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A MALAYSIAN NATIONAL CONSERVATION STRATEGY: BASED ON STATE CONSERVATION STRATEGIES

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ABSTRACT. — Stimulated by the appearance of the World Conservation Strategy in 1980, Malaysia embarked, after a period of intense socio-political, economic, technical and scientific development, on a process for developing a national conservation strategy. This was implemented at State level, as States have constitutional, legal and administrative power over land, water and other key natural resources. The State Economic Planning Units of nine States, with technical support from WWF Malaysia, completed conservation strategies in the period from 1981 to 1992, and a concluding National Conservation Strategy in 1993 covered all States together with the federal overview. This was a unique approach to the conservation challenges faced by a middle income country in the period leading up to the United Nations Conference on Environment and Development.

KEY WORDS. — conservation, Malaysia, National Conservation Strategy, World Conservation Strategy, sustainable development, science and development, WWF, IUCN, UNEP

INTRODUCTION

When *The World Conservation Strategy: Living Resources Conservation for Sustainable Development* was launched by the World Conservation Union (IUCN), the World Wildlife Fund (WWF) and the United Nations Environment Programme (UNEP) in 1980, with the support of the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Educational Scientific and Cultural Organization (UNESCO), Malaysia had reasonable capability as a lower middle-income country to initiate and undertake its own national conservation strategy for at least three reasons. Firstly, up to the 1970s, natural resources extraction and production (mainly tin, tropical timber, rubber and palm oil) formed the mainstay of an export-driven economy. Large-scale plantations for commercial crops (1876 – rubber, 1917 – oil palm, 1950s – cocoa) were supported by research centres established by the British colonial administration or planters associations which became institutionalised for agricultural, forestry, tropical medical and tin research in the early 20th century. While plantation, agricultural, forestry and tin research focused on downstream products for value-added exports, they also engaged in some pertinent environmental research. Plantation, agricultural and forestry research not only focused on new varieties and husbandry or farming systems adapted for local conditions (e.g., silviculture –

Wyatt-Smith, 1963; rubber – Edgar, 1960; Wycherley, 1964; Barlow, 1978; vegetables – Lim, 1972), they also addressed integrated pest and pathogen management techniques to optimise production (e.g., oil palm – Gillbanks et al., 1967; Wood, 1964, 1973, 1976; Wood & Liau, 1978; smallholder farms – Conway, 1972; vegetables – Henderson, 1957; Ho, 1965; Lim, 1974; Ooi, 1979a; rice – Balasubramanian & Ooi, 1977; Ooi, 1982). In this process, the Forest Research Institute of Malaysia (FRIM) and the Forest Departments of Sarawak and Sabah also acquired a good understanding of the structure and dynamics of tropical forests for extractive forest production on a sustainable basis (e.g., Wyatt-Smith, 1964, 1966; Brunig, 1969, 1977; Wong & Whitmore, 1970; Whitmore, 1975). The Institute for Medical Research (IMR), Malaysia had begun exploring reservoirs of zoonotic diseases in sylvatic and terrestrial cycles of tropical rain forests (leptospirosis, rabies, influenza, Japanese encephalitis, toxoplasmosis) (e.g., Harrison, 1962; Muul & Lim, 1970; Lim et al., 1977; Tan, 1981), to supplement its established research on vector-borne tropical diseases (malaria, filaria, dengue fever); and gained invaluable support from the Hooper Foundation of the University of California (San Francisco) in the early 1960s coinciding with the beginning of the Vietnam War. The Malayan Nature Society (afterwards the Malaysian Nature Society, MNS) functioned as the scientific association for biologists since its establishment in 1940.

Secondly, the University of Malaya established in 1949 but located in Kuala Lumpur in 1959 after Malayan independence, focused its research and teaching on topical issues unique to Malaysia and the humid tropics, often in collaboration with other academics, such as on plant communities (e.g., Poore, 1962), animal communities (e.g., Hendrickson, 1966; Medway, 1969, 1972; Medway & Wells, 1971; Collins, 1979), aquatic communities (Bullock & Furtado, 1968; Furtado, 1969; Bishop, 1973), natural resources (e.g., Jackson, 1969; Furtado, 1974, 1978, 1980a, 1980b; Aiken & Moss, 1975; Dunn, 1975; Fernando & Furtado, 1975; Barlow, 1978; Lee et al., 1979; Arumugam & Furtado, 1980, 1981; Kiew et al., 1980; Goh, 1982; Ho & Furtado, 1982), integrated pest management (e.g., Ooi & Sudderuddin, 1978; Sudderuddin & Kok, 1978; Ooi, 1979b; Lim, 1982), tropical medicine and health, and on socio-economic development (e.g., Silcock & Fisk, 1964; Ness, 1967; Lim, 1975, 1977, 1982; Nagata, 1975; Shamsul, 1983). It had established an ecology degree programme in 1965 based on natural resources and ecosystems research including integrated pest management, on the advice of Professor John Maynard-Smith, FRS; and played a pivotal role in the International Biological Programme (IBP) studies on comparative biological productivity in 1968–1972 in Southeast Asia by undertaking ecosystem studies at Pasoh Forest in Negeri Sembilan and Tasek Bera in Pahang with support mainly from the Royal Society, London, the Japan Science Council and the Japan Society for the Promotion of Science, involving British and Japanese scientists (e.g., Mori & Kira, 1973; Yoda, 1974; Ashton, 1976; Matsumoto, 1976; Soepadmo, 1978; Wells, 1978; Mori & Furtado, 1982). Participation of the University in this international research programme was possible in the absence of a national research council or a national academy of science, through the support of the Forest Department, which had the concurrent mandate with the States for the terrestrial environment, and the Forest Research Institute of Malaysia and the Economic Planning Unit, and through the initiative of the Chief Secretary of the Government in the Prime Minister's Department who signed the international agreements on behalf of the government. Much of this topical and resource orientation was replicated somewhat in new and emerging Malaysian universities post-1970. Apart from the Malayan Nature Society, the late 1960s and early 1970s also saw the emergence of grass-roots environmental movements coinciding with enhanced environmental understanding among the public, driven by large-scale deforestation for agriculture and land development schemes, and localised pollution from industries, both of which displaced rural communities, affected agricultural and rural livelihoods and water supply, and caused flood and landslide hazards affecting infrastructure especially in urban-industrial complexes. Some emerged well before the 1972 Stockholm Conference (the United Nations Conference on the Human Environment) when the human environment emerged on the political map. These civil society organisations included the Environmental Protection Society of Malaysia (EPSM), the Consumers Association of Penang (CAP) and the Friends of the Environment Malaysia (SAM), besides the Malaysian Nature Society (MNS); and were instrumental in promoting public environmental awareness (Ramakrishnan, 2002). Although originally staffed by professionals, even expatriates, these organisations attracted and recruited grass-roots members from all social groups, became fully indigenous, and began coordinating their activities when the 1977 Endau-Rompin conflict of interests occurred between the Pahang State and Federal governments over forest exploitation and conservation (Kathirithamby-Wells, 2005; Hezri & Hasan, 2006).

Finally, Malaysia as a federation of States with a parliamentary democracy and constitutional monarchy structured on the Westminster model began pioneering a consultative mechanism for promoting socio-economic development planning and implementation between Federal and State governments, besides electing a Paramount Chief (King) from among the nine hereditary State Sultans. Such a consultative mechanism was necessary not only to assess the aspirations and constraints of different classes of stakeholders, but also to facilitate governance since the Federal Government was the focal point for all external aid and development assistance: Each State under a Sultan or Governor had exclusive traditional jurisdiction over its terrestrial and coastal natural resources, while the Federal Government had exclusive jurisdiction over off-shore, oceanic, atmospheric and space resources, with the environment being joint responsibility. This traditional jurisdiction was later enshrined in three lists of Federal, State and concurrent areas of responsibility under the Constitution. Malaysia had adopted a serious approach to development planning with a combination of functional Five-Year Plans, underpinned by perspective plans and visions, and long-term socio-economic research and monitoring to enhance the livelihood and development of its multi-ethnic and plural society by growing and transforming the economy

to meet changing demands. From the very beginning, the Five-Year Plans were monitored regularly by the Cabinet (especially the Deputy Prime Minister) literally using 'Red Books' to record progress made against plans with information submitted by District Officers, and to project this visually and geographically for easy comprehension by policy- and decision-makers: The initial thrust on Rural Economic Development (RED) leant its name to the 'Red Books' since the first reforms after independence addressed rural poverty (e.g., 1964). Later, Operations Room Techniques (ORT) based on information technologies (e.g., Puthucheary, 1970) were used to monitor progress of Plans, underpinned by implementation coordination. This functional planning approach was founded on upright political leadership, good public sector management capability especially at the District level where information had to be inputted (e.g., Esman, 1972; Chee, 1974), and on clear political objectives and targets both for perspective visions and Five-Year Plans. In the 1970's, there was urgency to restructure the economy under the New Economic Policy (NEP) due to racial tensions in a plural multi-ethnic society, so as to eradicate poverty, de-link ethnicity and class from employment, and restructure the economy including business ownership. The NEP envisaged making Malaysia an emerging middle-income country and a net donor of aid by doubling and diversifying the economy within 20 years (1970–1990) through industrialisation and skills enhancement (e.g., Freedman, 1960; Fisher, 1966; Leinbach, 1975; Young et al., 1980). Malaysia participated in shaping UNESCO's Man and the Biosphere (MAB) Programme especially on tropical forests in the early 1970s, attended the 1972 United Nations Conference on the Human Environment (UNCHE or the Stockholm Conference), and developed an environmental focus in the Third Five-Year Plan (1975–1980) with support of the World Bank, which resulted in the establishment of a Department of Environment (DOE), a Ministry of Science Technology and Environment (MOSTE), and a National Council on Science and Technology for Development (MPKSN) under the chairmanship of the Cabinet Secretary.

