AN ANALYSIS OF SUSTAINABLE DEVELOPMENT IN VIETNAM: A CASE STUDY OF DONG HA TOWN, QUANG TRI PROVINCE

Le Trinh Hai

Institute of Geography, Vietnamese Academy of Science and Technology (VAST)

18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam

Email: letrinhhai@yahoo.co.uk

ABSTRACT

For each country, region or area, sustainable development (SD) planning is of paramount importance. Defining SD has both global and local aspects. SD is a core concept at the moment and also in the future. Development is largely dependent upon the natural resource base. The main point of view of SD is the integration of environmental, economic, societal and institutional aspects.

In Vietnam, there is insufficient scientific basis to define SD and even less basis to define it at the provincial and local level. Decision making for SD is poorly instrumented. Opportunities that are e.g. GIS (Geographical Information System) based are used.

In view of the foregoing, if SD is to be achieved, a sustainable use of the natural resource and socio - economic base is a critical issue. It will help and support SD and decision making process will be fast and correct way by a given period time and spatial aspects.

1. INTRODUCTION

Sustainable development (SD) is very importance for each country, region, or area. It implies, for example, that progress in poverty reduction is lasting, rather than fleeting (Alex, Candy and Catherine, 1998). It has to be analysed and valued basically on a general valuation of environmental and socio - economic components.

Vietnam has achieved significant successes in socio - economic development since the "*Doi moi*" (re-newal) policy, which was initiated in 1986. Vietnam is still in the process of transition from a centrally planned to a market economy. It faces many unsustainable factors, such as fast population growth, dramatic environmental degradation and complex social-economic development issues. SD is a unique social choice and as such extremely important for Vietnam's future.

Quang Tri province is located in central Vietnam. It is one of the poorest provinces. The province has 2 towns (Dong Ha town and Quang Tri town) and 7 districts. It covers an area of 4,745.7km^2 with 575,000 inhabitants. Quang Tri province and also Vietnam as a country have been heavily affected by two wars, not only disrupting peace but also destroying the socio - economic, environment and natural resources base in some of the

fiercest ground fighting of the American war, especially from 1966 to the end of the war in 1975. The U.S. Department of Defence estimates that about 10% of this ordnance did not detonate as designed, meaning that much of these dangerous and unstable munitions still lie just under the surface, or buried deep in the earth, throughout Quang Tri Province (Vietnamese land mines organization, 2002).

Dong Ha is the provincial capital of Quang Tri province; it contains 9 precincts, with 73.59km^2 and 72,191 people in 2000 (Quang Tri statistical office, 2001). Dong Ha's economy is more developed than other districts of Quang Tri province, but less developed than other towns and districts of Vietnam. At present and in the near future sustainable economic re-construction is required for economic development, and environmental prevention. On the other hand environmental resources have to be protected. How can this be achieved in a sustainable way? One of these best ways to measure SD is to rely on indicators or sustainable development indicators (SDIs). SDIs are various statistical values that collectively measure the capacity to meet present and future needs (NASA headquaters website, 2003). SDI will provide information crucial to decisions of national policy and to the general public. In fact, many indicators are applied and used into practice (economic, social, cultural and environmental aspects) as well as SD. As SD is a wide area, many issues need to be concerned; so how and which best indicators will be selected, established and applied for this case study basic on SDI (in general), Vietnam and Dong Ha's conditions - potential and status into all aspects.

In this paper, the case study and the establishment of indicators will be approached by reversing the top down approach, because of *"... a local initiative model empowers people in a community to discuss and derive actions and policies at the community level involving business, government, neighbourhoods and villages in a way which is interconnected with community functions"* (Nath, Hens and Devuyst, 1998).

2. APPLICATION OF SDI SYSTEM FOR THE CASE STUDY

These SDIs belong to 4 major aspects: socio - economic - environmental - institutional. These indicators will be established, which adapt to the case study conditions, materials and documents availability, Vietnam's SD characteristics, SDI framework of UN. Each SDI is constructed in the concepts of definition (brief definition), unit of measurement, type of indicator, policy relevance (purpose, relevance to SD, linkages to other indicators), and methodological description.

