential clusters secured by dykes on one hand, and the adaptation of houses and infrastructure to frequent flooding on the other hand<sup>25</sup>. This

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<sup>22</sup> BILDAN 2003: 35; SOCIALIST REPUBLIC OF VIETNAM 2001: 20

<sup>23</sup> CCFSC 2001: 9; UNDP

<sup>24</sup> SOCIALIST REPUBLIC OF VIETNAM 2001: 29

<sup>25</sup> SOCIALIST REPUBLIC OF VIETNAM 2001: 23

policy includes the provision of loans in order to promote the resettlement of people to planned residential clusters protected by high dykes. Beyond this, the official disaster management strategy does not include any more details or precise measures about how the strategy of ‘Living with the Floods’ is supposed to be applied on the ground. However, flood management is not limited to the strategies and measures mentioned by the disaster management plan. On the contrary, flood management is strongly influenced by other policies, which are here summarised under the term ‘development planning’.

### 3.2 Development planning: the leading notion

The productivity of agricultural production has steadily increased in the recent years, and today, 50% of total rice and 90% of rice for export are produced in the Mekong Delta. The Delta thus contributes a large part to the tremendous growth of the Vietnamese economy since the economic reforms in the 1980s (*doi moi*). The ‘Socio-Economic Development Plan 2006-2010’ has set the target of Vietnam becoming a middle-income country until 2010<sup>26</sup>. Within this strategic planning, the government aims to further strengthen the role of the Mekong Delta as area for agriculture and fish production in order to ensure national food security and increase export capacities. An important element herein is the establishment of “modern production zones on agriculture and fisheries with high value and quality products”.<sup>27</sup>

The ambitious socio-economic development goals of the Vietnamese government have become the dominant factor to shape the perception of floods and in consequence the policy towards them. This is reflected in numerous text passages of the Mekong Basin Development Plan. The hydrologic regime of the Mekong leading to the annual flooding of nearly half of the Delta is seen as a major constraint for development:

“...floods cause obstacles on land potential exploitation and rural urbanization towards modern civilization [...] Planning for the water resource utilization and protection is therefore developed in close combination of the planning sector developments on transportation, construction, fisheries and agriculture for the sake of modern rural civilization development.”<sup>28</sup>

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<sup>26</sup> VIETNAM CONSULTATIVE GROUP 2007: i

<sup>27</sup> VIETNAM NATIONAL MEKONG COMMITTEE 2003: 22 et seq.

<sup>28</sup> *ibid.*: 17

Flood policy is therefore strongly geared to controlling the hydrological cycle by means of large-scale engineering measures. The basis for this technical planning approach is the division of the Delta into three areas:

1. “Non-controlled flood areas” (117,700 ha)
2. “Flood control areas in certain time” (859,000 ha)
3. “Flood control areas in whole year time” (938,490 ha)<sup>29</sup>

This means that nearly half of the previously flooded area is planned to be totally protected from flooding by dykes. This is presumably due to the intention of the government that farmers shift from a 2-crop to a 3-crop pattern in order to increase the total agricultural output<sup>30</sup>. The third crop is then to be grown during the flood peak in September, when most people traditionally practiced fishery.

The results of the 2002 ‘National Workshop on Water, Food and Environment’ provides further insight into the planned flood control projects. According to this, the “flood control planning project” aims to protect all cities, towns, centres of provinces and districts as well as large communities from flooding by dykes, and to develop “other infrastructure based on the flood control system”. Further, the canal system is supposed to be completed, and additional dykes, sluices, embankments and culverts are planned in order to tackle salinity intrusion. It is clearly pointed out that flood control is an “indispensable direction for sustainable development in the flooded area”.<sup>31</sup>

Another factor which heavily influences flood management in the Vietnamese Mekong Delta is transboundary water policy under the Mekong River Commission (MRC). There is a strong tendency towards water resources development by the construction of dams throughout the Mekong Basin. 11 dams on the Mekong mainstream and many more on its tributaries are currently planned, often referred to as ‘multi-purpose’; besides the generation of hydropower and water for agricultural development, dams are also seen as beneficial for flood control by leading to a more ‘uniform flow’ of waters.<sup>32</sup> Hence, the technical approach of controlling the floods is also leading on the international basin scale.

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<sup>29</sup> *ibid.*: 17 et seq.

<sup>30</sup> WISDOM Group Discussion, 9.11.2007

<sup>31</sup> TO/NGUYEN 2002

<sup>32</sup> MILLER 2005: 181 et seq.