ORIGINS OF THE MALAYSIAN CONSERVATION STRATEGY

The global context. — The World Conservation Strategy (WCS) (IUCN, UNEP & WWF, 1980) emerged from the UNESCO Conference on the Scientific Basis for Rational Use and Conservation of Resources of the Biosphere, in Paris in 1968 (known as the 'Biosphere Conference') (UNESCO, 1969), organised in collaboration with the World Conservation Union (IUCN) and the International Biological Programme (IBP) under the auspices of the International Council of Scientific Unions (ICSU) (1964–1974). The WCS had three objectives, namely:

(a) To maintain essential ecological processes and life-support systems on which human survival and development depend, including soil regeneration and protection, nutrient recycling, and water quality protection;
(b) To preserve genetic diversity on which depend the functioning of many of the ecological processes and life-support systems, the breeding programmes necessary for the protection and improvement of cultivated plants, domesticated animals, and microorganisms, as well as much scientific and medical advance, technical innovation, and the security of the many industries that use living resources; and
(c) To ensure the sustainable utilisation of species and ecosystems which support millions of rural communities as well as major industries.

It marked a significant turning point in the approach towards nature conservation: From a fragmented approach focused on charismatic or threatened species and protected areas at the local level that was somewhat divorced from socio-economic and natural resources development, the WCS promoted the integration of nature conservation with mainstream socio-economic planning and natural resources development at the local, national and global levels. In so doing, the WCS codified for the first time the concept of sustainable development, which was later adopted politically by the Brundtland Commission and the United Nations; and changed the agenda of the conservation movement, especially the World Conservation Union (IUCN) and the World Wide Fund for Nature and their affiliates, from one of rearguard actions to one of pro-active eco-development working with central planners and policy-makers.

The WCS approach, integrating nature conservation with socio-economic and natural resources development, or sustainable development, included three significant innovations to the concept of nature conservation:

(a) Firstly, it conceived nature conservation as an ethical imperative based on the intrinsic and existential value of nature for the interests and welfare of present and future generations, as Adam Smith had articulated two centuries earlier. This ethical element is central to sustainable development pathways even if the latter is too elastic for implementation and needs considerable research to elucidate linkages. It prevailed in the Oriental philosophical enlightenment of the Vedas, Lao-tze and Kung-fu where balance and harmony were sought between Man and Nature through a combination of the subjective and objective modes, but was absent in Cartesian or European enlightenment where Nature was subjugated by Man for an objective reality.
(b) Secondly, it encouraged opinion-makers (the media, civil society and professional experts, especially conservationists) to assume responsibility and deliberately influence decision-makers (politicians, senior government officials, and private entrepreneurs) concerned with socio-economic development at local and national levels, so as to counter-balance this with conservation or environmental and social safety nets. This convening power is perhaps the strongest point of sustainable development as an ethical concept; but it has serious constraints in biodiversity-rich environments as in the tropics where complex networks (biocoenoses) are susceptible to collapse with the slightest of perturbations.
(c) Finally, it treated ecosystems and biodiversity collectively forming the biosphere as a global public good ('global

common property') shared by all on planet Earth, but managed at local and national levels ('sovereignty' under the Treaty of Westphalia), and dependent on the sharing and transfer of knowledge, skills and resources to meet conservation costs and to attain effective outcomes for both the local and global community. This biospheric approach introduced a new dimension to planetary governance and benefit transfers that has yet to be realised within the nexus of nation states, transnational organisations, and social and private enterprises.

The change in approach towards nature conservation, namely conceiving the biosphere and biodiversity as a global public good, emerged mainly from international coordinated ecosystems and conservation research under the auspices of the International Biological Programme (IBP) (Worthington, 1975), the concept of autopoeisis underpinning the organisation of life and ecosystems (Maturana & Varela, 1973) and the Gaia perspective of Earth (Lovelock & Margulis, 1974), reinforced by space exploration.

Preliminary results from the International Biological Program studies presented at the UNESCO Conference on the Scientific Basis for Rational Use and Conservation of Resources of the Biosphere, in Paris in 1968 (Biosphere Conference) (UNESCO, 1969) (a) demonstrated, among others, the comparable productivity of some agricultural systems to their natural ecosystem counterparts, such as between rubber plantations and tropical rain forests, and wet rice fields and alluvial swamp forests; (b) introduced the ecosystems approach for analysis of biocoenoses; and (c) pioneered large-scale international biological studies calibrating different levels of methodology and strengthening local capability (Cooper, 1975; Worthington, 1975). The Conference reinforced previously articulated concerns about over-utilisation and exploitation of scarce natural resources and environmental degradation in tropical and sub-tropical countries rich in biodiversity (UN, 1950), due to several factors, notably limited carrying capacity, human population pressures, and poor terms of trade post-independence when they had exclusive sovereignty over nature and natural resources under the Treaty of Westphalia.

Review of IUCN's and WWF-International's experience in implementing the WCS in several developing countries in the 1980s, identified at least five factors which these countries perceived as important for promoting sustainable development or integrating nature conservation with development planning through their National Conservation Strategies (Halle & Furtado, 1987):

(a) For two decades, international development in developing countries under the auspices of the United Nations had promoted sectoral economic growth and industrialisation using 'Western' resource-consumptive models successfully developed for the temperate zones, but which had failed to internalise environmental externalities, such as the impacts on fragile biodiversity-rich ecosystems or on nutrient-poor soils in the tropical and sub-tropical zones.
(b) Development assistance from the industrialised countries had emphasized the continuance of export-driven economic and industrial growth in developing countries to satisfy metropolitan markets, but had failed to address the questions of wealth distribution and quality of life, and governance and corruption, besides environmental protection and biodiversity conservation at the national level in these tropical and sub-tropical countries.
(c) Institutions in tropical and sub-tropical developing countries possessed inadequate human and technical capacity to absorb, adapt and integrate technologies transferred from the industrialised countries, resulting in 'inappropriate' technologies, 'white elephants' or poor operations and maintenance of technologies transferred, or in societal disruptions, displaced communities or environmental and natural resources degradations.
(d) Extensive and intensive forms of natural resource transformations in developing countries to meet the needs not only of their growing populations but, also, of metropolitan economies for raw materials had begun to reveal 'sudden' ecological or environmental hazards (e.g., degradation, pollution, pestilence, epidemics, extinctions) arising from breakdown in complex and fragile linkages in tropical and sub-tropical ecosystems, some of which were beginning to show dispersed regional effects (e.g., cholera, vector-borne haemorrhagic fevers).
(e) Advances in sciences (e.g., molecular and space sciences) and sophisticated technologies (e.g., information and bio-technologies), and international research co-operation (e.g., undertaken for the first time in ICSU's International Biological Programme (IBP) on comparative biological productivity during 1964–1974) had demonstrated the potential for bridging the cleavage in knowledge and technological capability between the industrialised and developing countries, by focusing collectively on the specific problems of the global environment.

These factors also highlighted the marked differences in natural, technical and socio-economic endowments and capabilities between the industrialised (mainly temperate zone) countries and the developing (mainly tropical and sub-tropical zone) countries. Such differences were perceived a threat not only to the functioning of transnational corporations and emerging globalisation, but also to the management of the biosphere as a global public good.