Establishing indicators systems for SD in Dong Ha Town are mostly based on the analysis characteristics, actual conditions and data availability in the case study area, Quang Tri province, Vietnam, and on guidelines and methodologies for SDI of UN, among other. In addition, the author referred other studies by the people's committee of Quang Tri province (2000) and Phuc Tuan (2000). Application of the SDI system for Dong Ha town contains below indicators:

- **Environmental aspects**
  - Integrated approach to the planning and management of land resources: *Changes in land conditions; Land use change.*
  - Promotion of sustainable agriculture and rural development: *Arable land per capita.*
  - Quality of water resources: *BOD in water bodies; concentration of faecal coliforms in freshwater.*
- **Social aspects**
  - Combating poverty: *Poverty gap index, Unemployment rate.*
  - Demographic dynamics: *Population density; Population growth rate; Total fertility rate.*

- Promotion of education, public awareness and training: *Primary school and secondary school enrolment ratio – gross; Women per 100 men in the labour force.*
- Promoting sustainable human settlement development: *Flood area per person.*
- Protection and promotion of human health: *Access safe water; Immunization against infectious childhood diseases; Life expectancy at birth.*

- **Economic aspects**
  - Changing consumption patterns: *Share of economic sectors in GDP.*
  - International cooperation to accelerate SD in countries and related domestic policies: *GDP per capita.*

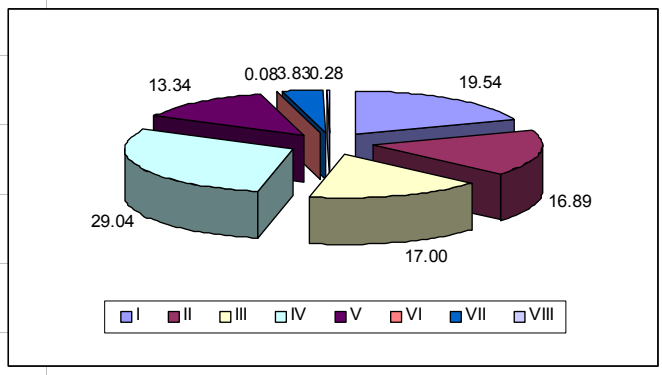
- **Institutional aspects**
  - Information for decision-making: *Main telephone lines per 100 inhabitants; Programmes for local environmental statistics.*
  - Integration environment and development in decision-making: *Mandated environmental impact assessment; Programme of integrated environmental and economic accounting; Sustainable development strategies.*

3. MAP ANALYSIS A SD MAP BY USING GIS

The author tried to apply GIS as a tool to establish map components (map of arable land per capita, map of distance from health care centre, map of distance from schools, map of flood area per person, map of population density, and map of soil erosion from correlative indicators. The SD map (map 1) is displaying spatial distribution of each area, which presents different areas in between sustainable degrees (*from very low sustainable - degree I to very high sustainable - degree VIII*) of the case study area. It is final map, but by no means a last issue; it is opened to discuss and find out the best solution for SD of the case study area. Table below shows the total area in different degrees of SD map in Dong Ha town in 1998.

Table 1. Total area and percentage in different degrees of SD in Dong Ha town in 1998

The degrees of SD	Area (ha)	Percentage (%)
I.	1,372.92	19.54
II.	1,186.86	16.89
III.	1,194.18	17.00
IV.	2,040.01	29.04
V.	937.05	13.34
VI.	5.56	0.08
VII.	268.73	3.83
VIII.	19.66	0.28

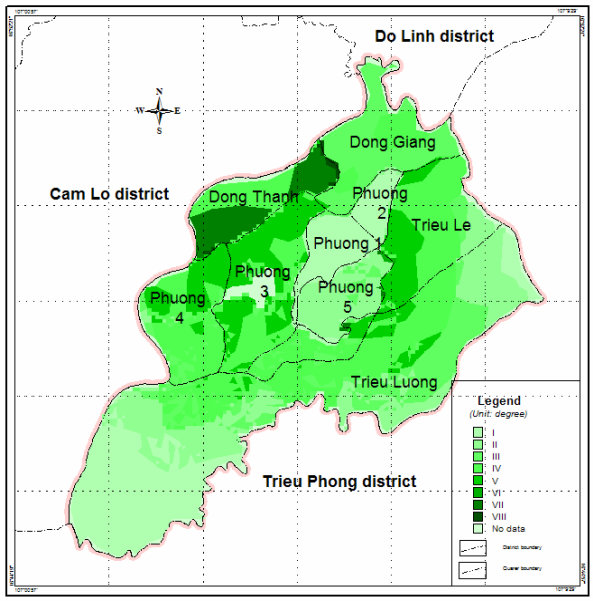


From this table, the total area (the 2nd column) and percentage (the 3rd column) in different degrees of SD (from degree I to degree VIII) in Dong Ha town in 1998 are shown.