It can be summarised that in contrast to the stated principles of disaster management and mitigation, current flood management is not based on a ‘bottom-up’ approach, but on a ‘top-down’ policy which pursues a rather one-dimensional strategy of controlling the Mekong waters by large-scale technical measures. The following chapter will address the shortcomings of this strategy, which reduces certain risks and thereby creates others.

#### **4 Reducing risk or re-distributing risk?**

Several direct and indirect negative impacts are connected to the dominant perception of flood management as a technical problem.

First, it is argued that the system of high dykes may in fact lead to a higher vulnerability to floods as it will increase the potential of a catastrophic impact if a dyke failure occurs. This risk is even reinforced by the strategy of resettling population to dyke protected areas that formerly were high flood risk areas (‘Levee effect’). The shift towards a 3-crop pattern in this sense creates a risk towards higher death tolls as well as higher economic losses. Further, it may also exacerbate the risk that is presented by water pollution: In order to compensate the soil nutrition that has hitherto been delivered by the floods, farmers will increasingly depend on the use of chemical fertilizers. A series of further consequences, like the reduction of fish populations and health problems, are in turn linked to a declining water quality.<sup>33</sup> Apart from that, the resettlement to flood-protected residential clusters can also increase the risk on the household level, if the repayment of loans is not ensured. In this case, there is a shift from a flood to a debt-repayment risk.<sup>34</sup>

Beyond these potential impacts, it is crucial for the assessment of the current flood management policy to place it into the context of the livelihood strategies of a large share of the Delta population. The effects on fishery are a major concern in this respect. An estimated 800 to 1,000 fish species live in the Mekong River, of which the majority depends on its annual flooding cycle. Changes to this natural environment are very likely to affect the fish populations in a negative way<sup>35</sup>. This will directly harm millions of small scale farmers and fishers who are partly or fully dependent on fishery for their livelihoods,

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<sup>33</sup> MILLER 2005: 185 et seq.

<sup>34</sup> LEBEL ET AL. 2007: 6

<sup>35</sup> The major threats to sustaining fisheries include the destruction of spawning grounds or dry season refuges by habitat alterations, changes in the quantity and quality of water available and in the timing of hydrological events, water pollution, and the construction of dams or other barriers which hinder fish migration. (WHITE 2002: 16)

and for whose diet fish is the major source of protein intake<sup>36</sup>. As WHITE points out, the size of inland fisheries is “grossly under-reported because of the subsistence nature of the sector”<sup>37</sup>. The Mekong Basin Development Plan recognises negative impacts on fisheries, but at the same time puts them into perspective by pointing to the development of large-scale aquaculture:

“Although the flood control reduces partially natural fish capture productivity, it facilitates favor conditions for aquatic development.”<sup>38</sup>

It is however questionable, whether aquaculture farms have the potential to compensate the loss of wild fisheries as an income source for a broad part of society; aquaculture usually involves high investments, which are likely to exceed the capacities of small-scale farmers.

The review of government strategies and their potential environmental and social impacts demonstrates that current flood management does not reduce risks, but re-allocates them on a spatial, and particularly on a social scale. This is due to the one-dimensional perception of flood risk as a threat to socio-economic development, which neglects the range of ecosystem services of floods as well as the traditional risk coping mechanisms within local livelihood strategies. On the transboundary level, this is reflected in the plans for controlling the Mekong water by large dams which will cause the most serious changes to the annual flood cycle and the ecosystem linked to it. It is unclear, to which extent Vietnam supports this policy; however, there is evidence that disputes in the MRC rather focus on the equal division of water for economic growth than on the construction of dams and their impacts on livelihoods<sup>39</sup>.

Why are the institutional arrangements for flood management “blind to the full spectrum of ecosystem values and benefits”<sup>40</sup>? The last chapter aims to provide possible answers by building three hypotheses.

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<sup>36</sup> SNEDDON/NGUYEN 2001: 243 et seq.; WHITE 2002: 19

<sup>37</sup> WHITE 2001: 16

<sup>38</sup> VIETNAM NATIONAL MEKONG COMMITTEE 2003: 19

<sup>39</sup> See SNEDDON/NGUYEN 2001: 240; FOX/SNEDDON 2005.

<sup>40</sup> FOX/SNEDDON 2005: 2

## 5 The allocation of risk: Three hypotheses

*The deficient consideration of environmental and social issues in flood management is caused by the lack of coordination and information within the political system.*

The review of documents related to flood management and broader development planning has shown that there is a series of different strategies and regulations. In addition to the national and regional plans that were presented, there is the ‘Strategy on Flood Management and Mitigation’ by the MRC, which also defines a strategy and management measures<sup>41</sup>. It remains unclear, how they are related to each other, and which government agencies implement which plans.