The Malaysian context. — The WCS provided an ethical and intellectual framework, and practical guidelines, for promoting nature conservation within the context of socio-economic development, or for balanced or sustainable development, at national and provincial levels, that recognised nature or biodiversity as providing the 'source' of human livelihood and the 'sink' for its wastes, and demands on its transformation by a growing human population for industrial diversification and security. The three principal entities issuing the WCS, namely, IUCN, WWF and UNEP, had each briefed their constituent members or counterparts in countries, urging them to explore the implementation of the WCS nationally: In Malaysia, the constituent members included the Malaysian Nature Society (MNS) and the Department of Wildlife and National Parks (DWNP) for IUCN, WWF Malaysia for WWF International, and the

Department of Environment (DOE) for UNEP. In the absence of any government-sponsored initiative, the then Executive Director of WWF (Malaysia) saw an opportunity for applying the innovative WCS approach integrating conservation with development in Malaysia, since it had a proven track record in raising conservation funds and executing conservation projects, albeit on spectacular species or unique habitats; and sought the opinion of professional experts at the University of Malaya who had undertaken ecological, nature conservation and natural resources studies and management, to assess the feasibility of a National Conservation Strategy (NCS) project in Malaysia. WWF (Malaysia) was the only environmental NGO then with the capacity to organise and fund teams to tackle issues on nature conservation; and this opportunity provided it a challenge to raise its profile, status and function in nature conservation. In view of potential competing interests for such a NCS project at the national level from affiliates of IUCN and UNEP, and the predominance of government initiatives and control in all sectors at the time (including higher education) (i.e., pre-privatisation in the 1990s), this initiative by WWF (Malaysia) was treated confidentially and delicately during its incubation phase.

Natural resources approach. — The professionals at the University of Malaya consulted confidentially with the few experts engaged in nature conservation, and ecological, geographical and natural resources research, development and management to assess the feasibility of undertaking a National Conservation Strategy in Malaysia based on the WCS. Malaysia had reasonably good but scarce professional expertise in natural resource development, research, management and planning, albeit including expatriates; and a strong governance structure harmonising socio-economic development initiatives between the Federal and the State levels (including regional and district levels) through the implementation of functional Five-Year Plans set within perspective plans and policies. The States had jurisdiction over terrestrial and aquatic natural resources up to the 12-mile coastal limit, while the Federal government had concurrent jurisdiction over the environment and exclusive jurisdiction over the Exclusive Economic Zone (EEZ; 200 mile limit) of the sea, and over atmospheric and space resources. A fairly good information base prevailed on Malaysian nature and natural resources in the form of maps, reports, surveys or in-depth studies. Furthermore, academic researchers had established good links with sectoral, regional, State and Federal government agencies and institutions in view of the scarcity of professional researchers at the time, and the premiere role played by the University of Malaya in development research. The natural resources approach seemed the only option for initiating the NCS process since information was available on a geographical basis, a geographical approach fostered engagement of relevant experts and stakeholders including sectoral agencies, and since geographical presentation made decision-makers visually aware of potential synergies, constraints and conflicts regarding environmental and natural resources use, as in the National Operations Room with the RED book data. Although the natural resources approach was a significant departure for WWF (Malaysia), experts involved received sufficient support from it to draft an outline of a Malaysian NCS project for further consideration.

State approaches and strategic support. — At the time, the relationship between the States and the Federal government was being realigned and restructured to accommodate changing emphases in socio-economic development, including Special Economic Zones (SEZs) for export-oriented manufacturing and Regional Development Agencies (RDAs), both of which were Federal-sponsored; the States regulated most of the natural resources forming the backbone of resource-intensive industries; and the Department of Environment and the Ministry of Science Technology and Environment as Federal agencies were in their organisational infancy. After discrete confidential consultations by WWF (Malaysia) trustees familiar with political sensitivities in Malaysia at the time, the State-by-State approach emerged as the best way to initiate implementation of the WCS, eventually followed by development of an overall Malaysian NCS. The NCS approach itself was a departure for WWF (Malaysia), which until then had been concerned with conserving iconic threatened species (e.g., tigers) and critical ecosystems (e.g., coral reefs). The States approach received strategic support not only from WWF (Malaysia) trustees, but also from the Ministry of Science Technology and Environment (MOSTE), the Chairman of the National Council for Scientific Research and Development (MPKSN), and the external key financiers of the Malaysian NCS, namely, WWF (International) and the Malaysian Conservation Development Fund (MCDF) under the Treasury. WWF (Malaysia) had committed a major part of its finances towards the Malaysian NCS, and had developed a co-financing arrangement for it with WWF (International). The Malaysian Conservation Development Fund (MCDF) had amassed a significant sum of money in the Treasury from the Malaysian Wildlife Coin Collection, with the support of WWF (Malaysia), which the then Minister of Finance thought fit to allocate towards the Malaysian NCS on a cost-sharing basis. The Federal or State Governments of Malaysia were not asked initially to contribute financially to the NCS process, but contributed in kind and in supporting the studies in each State. The Sarawak State Government provided free accommodation to the officer working on the Sarawak State Strategy from 1984–1985. The concluding Malaysian NCS undertaken by the Economic Planning Unit with technical support of WWF (Malaysia) was financed by the Federal Government.

IMPLEMENTING THE MALAYSIAN NATIONAL CONSERVATION STRATEGY

Learning methodology. — The novelty, challenges and uncertainties posed in formulating a Malaysian NCS precluded the use of any known template or ready-made solution to explore the interface between nature conservation and socio-economic development. An adaptive socio-ecological management approach was therefore adopted de novo to explore relevant sets of information available, discover links, understand the critical synergies and constraints between socio-economic development trends and environmental and

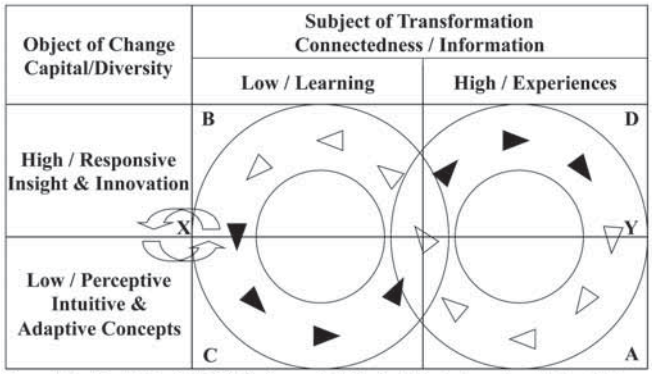
natural resources conservation, and to make recommendations for balanced or sustainable development policy formulation. Such a learning-by-doing approach had been pioneered by Holling (1973, 1978) to manage insect pests of spruce plantations and later applied to environmental and natural resources management (Walters, 1986; Homer-Dixon, 1999). It simulated the stimulus-response processes in behaviour of sensory perceptions, neural coordination, integration and learning, and motor responses; and the asymmetrical development and adaptation of natural ecosystems to perturbations, somewhat along a horizontal figure-8 like a Mobius ring, that enables these organic systems to appropriate resources through saturation, competition, differentiation (adaptive radiation) and association and mutualism, thereby acquiring greater connectivity and innovation, amass capital and infrastructure, transforming from 'open' to 'closed' systems with respect to external selection pressures, and acquiring resilience towards external and internal threats. It consists of four (4) phases of dissimilar duration and oscillation per asymmetrical cycle, with two points of interface, depicted in Fig. 1 and summarised in Tables 1 and 2:

Point 'Y': Sensory perception of mosaic decay or perturbations, changing 'client' demands, or opportunities for resource transformation or development and conservation; and consequential experiential and systemic response to it;

Phase 'A': Systemic and collective sensing and understanding of perturbations or decay, changing 'client' demands, or opportunities; and 'creative destruction' of existing structures and connectedness where deficient ('selection pressure'), so as to realign the balance of resource transformation or development and conservation;

Phase 'B': Re-organising resource transformation or development and conservation with insights, new information and innovations to rectify deficiencies perceived in structures and connectedness; and deconstructing assumptions, transcendental 'beliefs' or the status quo;

Point 'X': External consultations, information inputs, and knowledge retrieval to enhance conceptual and functional meaning to innovations between deconstructive Phases 'B' and reconstructive Phase 'C';



Source: Adapted from Holling, C. S., 1973. Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, **4**: 1–23; Holling, C. S. (ed.), 1978. *Adaptive Environmental Assessment and Management*. John Wiley & Sons, London.

Fig. 1. Learning and Transformational Change Processes for Developing Capital and Connectedness.

Phase 'C': Reconstructing 'states' or mosaics realigning the balance of resource transformation or development and conservation based on new functional and conceptual meaning for the adaptive response needed; and

Phase 'D': Designing new systemic approaches or relationships and reframing new mosaics or 'policies' to match the perceived demands for realigning resource transformation or development and conservation.