SD degrees are displayed also in map 1, range from degree I (very low sustainable) to degree VIII (very high sustainable). The illustration and justification of degrees is following:

- **Degree I:** it presented very low sustainable site, which occupied at Trieu Luong precinct (68.17%), Phuong 1 precinct (18.19%) and Phuong 2 precinct (9.45%). In Phuong 1, almost area of this precinct was the degree I (95.85%) and Phuong 2 (91.29%). In the mean of SD they could not high result of cultivation agriculture and other (utilities from school and health care centre) objectives. One of main reason at Trieu Luong precinct was heavily affected by flood at near Thach Han river place. But some of them were good option for commerce, service and tourism, for in stance, at Phuong 1 and Phuong 2 places.

Map 1. MAP OF SUSTAINABLE DEVELOPMENT - 1998
(Dong Ha town, Quang Tri province)



- **Degree II:** it presented low sustainable site and was high percentage (16.89%). Highest area of this degree was at Trieu Luong precinct (67.22%) and Phuong 5 precinct (23.23%). In Phuong 5, almost area of this precinct was the degree II (78.36%). Also, one of main reason at Dong Giang and Trieu Luong precincts were heavily affected by flood at near Thach Han river place. Utility levels in which an area were better than the degree I, but was still low.

- **Degree III:** it presented the very low moderate sustainable site, which was better than degree I and II situations about access to school, health care centre, and more available agricultural land, less affected by flood and soil erosion issues. Trieu Luong and Dong Giang precincts were occupied largest area of this degree, 43.65% and 37.96%.

- **Degree IV:** it presented the low moderate sustainable site. This degree was highest area of the case study 2,040.01ha (29.04%). We combine with all of them, the degree from I to IV was very lager area about 5793.97ha (82.48%) in the total.

- **Degree V:** it presented moderate sustainable site. From this degree, SD in the case study was an acceptable for aspects (e.g. access to school, health care system, available cultivation land, and less more soil erosion, flood effecting and among them). In Phuong 3 precinct was highest percentage rate (41.75%) in Dong Ha town. Unfortunately, in Dong Giang, Dong Than, Phuong 1, Phuong 2, and Phuong 5 precincts were almost zero percentage rate.

- **Degree VI:** it presented high moderate sustainable site. The same situation with the degree V, 7 precincts left of Dong Ha town were almost or zero percentage rate,

because only Phuong 5 and Trieu Le precincts occupied 59.15% and 40.85% of the total area of this degree. But unfortunately, this degree was smallest area about 5.56ha (0.08%) in the total area of Dong Ha town. This degree was more sustainable than the degree V.

- **Degree VII:** it presented high sustainable site. The same situation with the degree VI, this degree belonged to Dong Thanh precinct (96.93%). In point of SD view in aspects such as access to school, health care system, available cultivation land were good situation and development; beside that softly effected from soil erosion, flood, population growth and among.

- **Degree VIII:** it presented very high sustainable site. That means it was highest degree of SD issue in Dong Ha town. Unfortunately, this degree had very small area about 19.66ha (0.28%) and it was existed only 2 precincts as Dong Thanh (65.76%) and Dong Giang (30.24%). Even, if we combine with all of the degree from V to VIII was small area about 1230.99ha (17.52%) in the total.

In view of the foregoing, it will help and support local people, planning and decision-making to manage, develop economic and social and environmental issues, at least including education, health care, population density, soil erosion and flood in the case study.

