

THE VALUATION OF NATURAL RESOURCES

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ABSTRACT

Conservationists are frustrated with the deteriorating environment of today. Green pressure groups and pro-development advocates have both tended to pit economic growth in one corner against environmental concerns in the other. By asserting that there is a conflict between the objectives of economic growth and those of environmental protection, the protagonists have failed to see potential for mutual reinforcement.

Property Valuers of today can no longer afford to be mere by-standers when faced with the growing demands of the 'Greens'. It is for the Valuers to put forward the argument that, contrary to popular belief, economic growth, market systems and environmental improvements, can go hand in hand. As environmental resources become scarce, or less abundant, there is a greater need to use markets, prices and other devices from the Valuer's toolbox, since these are the proven mechanisms for dealing with the challenges of scarcity. In the context of Asean countries, Property Valuers have to play a bigger role in environmental matters mainly because of the fact that the environmental planning and legislation are still not as sophisticated as those in America or European countries. Issues such as the greenhouse effect and the problems caused by acid rain should now be the concern of present-day Property Valuers.

This paper aims to bring into focus the need for property valuers to be 'environmentally conscious'. It discusses the need for Valuers to place a value on the preservation of the natural environment. It examines the current methods of valuation of property with natural resources. It encourages valuers to evaluate the economics of environmental quality, to become a member of the emerging group of "green valuers."

Setting the Background

It was the former Prime Minister of England, Margaret Thatcher, who in 1988 said:

"No generation has a freehold on this earth. All we have is a life tenancy, with a full repairing lease."

This one statement turned the Iron lady into the Green Goddess.

If one is to reflect upon the statement, one will realize that, oft times, the present generation has acted selfishly in the use and development of land and property, with total disregard of the environment and thus created problems for future generations. There is now a noticeable shift of public opinion all over the world towards a greener and better environment for our future generations to enjoy.

The Kingdom of Thailand

In the Kingdom of Thailand, the Eighth National Plan (1997 - 2001) had focussed, inter-alia, on:

*"encouraging the proper use and care of natural resources and the environment to support the sustainable development of the economy, society and the quality of life."*¹

The Plan states that the environmental resources will be protected by rehabilitating forests to ensure coverage of at least 25% of the national landmass, creating opportunities in natural agricultural opportunities, in natural agricultural occupations such as organic farming, integrated farming, and agro-forestry, and investing in the resuscitation of the environment to raise the quality of life in cities and the countryside.

The current Ninth National Plan (2002 - 2006) has been described as a deepening of, rather than a departure from, the goals expressed in the previous Eighth National Plan and encapsulates a people-centric vision

¹"The Investment Environment in Thailand", June 1996, pp. 19, published by the Office of the Board of Investment, Office of The Prime Minister, Royal Thai Government.

of development for Thailand. This is meant to be complementary to the measures introduced to strengthen the economic and social foundations for long-term sustainable growth.

Whilst encapsulating a renewed vision of development promulgating increased participation and self-sufficiency, the Plan's priorities aim to alleviate many of the factors that have hindered an increase in the pace of economic recovery in 2000. The plan is explicit in the need for continued restructuring, particularly of the financial sector, and for improving the information technology knowledge base in Thailand to enable the country to assert its middle-income status.

A central pillar of the plan is good governance and the formulation strategy of the plan also reflects the importance of good governance and political reform. These issues are of equal concern to the Thai people as social and economic issues. Viewed crucially as an essential building block to sustainable development, the Ninth Plan emphasizes the growing significance of the role of civil society in the decision making process. Participatory planning approaches were widely applied during the formulation of the plan.

The Singapore Approach

Singapore's approach to environmental planning has been set within the framework of an urbanized society and the focus so far has been on

- a. the protection of established natural reserves and water catchment areas;
- b. the separation of industries from residential areas; and
- c. the provision of 'clean and green' environment for the population.