The gap between the principles of the ‘National Strategy and Action Plan’, which highlight the importance of social inclusion and environmental sustainability, and the policy implementation may also be due to the lack of coordination between and within the different government agencies. This leads to an inconsistency between national and local plans and between the plans and strategies on the horizontal level<sup>42</sup>. On the national level, responsibilities are fragmented in the way that agencies in charge of ‘environmental’ issues have adopted a perception of the environment as ‘resource’ rather than as a complex ecosystem. Flood policy does therefore not follow a systematic approach. Another reason may be seen in the lack of management skills, planning capabilities and human resources in government agencies.<sup>43</sup>

Moreover, LEBEL ET AL.<sup>44</sup> argue that risk allocation is difficult, when the risks are highly uncertain or unknowable because sound information is not available to policy makers.

*The failure to regard the full spectrum of risks is caused by the lack of democratic identification of these risks.*

As it has been demonstrated, different stakeholders perceive risk in different ways. In order to represent the full spectrum of risks, and thus allocate them in a social and environmental sustainable way, it is necessary to include all stakeholders into the process

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<sup>41</sup> MRC 2001

<sup>42</sup> URBAN AND RURAL DEVELOPMENT NETWORK 2007

<sup>43</sup> SNEDDON/NGUYEN 2001: 254 et seq.

<sup>44</sup> 2007: 11

of risk identification and definition<sup>45</sup>. However, current decision-making in flood management takes part without the consideration of public views on risks and the interests of certain stakeholders are therefore not represented. The shifting of risk is concealed by this lack of participation and transparency<sup>46</sup>.

In order to explain, why certain perceptions of risk become dominant, it is necessary to understand which stakeholders benefit from the policy and the environmental changes linked to them<sup>47</sup>. Power is a crucial explaining factor in human-environmental interactions and refers to the capability of certain actors to control these interactions, and the social discourses on the environment<sup>48</sup>. It remains to be investigated, how and by which actors environmental discourses are governed in the Mekong Delta.

*In the age of globalisation, there is no room for social and environmental needs in the political arena, as the world economy does not reward diversity and sustainability, but specialisation and intensification.*

Globalisation is a process of re-movement of spatial and systematic barriers, which is characterised by the transition of national to international capitalism and hence, the shift of power from nation states to transnational markets<sup>49</sup>. However, an inherent quality of globalisation is the simultaneity of integrating and fragmentating processes in the global competition; this simultaneity is also reflected in the current development of flood policy in the Mekong Delta. The need to compete in the globalised economy, and the aspiration of national elites to ally with the globalised forces of the transnational economy in order to ‘catch up’ with the international consumer class, leaves no room for the needs of those parts of society that are not capable of competing:

“Committed to promoting the insertion of their industries and middle classes into global markets, they consider the non-competitive social majority a liability rather than a boon. As a result, in many societies a split opens between the globally oriented middle class on the one side and – in terms of the world market – superfluous populations on the other.”<sup>50</sup>

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<sup>45</sup> *ibid.*

<sup>46</sup> LEBEL ET AL. 2006:3

<sup>47</sup> ROBBINS 2004: 52

<sup>48</sup> BRYANT/BAILEY 1997: 39

<sup>49</sup> SCHOLZ 2000: 2; SACHS 2000: 19

<sup>50</sup> SACHS 2000: 21

The ubiquitous quest of the Vietnamese government for maximising agricultural output by the technical control of floods is in this sense the consequence of the transnational economic system, “which at present rewards productive specialisation and intensification over diversity and sustainability”<sup>51</sup>.

## 6 Conclusion

The present paper has shown that current flood management in Vietnam’s Mekong Delta is not based on the principles stated in the official disaster management strategy, but is determined by the imperatives of long-term development planning. ‘Risk’ is therefore defined as a threat to industrial agriculture and fishery development in the Mekong Delta. This one-dimensional perspective however leads to the creation of new risks, and may hence increase the risk for society as a whole. Three hypotheses were presented that provide possible explanations for the lacking integration of different risk perceptions into flood management.

In order to sustainably reduce risk, a broader view of the term seems necessary. It could be defined as “the odds or chance that a flood event, *or change to a flood regime*, will have a significant adverse impact on a particular individual or group”<sup>52</sup>. The acceptance of such a broader definition of risk would acknowledge the full complexity of the Mekong River ecosystem and local livelihood strategies. In consideration of the future challenges presented by climate change, this seems even more indispensable in regard to the social and environmental sustainability of socio-economic development in Vietnam.

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<sup>51</sup> UNDP 2004: 2

<sup>52</sup> LEBEL ET AL. 2007: 2 (accentuation by N.R.)

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