4. CONCLUSIONS

Dong Ha town is the centre and the heart of Quang Tri province. It has been awarded the status in 1998 and will be came Dong Ha city in 2005. To date, Dong Ha's economy is more developed than other districts of Quang Tri province, but less developed than other towns and districts in Vietnam. Anyway, we can say that Dong Ha's economy is rising well from the ashes of the American war. Beside that, many issues need to be addressed as poverty, population growth, environmental pollution, and amongst others. To be the centre and heart of Quang Tri province, the continuous re-construction of Dong Ha is required for the economic development, and environmental prevention and environmental resources protection. This urgent action is required at present and in the near future sustainable for all aspects. Local people also would like to have a future development, in which an adequate improved living conditions, education, training, sustainable economic, good environment conditions, and among other.

SD is a unique social choice and as such extreme important for the case study area; and it relies on indicators or SDIs. SDIs are various statistical values that collectively measure the capacity to meet present and future needs (NASA headquaters website, 2003).

In view of the foregoing, for Dong Ha town it is necessary to establish a specific system to manage progress toward SD through a SDI's system. In addition, the author used GIS as a tool to apply for analysing and creating 6 sector maps (arable land per capita map, sustainability distance from health care centre map, sustainability distance from school map, flood area per person map, population density map, soil erosion map), which are based on 6 correlative SDIs; and then, 6 sustainable sector maps and a SD map were created from 6 above sector maps. Finally, a SD map was built from these sector maps by using GIS overlay analysis. The study gives an example of the application of a new method to SD based on SDIs.

The set of above indicators at the previous part, results of these sector maps and the SD map showing the "***picture***" of the present situation and the tendency of changing over time, in particular during the year 1996, 1998, 1999 and/or 2000 for planning and decision-makers as well as to support and provide them for policy making in right form, right place at right moment for the local people today and to the future by the following:

- *Aspects of sustainability (because the intensity of the target problems was reducing over time) included:* land use change (forest area, scrub, grass, and other land), poverty gap index, population growth rate, total fertility rate, primary school and secondary school enrolment ratio - gross, women per 100 men in the labour force, access safe water, immunization against infectious childhood diseases, life expectancy at birth, share of economic sector in GDP, GDP per capita, and main telephone lines per 100 inhabitants.

- *Aspects of un-sustainability (because the intensity of the target problems was increasing over time) included:* high soil erosion degree rate, arable land per capita, BOD_5 in water bodies, concentration of faecal coliforms in freshwater, unemployment rate, population density, and flood area per person.

- *Almost all institutional situations of this case study were weak,* such as programmes for local environmental statistics, programme of integrated environmental and economic accounting, mandated environmental impact assessment, and sustainable development strategies indicator. Unfortunately, some of them has been supported and helped by Quang Tri's DoSTE. Local people, they had only the accounting system for economic and social sectors. The economic and social sectors are extremely part of SD, but these are not enough at all. Consequently, may be it was only basis on short term of planning and decision - making.

As the recommendation, the aspects of sustainability have to be encouraged to develop; other side the aspects of un-sustainability have to reduced and reject eradication.

And last, but by no means least, through establishment of SDIs for the case study, situations and tendency movement were shown and indicated, that is right issue for planning, policy and decision-makers to follow SD point of view by put regulation and development forces. That means they always have to consider each situation and tendency of all aspects: socio - economic, environmental and institutional interrelationship.

5. REFERENCES

Alex, M., Candy, W. and Catherine, U., 1998. *Communities count! A step by step guide to community sustainability indicators*. New Economic Foundation, ISBN 1 899407 20 0, 163 papers.

NASA headquaters website., 2003. *Sustainable Development Indicators*. http://www.hq.nasa.gov/iwgsdi/Welcome.html.

Nath, B., Hens, L. and Devuyst, D., 1998. *Sustainable development*. 2nd edition. Brussels: VUB Press, Belgium, paper 184.

Quang Tri statistical office, 2001. *Statistic yearbook in 2000.* Quang Tri province, Vietnam, 192 papers.

Simon, B and Stephen, M. 1999. *Sustainable indicators: Measuring the immeasurable?* Earthscan Publications Ltd., London, England, 175 papers.

The people's committee of Quang Tri province., 2000. *Establish the environmental indicators of Quang Tri province*. Quang Tri, Vietnam, paper 83.

Phuc Tuan, T., 2000. *Sustainable development indicators system for Thanh Lan Island*. Human Ecology Department. Free University Brussels (VUB), Belgium, 74 papers.

Vietnamese land mines organization, 2002. http://www.vietnam-landmines.org/english.htm.