Adaptive management involved consultative and participatory learning and successive approximation, and was labour-intensive and time-consuming. It comprised traversing phases at different velocities: Phase 'C' to 'D' was labour and skills-intensive, and took the longest time—for example, the Project team needed to review volumes of information and reports in collaboration with each State government, and sometimes with Federal government departments and other experts, to identify the synergies, constraints and conflicts between socio-economic development plans and environmental and natural resources conservation, so as to elaborate a draft report with meaningful decision-making alternatives for review and consideration. Phase 'A' to 'B' was fairly quick even though the Project team needed intensive consultations with technical experts to reorganise and restructure the methodology and/or the report to meet demands articulated by the State or Federal government (i.e., the client). Initially, the demands of State and Federal agencies were often vague, since nature conservation was a novelty to public administrators, even though a chapter on the environment had been incorporated in the Third Malaysia Plan with the support of World Bank consultants, and did not generate a revenue stream similar to resource exploitation or production: Learning thus challenged both parties. At two points in each asymmetrical cycle the project's work was challenged, and demanded further refinement. At the end of Phase 'D' (Point 'Y'), concepts and products developed by the Project team were presented to the State or Federal government officials for consideration, review and advice; and at the end of Phase 'B' (Point 'X'), external inputs were sought in confidence to the outputs and products developed from national and international professionals and institutions engaged in sustainable development, so as to reform the process and/or report to meet the client's perceived needs. Such a consultative and socio-ecological approach enabled the Project team, and indeed all stakeholders involved, to learn much from experiences and make adjustments as necessary.

Implementing the States approach. — The Malaysian NCS project was undertaken under the auspices of WWF (Malaysia), and necessarily entailed bi-cameral consultations and discussions: At the Federal level, principal consultations undertaken and commitments sought consisted of the following in accordance to the learning approach outlined above (Fig. 1) and summarised in Table 1:

1. Support for the Malaysian NCS project concept from WWF (Malaysia), based on an outline developed in consultation with professional experts;
2. Approval for the Malaysian NCS project by WWF (Malaysia) trustees together with suggestions on ways forward, financing and logistics;

Table 1. Malaysian National Conservation Strategy: National Approach.

Structure / Diversity	**Connectedness & Information**	
	Low / Learning	**High / Experiences**
High Responsive & Innovative	**(B) Deconstruction & Re-Organisation:**	**(D) Systemic Design & Reframing:**
	1B: Revise NCS project concept to address WWF-Malaysia comments & submit for external expert review	1B: Present NCS project concept to WWF-Malaysia Board for review
	2B: Present revised NCS project brief to international & national bodies for financing & support	2B: Present final NCS project brief to WWF-Malaysia for approval & views on way forward especially approach, financing & logistics
	3B: Recruit technical personnel for NCS project team, acquire equipment & ensure financing & logistics	3B: Receive financial & technical support commitments for NCS project from international & local bodies, suggesting States followed by Federal approaches
	4B: Project team develops strategy to approach (pilot) States for initiating a State CS (see: Table 2)	4B: WWF-Malaysia reviews NCS framework for the State-by-State approach, & identifies pilot States
	5B: After each SCS, Project team uses its experience to re-organise approach for the next (pilot) State CS (see: Table 2)	5B: After each SCS, Project leaders brief WWF-Malaysia, & local/international financing/ supporting bodies on progress made
Low Perceptive & Adaptive	**(C) Reconstruction & Novel:**	**(A) 'Collective' Sensing & 'Creative Destruction':**
	1C: Draft NCS project concept together with local experts, in response to WWF-Malaysia	1A: WWF-Malaysia trustees make comments on NCS project concept & indicate firm interest
	2C: Draft NCS project brief to include expert inputs & options for State-by-State vs. Federal approach	2A: Revise NCS project brief together with WWF-Malaysia & finalise for internal & external presentation
	3C: Review potential financial & technical commitments to NCS project by international & local conservation & financing bodies	3A: Review State-by-State NCS approach especially with respect to financial, manpower & logistical implications
	4C: Project team adapts NCS framework for State-by-State approach	4C: Project team finalises NCS framework & methodology for State-by-State approach
	5C: After each SCS, Project team reviews experiences gained & lessons learned	5C: After each SCS, Project team reviews suggestions from local & international supporting institutions

Iterative cycles: 0 1 2 3 4 State NCS (Table 2) 5 State NCS 5 / Repeated till completion of all State CS
Phase sequence: X C D Y A B / Repeated over next cycle

(X) External Influences, Inputs/Outputs or Effects: (between Phase 'B' and 'C')

0X: WWF Malaysia explores feasibility of developing NCS in Malaysia, after briefing by WWF-International, a co-author of the WCS, and approaches UM experts on ecosystems, wildlife conservation, and natural resources management research (and also WWF Board members) to consider Malaysian NCS project outline

1X: Local and international technical experts review draft Malaysian NCS project outline especially with reference to Federal vs. States approach, confidential consultations with Federal sectoral vs. cross-sectoral agencies (EPU, MOSTE), technical approach and feasibility (WWF, IUCN, UM), and potential financing (WWF, MCDF/Treasury)

2X: Draft Malaysian NCS project document reviewed in confidence by Federal institutions with respect to State-by-State approach (EPU, MOSTE), technical feasibility (WWF, IUCN) and potential financing (WWF, MCDF); State-by-State approach viewed as best option in prevailing climate of tension between State and Federal governments before undertaking a Malaysian NCS

3X: Recruitment and briefing of NCS Project team for the NCS initially on a States basis; Project team develops methodology and approach based on the use of overlay techniques for reviewing, and identifying synergies and constraints between, sectoral and regional development plans and natural resources and nature conservation data;

4X: Project team consults national and international technical experts to re-organize and refine the NCS brief, and the methodology used in the State-by-State approach

5X: Project team collates its experiences after each SCS, consults with national and international technical experts, and revises its methodology and approach for use in the next SCS

Table 2. Malaysia National Conservation Strategy: States Approach.

Structure / Diversity	Connectedness & Information	
	Low / Learning	**High / Experiences**
High Responsive & Innovative	**(B) Deconstruction & Re-Organisation:** 1B: Revise SCS plan & method to address needs & priorities for decision-making by State Executive 2B: Review draft SCS report for further data collection & analysis, & restructuring 3B: Review experiences gained in developing the SCS report & use it to reform plans & methods for approaching the next (pilot) State	**(D) Systemic Design & Reframing:** 1D: Present outline SCS Project and plan to State Secretary & Executive in confidence for review & comments 2D: Present draft SCS report outline in confidence to State Secretary & Executive for review & comments 3D: Present revised SCS report to State Secretary & Executive (or Assembly) for review & adoption
Low Perceptive & Adaptive	**(C) Reconstruction & Novel:** 1C: Approach each State Secretary with a NCS brief for developing a SCS, starting with using Pilot States 2C: NCS Project team works with State EPU to review sub-regional, interregional & sector reports & data using overlays to mark potential synergies & conflicts between development & conservation objectives 3C: Finalise SCS report with additional data & analysis to meet priority needs & concerns articulated	**(A) 'Collective' Sensing & 'Creative Destruction':** 1A: Review & clarify comments & suggestions by State Executive on SCS outline plan 2A: Note & clarify in confidence State Executive observations on inter-sectoral and/or regional synergies & potential conflicts between development & conservation objectives & priorities 3A: Refine & finalise SCS report on basis of feedback at presentation to the State Executive, & present it to the State

Iterative cycles: 0 1 2 3 / Federal consultations / 0 1 etc.
Phase sequences: X C D Y A B / Repeated for next cycle

(X) External Influences or Inputs/Outputs: (between Phases 'B' and 'C')

0X: Specific influential WWF-Malaysia trustees make contact with each State Secretary to explore an opportunity for briefing on the NCS Project under the aegis of WWF-Malaysia; NCS Project team prepare a SCS Project Brief and outline methodology for presentation to the State Executive

1X: National and international technical experts consulted to review, reorganise and revise SCS plan and methodology to meet needs of and work with each State EPU

2X: Draft SCS report restructured & finalised in confidence in consultation with national and international technical experts

3X: Experience gained in developing and formulating each SCS used to refine plans, methodologies and approaches used in the next (pilot) State

3. Financial and technical commitments for the Malaysian NCS project from local and international institutions, beginning with State Conservation Strategies (SCS), and this included WWF (International) and the Malaysian Conservation Development Fund;
4. Support for the Malaysian NCS framework using the SCS approach and identification of pilot or next States.

WWF (Malaysia) trustees, who had political connections in certain States, facilitated identifying and engaging with government officials in the respective States. The States identified for piloting the SCS were small or not heavily industrialised; and consisted initially of Negeri Sembilan, Melaka, Trengganu, Kedah and Perlis. The WCS and the objective of the SCS were explained to each State Secretary and State Executive to secure their invitation, commitment and support to undertake the State project. The SCS approach was potentially attractive for each State since it was in their planning and decision-making interest, did not incur any State financial outlays, and was undertaken for them by WWF (Malaysia) in confidence at their invitation. The initial focus on small States provided a distinct advantage for the Project team and WWF (Malaysia): namely, it afforded them the opportunity to learn about the ramifications of the dynamics between socio-economic development, State-Federal governance and nature conservation; test and gain experience about methodology and implementation; and to use this experience to refine the SCS approach and methodology when engaging especially with larger and/or more industrialised States and territories. Unknown to the Project team at the time, such a State (or Provincial) approach was being initiated independently in Canada and Australia, where somewhat similar Federal-Provincial or State relations prevail as in Malaysia; elsewhere, the NCS approach was strictly top-down involving the central government, and usually undertaken by foreign consultants.