The prospects of further urbanization and depletion of existing natural environment has given rise to concern of a need for more rigorous environmental planning procedures as there is no single co-ordinating body which deals comprehensively and authoritatively with environmental planning matters. In addition, there is no systematic collection and sharing of environmental data amongst the various planning and development agencies. There is also no definite set of procedures that require implementation agencies and developers in Singapore to adhere to processes that ensure a high degree of environmental sensitiveness when undertaking major developments such as housing and infrastructure construction.²

Defining Natural Resource

A natural resource is anything produced naturally that is needed by a group of organisms. Fertile soil upon which to grow is one resource that people need in their environment. Other natural resources include fresh water and fuel for washing and heating respectively. People also need metals and other minerals, building materials like granite and sand, fibres to make clothes and air space.

Natural resources can be classified as either non-renewable resources, which can become depleted in time and renewable which, at least in theory, can last forever. Metal, sand and clay are examples of non-renewable resources while fresh water, air, soil, trees, crops and other living organisms are examples of renewable resources.

This Paper's Aim

This paper deals first with the valuation of land with natural resources generally, be they granite, limestone or fresh water and later with the need to consider the value of renewable resources in order that we can achieve the goal of environmental science - that is to have a sustainable world, a world in which human populations can continue to exist indefinitely with a high standard of living and health.

"Sustainable" is the key

A sustainable world is one that can go on indefinitely. This does not mean an unchanging world; it means a world containing enough of the things that people need to support human life forever. In practice, in a sustainable world, we would produce enough food each year to feed the human population, while keeping the soil fertile so that agriculture could produce just as much food in every future year. We would supply clean water to everyone, while ensuring that we would have just as much to use next year, by cleaning polluted water before returning it to the water supply or by using no more water than nature purifies each year. We would use energy, building materials, and minerals no faster than they could be produced so that our supply of these things would last forever. And then we would dispose of our wastes in such a way that the air remains fit to breathe, and no one has to live next to a toxic dump or an unsightly pile of plastic garbage.

²Conference paper entitled "Environmental Planning" presented by Malone-Lee Lai Choo at the seminar on "Environmental Issues in Development and Conservation"

The Valuation of Land with Natural Resources

The Valuation of Land

Land valuation is a familiar subject to most valuers.

In the case of vacant land, traditional valuers have used an array of analysis of market data such as:

- a. adjusted rates per square metre from asking prices;
- b. adjusted rates per square metre of standard depth tables;
- c. adjusted rates per metre frontage;

and so on, to provide evidence of market value within similar land usage zones. Where development of the land is envisaged, the traditional valuer will proceed to perform a residual analysis to justify the value of the land in spite of, or in addition to, market analysis.

These methods can produce fairly accurate estimates of land values so long as the environmental planning of the locality has been taken care of. In other words, the methods can only be used with certainty:

where the planning law has defined the land use for the area; and

where the environmental law has taken care of the possible ill-effects of soil erosion or of pollutants, and so on.

In the context of Thailand, however, the situation where proper land use planning and environmental control legislations are in place is at times absent, especially in property development projects outside the urban limits. Imagine a property valuer placing an opinion on the value of a piece of land next to a river only to find that the land disappears the very next month when the flooding period arrives.

Allowance for the Environment

Most valuers would allow discounting factors when faced with the valuation of an environmentally-sensitive property. Exactly how much of a discounting factor to allow has however not been subjected to any serious study. One can argue that the more a valuer allows for such a factor, the more he or she tends to be further from the "market" as it is basically the "unknowing" that determines "market values". This is where the 'Green Valuer' emerges. If the valuer can include an environmental impact study of the proposed development inside his or her report, the valuer would have no difficulty in justifying his or her valuation. An environmental impact study shows the expected impact of the development on the total environment including such issues as air quality, employment, energy consumption,

noise levels, vegetation, vehicular traffic, wildlife conservation and population density.