At the State level, principal consultations undertaken and commitments sought from the State government consisted of the following in accordance with the learning approach outlined above (Fig. 1) and summarised in Table 2:

1. Invitation and support for a confidential SCS project and plan from the State Secretary and State Executive, and facilitation of the Project team working closely with the State Economic Planning Unit (SEPU);
2. Consideration by the State Secretary and State Executive of a draft SCS report outlining balanced conservation-development alternatives;

3. Adoption of a revised SCS report by the State Secretary and State Executive.

Initially, the Project team envisaged each SCS to last 6–8 weeks so that the NCS for Malaysia could be completed within 18–24 months. However, the first State approached, namely Negeri Sembilan, desired a detailed and not a cursory assessment of development-conservation synergies, constraints and conflicts to facilitate its decision-making, since its SEPU had amassed a room-full of State, sector, regional and inter-State reports on socio-economic development potentials and plans, largely undertaken by foreign consultants and financed by overseas development assistance or grant aid. The State needed to find alternative pathways for socio-economic development that were realistic, and balanced nature conservation interests among the myriad of development proposals it had received. Demand for such detailed work was encountered in all other States where the SCS was undertaken. Each of these demands was conveyed to the financial supporters of the Malaysian NCS, and the Project proceeded with their support and commitment in each State. As a consequence, the State-by-State approach lasted ten to 12 years: Negeri Sembilan (1982), Melaka (1983), Trengganu (1983), Kedah (1984), Perlis (1984), Sarawak (1985), Selangor (1988), Federal Territory of Kuala Lumpur (1988), Kelantan (1991), and Sabah (1992). These 10 States (including one territory) covered almost 70% of Malaysia's land area. No SCS was undertaken for the States of Penang, Perak, Pahang or Johor, although an integrated natural resource management strategy was initiated for Johor in 1992. By 1990 there was both logic and pressure to compile a Malaysian National Conservation Strategy and overview. This was driven by several factors including the build-up to the UN Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992 ('Rio Summit'), in which Malaysia played a significant role, the change in dynamics between Federal and State considerations mentioned earlier, the demand for Malaysia to engage more with international processes due to globalisation and global conventions which only the Federal government was legitimately able to undertake, and the emergence of Malaysia as a middle-income country and a net donor of aid. As a result the four remaining States of Penang, Perak, Johor and Pahang (amounting to 30% of Malaysia's land area) were not addressed separately, but their concerns for integrating nature conservation were incorporated into the Malaysian National Conservation Strategy (1991–1993).

For each State, information additional to that possessed by the SEPU was gathered from State or Federal departments, university staff or other sources, so as to explore all aspects of the multi-sectoral interface between socio-economic development plans and potentials and environmental and natural resources conservation. Each SEPU facilitated agency contacts within the State. Some field visits were made to specific sites where potential conflicts were envisaged to verify the situation on the ground. The development-conservation overview formed the basis of each SCS report; and was presented to the State Secretary and State Executive for consideration and review. It was refined further in confidence to address the concerns or perspectives of the State officials so that the consultative process resulted in a final product that was perceived meaningful for the State for decision-making on balanced, sustainable development. Experiences gained in each State were discussed in a debriefing of trustees at WWF (Malaysia), and used in preparation for the next State and to garner further support and funding. Relevant Federal agencies were briefed confidentially on progress made with the State-by-State approach (Table 1).

For each State, the Project team reviewed the potential qualitative effects of proposed socio-economic development plans on natural ecosystems and the environment, both as 'sources' of natural resources for socio-economic transformation and as 'sinks' with the carrying capacity to absorb wastes and residues (Fig. 2) (e.g., Wackernagel & Rees, 1996), using as far as was possible a catchment or watershed approach since most States were based on a catchment or watershed basis. The review focused essentially on natural or environmental capital, without engaging intensively with the other four forms of capital critical for sustainable development: namely, human or social capital, political or institutional capital, technological or infrastructure capital, and economic or financial capital. The team examined those other issues that linked to the state of natural and environmental capital they were reviewing, but did not have the breadth of expertise or the resources to review the other dimensions of sustainable development in Fig. 2, namely the political (e.g., Paehlke, 2003), social (e.g., Sen, 1999) and economic (e.g., Elkington, 1998) aspects undertaken by each State Economic Planning Unit with whom they collaborated. The potential effects of socio-economic development plans (and hence policies) on natural ecosystems and the environment were reviewed strategically and qualitatively (as in strategic impact assessment, SIA, or strategic environmental assessments, SEA) in relation to ecosystem services (e.g., de Groot, 1992). Impacts whether point source, linear, dispersed or delayed in nature were assessed for the changes they effected on natural ecosystems and the environment, namely positive or negative distortions, displacements and irreversibilities. Particular attention was given to assessing irreversibilities because of the unique structure and function of mature 'closed' tropical forest ecosystems, especially in a mega-biodiversity region like Malaysia, where few species are dominant and most are rare and where dominant species change randomly with spatial distribution except along clinal gradients, such as a river course. Some ameliorative measures suggested in terms of provisioning, regulating, cultural and supporting ecosystem services in the State Conservation Strategies undertaken are outlined in Table 3.

Achievements and lessons learned. — The SCS proved useful generally for each State, enabling it to reconcile environmental and natural resource conservation with socio-economic development plans so as to attain sustainable or balanced development objectives. Furthermore:

1. The iterative consultative (or successive approximation) process sensitised the State government officials on the role of nature conservation in long-term balanced or sustainable development, especially in terms of their unique heritage of biodiversity-rich and 'closed' ecosystems in the Malaysian tropics and the fragility of these ecosystems to large-scale or intensive perturbations.
2. The integrated outline structure provided for viewing all sectors (a 'holistic' approach), reviewed strategically inter-sectoral impacts of socio-economic development plans on environmental and natural resources endowments, and resulted in State-specific observations, recommendations and reports.
3. Each State gained new insights on its potentials and constraints for decision-making among alternatives for its socio-economic development plans in relation to its environmental and natural resources endowments.
4. Each State Conservation Strategy (SCS) was able thus to focus on the priority concerns of the State, so that the State Secretary and State Executive could seek further clarification of constraints and alternatives before considering and making decisions in confidence on planning approvals.
5. Some States, like Sarawak, took proactive steps at implementing the recommendations, such as amending the Natural Resources Ordinance with the assistance of the SCS officer.
6. Local research professionals (and associated stakeholders) gained some understanding through the SCS process about macro-ecological and socio-economic development dynamics at the State level (i.e., the interactions between spatial, resource, transformation-conservation, and distribution systems involving and managed by different entities) and internalise it in terms of long-term objectives, even if the science of environmental economics, natural resources accounting and environmental risk assessment was then in its infancy.
7. The State Secretary and State Executive in most States were able to hear the SCS presentation by the Earl of Cranbrook, whose fluency in the Malay language, understanding of its culture, and field experience in Malaysia and Indonesia accorded him the status of an adopted son ('anak angkat'); and to learn first-hand of similar experiences in environmental policy and management at British and European levels through his membership of the United Kingdom's House of Lords Select Committees.
8. At no point in this exercise did WWF (Malaysia) undertake a formal review of the outcomes of the recommendations specific to each State; and it would be surprising to have found small or resource-poor States delaying implementing recommendations due to internal complexities or difficulties. Nevertheless, WWF (Malaysia)'s general satisfaction with the SCS process and its elevation in status enabled it to co-sponsor the Malaysian NCS at the Federal level undertaken by the Economic Planning Unit in the Prime Minister's Department. This Federal overview was able to review the progress and further expectations of each State (see below).