Land with Natural Resources

The traditional method of valuation of a plot of land with natural resources such as land for the mining of minerals is that of the profits approach. Whether it is mineral sands, uranium, diamonds, coal, iron or gold, mining has the potential of transforming mineral resources into commodities of considerable value. As such, the profits approach works on the principle of estimating the total profit flows that can be derived from the operation and capitalizing of such flows into a capital value. The basic sequence of the profits approach is as follows:

1. Determine the extent of the quantity of mineral resources that can be mined out from the property and the time frame within which the quantity is to be extracted;
2. Convert the estimated quantity into potential earnings within the time frame as cash in-flows;
3. Estimate the expenses to be incurred in the extraction process (including any possible government royalties imposed by law) in the form of cash-outflows;
4. Calculate the estimated cash positions on a monthly or yearly basis;
5. Convert the estimated series of cash incomes into a capital value using the discounted cash flow technique.

The 'Green Valuer' would additionally have to consider the environmental concerns associated with the mining process. How much of the landscape would be scarred? How would rivers and other pre-existing systems be affected? And, more importantly, what is the extent of the reduction in the values of those nearby plots of land, which are used for purposes other than mining? The Green Valuer would have to use cost-benefit analysis to assess the overall environmental impact of the mining process. He or she would have to recommend steps for the rectification of the land because mining has a history of leaving behind a legacy of degradation and destruction on the land.

Land Degradation

Land degradation is the adverse effects which various uses of land by man have on current and future services provided by land. It can be the consequence of mining as well as of farming. Decisions on grazing levels, on cropping practices, on irrigation and on clearing land, all designed to increase production and income, can result

in soil erosion, loss of soil fertility, salinity and other forms of land degradation.

The Green Valuer has to work out a framework for evaluating farm management decisions and government policies influencing land degradation. The emphasis should be on what should be done for the sustainable future and the cost of such actions allowed for in the present, as an expense of land development.

Cost-Benefit Analysis

Cost-benefit analysis is the systematic appraisal of all the benefits and all costs of a contemplated course of action in comparison with alternative courses of action. The central task in any cost-benefit study is to quantitatively estimate the costs and the benefits of various alternative actions to address a particular situation. This task is never easy when applied to environmental issues as it is difficult to place monetary values on items such as the degree of air pollution or the extent of failing health amongst the population. This area of valuation is relatively new to the green valuers who would have to, at least initially, rely on the works of environmental economists.³

The Cost of Pollution or The Value of Cleaner Air

The atmosphere is the life blanket of the earth, the essential ingredient for all living things. Air covers every part of the 200 million square miles of the earth's surface. In the course of a day, a single person breathes a large quantity of air in a constant automatic response to extract life-giving oxygen. The air is composed of 78 percent nitrogen, 21 percent oxygen and a small remaining 1 percent of various other gases such as argon, carbon dioxide, helium, hydrogen, krypton, neon and xenon.⁴

Pollution is the usual by-product of economic activity - whether it is acid rain, hazardous waste, oil-spilling tankers or a simply discarded beer bottle. Because of the fact that there is no global rubbish bin, it is normal to expect that the government of the day will make polluters pay for the waste or rubbish they dump. Green valuers will have to realize the benefit of say the separation of household refuse for recycling, not so much as to save raw materials but to avoid the high cost for somewhere to tip the refuse.

The consequences of deteriorating air quality

Some of the major identifiable economic effects of poor air quality are listed below so that green valuers can begin to think out ways of costing out possible remedies.

1. Human health effects.

The health effects of poor air quality elude efforts to place dollar value estimates on their damages. Loss of efficiency on the job due to air-pollution-related health effects is obviously a difficult item to measure, although it has been established that the presence of carbon monoxide reduces response time of the nervous system.

Sickness induced by air pollution may not be recognized as responsible for work days lost or above-normal absenteeism. Some on-the-job injuries and industrial accidents also may be attributable to air pollution although they are not recorded as such. In addition, there may be significant human health effects of persistent exposure to what is now believed as safe levels of air pollutants. Ideally, all of these items should be included in any dollar measure of the cost of air quality deterioration. Therefore, present estimates of these costs, however large they seem, must be accepted as only a rough under-estimate of the true human costs of air pollution.