Malaysia was already in a fortunate development position during the State-by-State NCS process for at least two reasons:

(a) By then, it had consolidated small farms for improved productivity, and promoted rural industrialisation to alleviate poverty and diversify rural employment (e.g., Aziz, 1964; Fredericks, 2012), alongside the commercial export-oriented plantations (mainly rubber, oil palm) established under British colonial rule. This involved

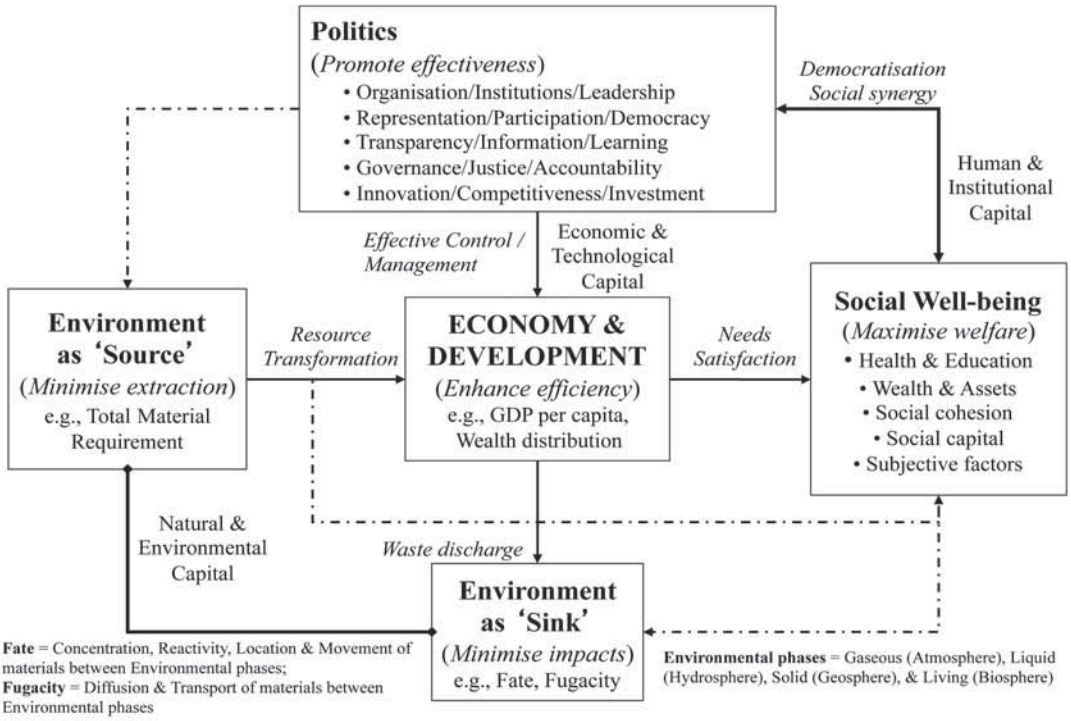


Fig. 2. Analytical Framework Reviewing the Effects of Development Interventions on Environment and Nature Conservation.

Table 3. Ameliorative ecosystem services measures in land use in the Malaysian National Conservation Strategy.

Ecosystem Services	**Ameliorative Measures in Land Use**
A) Provisioning: Food, water, fuel, fibre, fodder, medicines, genetic resources	
Primary Produce	– Multiple-canopy tree plantings on deforested & degraded lands to produce niche primary products (foods, fibres, oils, resins, alkaloids) – Additional Virgin Jungle Reserves for conservation of gene pools, potential genetic improvement of crops – Reduced Impact Logging (RIL) e.g., Kedah, Kelantan, Negeri Sembilan, Perlis, Sabah, Sarawak, Selangor, Terengganu CS
B) Regulating: Climate, hydrology, pest/pathogen control, waste & pollution control	
Radiation & Temperature	– Vegetation cover & multiple-canopy tree plantings on deforested & degraded lands to reduce radiation reflection, enhance transpiration, & provide shade & air circulation & cooling
Rainfall & Humidity	– Vegetation cover & multiple-canopy tree plantings in deforested & degraded lands, especially on steep slopes, to reduce high rainfall impacts especially of Monsoons on soil erosion, land slides & surface water flows, & enhance ground water storage & aquifer recharge – Protection of moss/cloud forests on highland ridges, & protective forest cover on sloping lands, to ensure perennial water supplies e.g., Kedah, Kelantan, Negeri Sembilan, Perlis, Sabah, Sarawak, Selangor, Terengganu CS
Floods & Inundation	– Flood plain & wetland retention/creation for water storage, flood control, groundwater recharge & nutrient capture – Retention of forest cover within River Reserves – Joint protection of water courses flowing from one State to another and along borders between States e.g., Perlis CS, Negeri Sembilan, Sabah CS
Salinisation & Acidification	– Mangrove, *Nipah* & Coconut palm and *Pandanus* tree retention/planting in coastal zone for rehabilitating saline soils – *Melaleuca* ('Gelam') tree retention / planting in tidal freshwater deltas to prevent iron toxicity in acid-sulphate soils e.g., Terengganu CS, Selangor CS
Storm Surges & Tsunamis	– Mangrove forest & *Pandanus* tree retention/planting on exposed shores to protect against storm surges or tsunamis e.g., Kedah, Kelantan, Sabah, Sarawak, Selangor, Terengganu CS
Pollination & Biological Control	– Forest/vegetation fractals & mosaics retention/planting of sufficient size (a) to promote biological control of pests & pathogens, & (b) to enable pollination of agricultural crops – Adaptive inter-cropping & integrated land-water husbandry systems – Additional Virgin Jungle Reserves for pollination & vector control – Creation of buffer zones around conservation areas – Retention of forest corridors – Specific biological control recommendations (e.g., barn owls for rats) e.g., Kedah, Kelantan, Negeri Sembilan, Perlis, Sabah, Sarawak, Selangor, Terengganu CS
C) Cultural: Spiritual & religious, aesthetic & recreational, inspirational, educational, attachment/belonging, heritage	
National / State Parks	– Protection of unique geological formations (e.g., limestone formations, quartzite ridges), & natural forests/ecosystems with unique or rich biodiversity to enhance heritage, educational & inspirational values – Protection of unique nursery grounds (e.g., turtle nesting beaches) – Protection of limestone caves of religious/spiritual significance & housing bat-pollinators of durians (e.g., Batu Caves), or of archaeological significance & providing roosts for birds-nest swiftlets (e.g., Niah Caves) e.g., Limestone formation & caves – Kelantan, Sarawak, Selangor, Kedah, Kelantan, Sabah, & Terengganu CS; Turtle beaches – Terengganu CS
Recreational Parks & Gardens	– Mixed tree planting mosaics in deforested & degraded lands in rural & peri-urban areas to enhance recreational & educational values – Woodland plantings in large open & degraded lands in urban & peri-urban areas to enhance recreational & educational values – Establishing additional parks & recreational forests e.g., Kuala Lumpur & Perlis CS
D) Supporting: Soil formation, nutrient cycling, primary production, organic decomposition	
Soil Formation	– Vegetation cover & multiple-canopy tree plantings in deforested & degraded lands, especially steep slopes, to enhance soil formation, & reduce soil erosion, land slides & topsoil loss & siltation – Minimal tillage & contour cultivation of agricultural crops e.g., All State CS
Nutrient Cycles	– Vegetation cover & multiple-canopy tree plantings in deforested & degraded lands, especially along drainage systems, to reduce nutrient leaching, & enhance nutrient capture, water retention & siltation – N-fixing vegetation & tree planting to enrich nutrient-poor & weathered tropical soils – Adaptive inter-cropping & integrated land-water husbandry systems retaining water in wetlands & recycling organic wastes to conserve scarce nutrients & recharge groundwater – Controlled fertiliser application on agricultural crops e.g., All State CS

establishing quasi-government organisations (e.g., RISDA – Rural Industries Smallholders Development Authority) to provide smallholders the management and technical infrastructure necessary for competing alongside large-scale commercial ventures.

(b) By then, it had promoted land and regional development schemes to commercialise and integrate rural agriculture and industries for export-oriented merchandise, to introduce new innovative development models within States, and to absorb surplus rural labour by relocating mainly youth (e.g., McTaggart, 1969; Chee ,1974, 1995; Wafa, 1974; Bahrin & Perera, 1977; MacAndrews, 1977a, 1977b; Jackson & Ruden, 1979; Hamid et al., 1987; Bahrin et al., 1988; Salih & Young, 1988; Jomo & Ng, 1996).

Land and regional development schemes potentially threatened nature conservation by the scale of their deforestation and intensity of land conversion, and associated environmental impacts due to intense solar radiation and precipitation in the humid tropics and catastrophic biodiversity loss in 'closed' mature ecosystems. However, Malaysia's socio-economic growth also witnessed a succession of policy interventions promoting structural reforms and economic diversification that targeted improving the livelihood of disadvantaged communities, education and skills enhancement, labour mobility and industrialisation. Malaysia envisaged becoming a net donor of aid by the end of the New Economic Policy (NEP), and a fully developed country under the New Development Policy (NDP) and Vision 2020.

Some of the key phases of its industrialisation strategy (e.g., Lim, 1987; Kanapathy, 1995, 2001; Lall, 2001; Tham, 2004; Lai & Yap, 2004; Vicziany & Puteh, 2004; Balakrishnan, 2008) include:

(a) Export-oriented manufacturing in special economic zones (SEZs) in the 1970s by providing terms and incentives, infrastructure support and cheap labour for attracting foreign investments and relocation of transnational corporations, for the assembly of imported raw materials and components (mainly electrical and electronic goods, textiles and garments): While this intervention absorbed surplus rural labour and generated valuable foreign exchange, it generated local pollution threatening ecosystem integrity and biodiversity, and resulted in little technology and skills transfer. However, it did stimulate labour mobility and skills enhancement.

(b) Import-substitution in the 1980s by encouraging the establishment of small and medium-sized heavy industries to diversify and deepen the industrial sector and strengthen indigenous technological capabilities (e.g. cars, motor-cycle engines, iron and steel, cement, petroleum refining and petrochemicals, pulp and paper): While capital-intensive industries with a long gestation period demanded initial protection and spear-heading by the public sector, they were later privatised.

(c) Market liberalisation in the late 1980s and 1990s continued the export-led industrialisation process, promoting local content in existing resource-based industries, diversifying non-resource-based industries, and encouraging technology transfer: This was supported by substantial incentives in areas of comparative advantage, and technology parks for R&D support and technology transfer.

These varied policy interventions enabled information and technology acquisition, expanded the service sectors, diversified human resources capability at tertiary and technical levels, strengthened R&D in priority areas, upgraded infrastructure, and enabled establishment of public investment funds. Coincidentally, the production of off-shore oil and gas were coming on-stream during this period and Malaysia benefited from massive investments from north-east Asia in the 1990s. Malaysia was the 10th fastest growing economy during 1970–1990, and benefited from social heterogeneity (Snodgrass, 1995) harnessing the complementary capabilities of various ethnic communities. While primary industries (agriculture, forestry and mining) dominated the Malaysian economy in the 1960s, they formed only 9% of the GDP by 2000 with light industries contributing 71% of the GDP. Manufacturing also dominated exports and employment.

States could thus afford to take some different critical decisions emanating from development-conservation conflicts in their SCS report, where it mattered. For example:

1. 'Downstream' industrial processing of natural resources for export markets, and diversification of the economy based on attracting and establishing secondary manufacturing and tertiary service industries, relieved pressures in all States from 'exploiting' natural resources for the export of raw materials, and thereby provided them the freedom to consider longer-term development options.
2. Where demands on water abstraction from a shared river, such as in east Negeri Sembilan, were being considered independently for industrialisation by three States (namely, Negeri Sembilan, Pahang and Johor), the State Secretary (in this case of Negeri Sembilan) was able to convene an inter-State Committee to rationalise the use of the shared waters: This was especially pertinent for east Negeri Sembilan since it was a unique drought-prone area of peninsular Malaysia, lying in the rain-shadow between two mountain ranges (the Main Titiwangsa Range of Peninsular Malaysia shading the northeast Monsoon, and the Barisan Range of Sumatra shading the southwest Monsoon).
3. Where new revenue streams were expected to be generated from the extraction and transhipment of natural gas for exports, and where timber prices were projected to double within 15 years, as in the State of Terengganu, the State was able to ban issuing further logging licenses on the East Coast Mountain Range (Pantai Timur Range) so as to capture higher rents in future.
4. Where the climate was seasonal and sub-tropical enough to threaten critical water supplies, as in the most northern State of Perlis, land use planners took special precautions to safeguard the catchment for the newly constructed Timah Tasoh Dam for its water supply network.
5. Where indigenous sensitivity and capability had been established, as in the northern State of Perlis, the State was able to revive its interest in SCS after an interval

of several years, create a new post in the State EPU, second staff from the State Forestry Department, and create a new State Park along the international border with Thailand, protecting nationally important limestone formations and creating a north-corridor to facilitate response to climate change.

6. Where strong indigenous capability prevailed, as in the State of Sabah, the State was able to establish a new Environmental Conservation Department within the then Ministry of Tourism and Environment, together with changes to the State legislation, and house the Sabah office of WWF (Malaysia) within the Sabah Wildlife Department, later a Ministry, facilitating a close and cordial relationship and synergy between government and non-governmental organisations.
7. Where special attention was necessary for safeguarding coastal fisheries and aquaculture, and value added in retaining forest fragments together with strong indigenous capability, as in the State of Selangor, the State government was able to collaborate with non-governmental organisations (especially the Malaysian Nature Society) to create the Kuala Selangor Nature Park in the coastal estuarine mangroves, and the Selangor State Park covering a swathe of dryland forest at the foothills of the Main Range (Titiwangsa Range) and including quartzite ridges.

A full a posteriori review and evaluation has never been undertaken and would still be fascinating in order to verify and track the implementation of these decisions at the State level.

In the process of undertaking the State-by-State NCS, the following lessons were learned about opinion-makers (professional experts and civil society organisations), like WWF (Malaysia), interacting with public decision-makers (State and Federal government agencies) in shaping the implementation of socio-economic development policies with a nature conservation (or 'green') agenda. These seem pertinent for societies in transition towards an advanced industrialised economy, where the levers of democracy and participatory governance are not fully developed; and are presented in Table 4. In summary, the lessons are:

1. Cherish the rare opportunity to make a difference and contribute a nature conservation perspective to development planning;
2. Reinforce client (State) ownership of the strategic process (SCS);
3. Ensure client confidentiality in working with its institutions (SEPU);
4. Maintain a low public profile in the strategic process (SCS) for freedom to explore alternatives;
5. Be sensitive to higher level (Federal-State) political relations;
6. Consult iteratively at all (State/Federal) levels to secure the facts and understand the context;
7. Instil awareness of long time-frames necessary for attaining sustainable development;
8. Avoid a template approach to developing a strategy (SCS);
9. Use some essential building blocks to craft a strategy (SCS);
10. Gather information in all critical areas needed for a strategy;
11. Facilitate confidential expert participation;
12. Promote inter-sectoral consultations and harmonisation;
13. Be aware of the dominance and capability of economically-productive sectors;
14. Be aware of the limits to trade-offs;
15. Review the robustness of regulatory frameworks;
16. Design mechanisms to resolve resource use conflicts;
17. Be aware of the role of market and social enterprises in implementing a sustainable development agenda;
18. Be prepared to transfer responsibility to collaborators (and even rivals) in the interests of very long-term, iterative and multifarious implementation of a sustainable development agenda.

At the time of the State-by-State approach to the Malaysian NCS, IUCN and WWF (International) were assisting developing countries, mainly in Africa, with technical assistance to formulate a single NCS working with central governments, and executed mainly by foreign consultants. The Malaysian NCS approach, based on States, was treated somewhat gingerly as being not quite national, since a National Conservation Strategy had not then materialised and took a decade to be framed. However, as international non-governmental organisations (INGOs), these institutions had limited experience at the time of the extent that development plans were being implemented and internalised in developing countries: where about a third (mainly middle-income countries) had functional development plans, about another third (mainly low-income countries) had development plans to attract development assistance, and the final third (mainly the highly-indebted poor or the least developed countries, HIPC) had no development planning capacity. While many countries with an NCS have been unable to make good use of it, Malaysia was able to use the States approach to formulate an overall Malaysian NCS.

OVERALL MALAYSIAN CONSERVATION STRATEGY

The State-by-State approach to the Malaysian NCS occurred during the Fourth (1981–1985) and Fifth (1985–1990) Malaysia Plans; and the SCS of nine States were completed through the auspices of WWF-Malaysia. The States approach to balanced development received some indirect support in the Fifth Malaysia Plan (1985–1990) where the importance of environmental protection and conservation was recognised in relation to natural resources over-exploitation, environmental degradation and pollution emissions. In 1986, a Seminar on 'Conservation for Development' was co-sponsored by the Economic Planning Unit (EPU), the Science Adviser's Office (SAO) in the Prime Minister's Department, the Department of Environment (DOE) and the Institute for Public Administration (INTAN). It was endorsed by the Federal government, and assisted the State governments to achieve their environment goals. The Sixth Malaysian Plan (1991–1995) included a chapter on environmental concerns, especially the efficient management of environmental

Table 4. Malaysian National Conservation Strategy: Lessons learned.