2. Agriculture and air quality.

Agricultural damage to crops and livestock is a second major effect associated with poor air quality. There is considerable evidence to suggest that agricultural damage caused by air pollution is extensive. Ozone, for example, affects plant cells beneath the surface of the leaf and ultimately damages or destroys the plant. Studies have demonstrated that extensive ozone damage to agriculture crops exists. Sulphur dioxide in the atmosphere is taken into plants through the respiratory process and in combination with water naturally contained within the plant, becomes toxic to plant cells.

The harmful effects of air pollutants on agricultural activities cannot again be estimated accurately.

³Refer to Arnold, Frank S.'s book on "Economic Analysis of Environmental Policy and Regulation" published by John Wiley & Sons, Inc. 1995, for examples of Cost-Benefit Analysis of some interesting environmentally related cases, such as the Asbestos Products Ban, Options for Enhancing Used-Oil Recycling, Restrictions on Formaldehyde Use in Textiles Manufacturing and the Cancellation of a Pesticide Registration.

⁴Seneca, Joseph J. and Youssig, Michael K. "Environmental Economics", Second Edition, 1979, pp. 158.

3. *Property damages.*

Air pollutants are also responsible for extensive damages to property. The blackened facades of buildings in urban centres bear testimony to the presence of particulate, hydrocarbon and sulphur pollutants. This soiling causes cleaning expenditures considerably in excess of those that normally would be undertaken.

Air pollutants corrode, crack and weaken building materials. Ozone, for example cracks and breaks rubber and sulphur dioxide emissions can affect a wide variety of property from the hardest of materials such as iron and steel to domestic furniture, synthetic fabrics and clothing.

4. *Safety and amenity effects of air pollution.*

Air pollutants can be responsible for a number of automobile, air and industrial accidents. Decreased visibility due to smog and smoke condition contributes to the frequency of highway accidents. The cost of these automobile accidents in terms of lives, injuries and property should be included as an additional cost of air pollution.

The Value in Trees

It is no coincidence that the Eighth National Plan for Thailand states that rehabilitating forests to ensure a coverage of at least 25 percent of the national landmass should protect the environment resources. A carefully planned and structured move towards a more market based forest industry could achieve an improved balance of environmental and economic goals. By allowing owners of forest resources to trade-off competing forest uses at prices, which reflect real market values, including values placed on environmental amenities, a country can have both a more efficient timber industry and more environmental benefits.

The green valuers should advocate that forest management be aimed at balancing competing forest uses by factoring community valuations of timber, leisure amenities and other needs into decisions. The costs of deforestation should be recognized. Uncontrolled and unmanaged deforestation can lead to diminished rainfall, unreliable water supplies, soil erosion, silting rivers and harming dams.

Reforestation

Natural forests provide us with numerous resources, such as new species and varieties of organisms, and absorption of carbon dioxide produced by burning fossil fuel. At the present time, tropical forest is being

destroyed mainly to provide fuelwood and subsistence farms to support the rapidly growing population and cash crops for export. One of the most pressing problems in many developing countries is a fuel shortage caused by the unsustainable harvesting of wood that results from over-population. The depletion of wood supplies is the largest single cause of environmental degradation in most developing countries. It raises the cost of living and causes malnutrition and disease.

Conclusion

The value of all natural resources must surely increase as they become scarcer. The greater the public is aware of the importance of natural resources and the need for a sustainable environment, the more there is a need for property valuers to become 'green valuers'. The Royal Institution of Chartered Surveyors is promoting to its members the 'profession of the environment' and urging RICS members to consider how their work in the environmental arena can enhance the collective skills of the profession and its reputation for good practice. Caring for the environment has become the concern of Chartered Surveyors when they advise their clients on the life cycle of land, property and construction.⁵

This paper serves to highlight the need for property valuers to be conscious of the environmental concerns and to look into the need to consider the value of natural resources when performing their professional duties.

⁵CSM (Chartered Surveyors Monthly) Vol. 5 No 11 September 1996. "The Environment Business: New RICS Strategy"

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