NCS Areas	Lessons Learned in Framing Advice on Sustainable Development or Nature Conservation Policies
1. Rare Opportunity	– Cherish the rare opportunity to provide confidential advice at State/National levels (or even to the private sector); and safeguard it from insensitive behaviour by team members, leakage of privileged information, or from inflexible approaches
2. Client Ownership	– Reinforce 'ownership' by clients of the process and outputs in framing advice at State/Federal levels, even if they be nascent 'clients', by listening to, verifying and articulating their real needs, through iteration or successive approximation, differentiating between skills, technology, institutional and policy needs, with the last perhaps being the most difficult to address
3. Client Confidentiality	– Respect the confidentiality of the client's data and reports provided for analysis and discussion in framing advice at State/Federal levels
4. Low Public Image	– Maintain a low, publicity-averse image in framing advice for clients at State/Federal levels, avoiding potentially-embarrassing media attention, for maximum freedom to explore alternatives before arriving at approaches best suited, especially if publicity has been the modus operandi for raising funds for the Civil Society Organisation
5. **Political Relations**	– Be aware of political relations between the States and the Federal government when designing realistic approaches to frame advice for clients
6. Iterative Consultations	– Adopt an open-ended, iterative, consultative and learning approach with clients at State/Federal levels, to ensure a close fit or approximation in framing advice and the client's perceived and articulated needs
7. Long Time-frame	– Be aware that framing advice for clients at State/Federal levels is a never-ending process, even if clients need to make/show public/Cabinet declarations to satisfy international development partners, since such policies need follow-up complementary (e.g., climate adaptation) or supplementary (e.g., sectoral) strategies, and since every development innovation creates 'space' for natural exploitation and saturation, thereby impinging on current levels of sustainability or conservation
8. Template Approach	– Avoid applying a fixed outline of issues at the interface between development and conservation like an isomorphic template in framing advice at State/Federal levels, so that processes and products address the client's needs and are 'owned' by them
9. Building Blocks	– Use development planning approaches familiar to clients in framing advice at State/Federal levels based on three building blocks: (a) Socio-economic development and nature conservation profiles; (b) Analyses of socio-economic development demands on nature and natural resources, and conservation constraints; and (c) Mechanisms for assessing risks, making trade-offs and consensus-building
10. Information Needs	– Be aware that framing advice at State/Federal levels may need data along the following lines: (a) Social – e.g., population & demography, skills & capabilities, health & welfare, institutions & management capacity, social crises; (b) Economic – e.g., livelihoods & employment, innovation & enterprise, capital & finance, services & manufacturing, technology & infrastructure, crises; and (c) Environmental – e.g., nature & natural resources, supply & demand, environmental degradation, natural hazards
11. Expert Participation	– Facilitate confidential participation by professional experts in framing options on prospects and limits at State/Federal levels, while sensitive to the needs for other civil society, public and corporate participation
12. Sectoral Integration	– Engage and involve all sectors in framing and reviewing integrated alternatives for advice at State/Federal levels, especially around infrastructure, technology and culture, so that the product is not viewed as an outline of 'environmental' limits to socio-economic development
13. Economically Productive Sectors	– Be aware that economically productive sectors dominating socio-economic development at State/Federal levels may show little concern for social and environmental limits and safeguards, and hence for advice in the short-term, but possess perhaps the best capacity to address issues relevant to their futures
14. Trade-off Limits	– Outline to clients at State/Federal levels the differences between long-term and short-term goals (e.g., interests of different peoples, different environmental outcomes, distortions, displacements, irreversibilities) for making informed choices on stewardship advice, since 'win-win' trade-offs are rare, and usually exclude or underestimate negative social and environmental externalities
15. Regulatory Frameworks	– Design advice on adaptive regulatory frameworks at State/Federal levels since prevailing socio-economic integration at regional and global levels ('Globalisation') erodes independent national or sub-national capacity to balance economic, social and environmental choices
16. Resource Use Conflicts	– Design mechanisms at State/Federal levels for resolving conflicts on shared resources use when undertaken independently, based on benefit transfers and sharing when framing advice
17. Policy Implementation	– While implementation of advice initially depends on economics (e.g., choices, risks, trade-offs) at State/Federal levels, its future relies on engaging social enterprises and markets with political vision, emotion, passion and imagination
18. Strengthening Indigenous Capability	– Be prepared to hand over or allocate responsibility for framing advice to interested or competing public, private or civil society organisations, in the interest of strengthening indigenous and local capability for very long-term, iterative and multifarious implementation

and natural resources stresses for balanced or sustainable development. It provided the opportunity for reviewing the initiatives in the SCS on conservation and development, and for promoting conservation of environmental and natural resources for balanced or sustainable socio-economic development at the Federal level. The Malaysian NCS was formulated in 1991–1992 under the umbrella of the Economic Planning Unit (EPU) and with technical support from WWF-Malaysia. It involved widespread consultations with the States, sectoral agencies and professional experts to identify consensus on principles, strategies and actions using an integrated multi-sectoral (or 'holistic') approach. These are documented in four reports outlining an Executive Summary and Strategy (EPU, 1993a), Administration (EPU, 1993b), Critical Areas of Environment and Natural Resources (EPU, 1993c), and Natural Resource Accounting (EPU, 1993d). The Malaysian NCS combined expertise from some 14 organisations, with sectoral background papers prepared by 25 specialists from academia, industry and non-governmental organisations. In the course of the work, the EPU organised workshops in all 13 States and the Federal Territory, each chaired by the State Economic Planning Unit and including the main government agencies in each case. Following these introductory workshops, data were compiled from and in collaboration with the agencies in every State.

New planning tools were promulgated through the Malaysian NCS. Land use statistics were compiled and analysed using a Geographical Information System (GIS) with assistance from the University of Malaya. Natural resource accounting was introduced as an economic planning tool in collaboration with Harvard International Institute for Environment and Development (IIED), Universiti Pertanian Malaysia (now Universiti Putra Malaysia, UPM) and the Institute for Strategic and International Studies (ISIS). While the organisations preparing the NCS were by no means the first to introduce these tools, their use during the NCS meshed well with the rising global and national sophistication of conservation planning techniques.

Pragmatic new relationships and working methods were forged between government and non-governmental organisations throughout the 1980s and 1990s, a trend within which the NCS fitted. NGOs have been increasingly consulted, both on a contractual basis for particular studies and through public feedback channels. After completion of the NCS, Malaysia entered into a relationship with the Danish Cooperation on Environment and Development (DANCED), with cross-fertilisation of ideas between the two governments, consultants and NGOs from both countries. Malaysian NGOs organised themselves under MENGO ('Malaysian Environmental NGOs') as an umbrella representative. Increasingly there have been career movements by individuals in both directions between government and NGOs.

For NGOs, another tangible benefit has been the training of a generation of conservationists, exposed to a wide range of administrative, development, economic and legal issues beyond the traditional role of nature-based organisations. Thus, when more recent national issues arose, government and NGOs were already well placed to collaborate on topics such as timber certification, ecotourism development, access to genetic resources and fair and equitable benefit-sharing, wetlands policy, and national assessment of the status of biological diversity.

POSTSCRIPT

In the course of implementing the NCS in Malaysia during 1980–1992, it became obvious that the concept of sustainable development was imprecise and elastic, even though sustainability originated as a scientific concept in natural sciences to assist managers in resource (population) harvests and conservation in relation to biotic potential. Sustainable development was defined by the Brundtland Commission (WCED, 1987) in several ways, and was accepted politically by the United Nations resulting in its strong convening powers. Its major constraints lie in:

(a) The accountability and internalisation of environmental externalities, when techniques for valuing ecosystem services are dependent generally on a scarcity value and hence need considerable refinement, and when externalities are being constantly generated by differences in knowledge and competing interests in heterogeneous societies;
(b) The difficulty in making trade-offs between inherited natural capital (ecosystems, biodiversity, and the biosphere) and synthetic capital (economic, technological, institutional and social) especially in biodiversity-rich ecosystems (e.g., tropical rain forests, coral reefs) where most species are rare and stenotypic, resulting in their accompanying irreversible extinction; and
(c) The challenges to governance of the biosphere as a global public good, especially when policy and decision-makers have short-term horizons and international governance is still based on nation states and out-of-date voting patterns.

Every innovation in knowledge, skills, organisation, infrastructure and economy or exchange by individual, social and corporate enterprises is bound to generate some level of perturbation to the relationship between humans and nature. While nature-based and human-centred philosophical and religious traditions have attained a balance in this relationship through trust and social capital in homogeneous societies (Olson, 1982; Ostrom, 1990; Fukuyama, 1995; Das Gupta & Serageldin, 1999; Gardner, 2008), such a balance does not prevail in heterogeneous societies due to competing interests, resulting in environmental and social externalities. Furthermore, such a balance has shifted dramatically in societal transitions from being matrifocal to patriarchal that accompanied settled agriculture and urbanisation about five thousand years ago, changed understanding about life (from enjoying the sacred to enduring suffering), ultimate power (from a mother-goddess promoting nurture to a paternalistic God demanding obedience), the role of humans (from the role of the woman as giver of life and healer to the role of the man as ruler and punisher of life), and cosmic or 'spiritual' connectedness (from providing knowledge and wisdom to providing exploitation and sacrificial death)

(Richard Hames, pers. comm.). With globalisation, it seems difficult if not impossible to revert to philosophical or religious states prevailing in somewhat homogeneous ancient civilisations as suggested by Ratna Roshida & Zainal Abidin (2010). Sustainable development is thus a long-term goal needing constant review, appraisal and re-adjustment and involving innovative instruments, open discourse and mutual learning. Some guiding principles are available for attaining this long-term goal (Hardi & Zdan, 1997; DAC, 2001; World Bank, 2005); however, even these are framed from a Western objective approach to reality and overlook the subjective. Malaysia is uniquely poised between the East and the West to forge an enlightened future of its own making. Its comparative advantage in the long-term may well lie, among others, in exploring the bio-engineering possibilities of its mega-biodiversity heritage in emerging recreation and lifestyle, sports and entertainment, and security and infrastructure mega-industrial complexes.

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