

SOLID WASTE MANAGEMENT IN MALAYSIA AND ECOLOGICAL MODERNIZATION THEORY PERSPECTIVE

SITI AISYAH SAAT

Faculty of Social Development, Universiti Malaysia Terengganu, 21030, Kuala Terengganu, Terengganu.

**Corresponding author: s.aisyah@umt.edu.my*

Abstract: This paper addresses the evolution, nature and appropriateness of the national waste management system in Malaysia in terms of its capability to meet sustainability goals. It does this by adopting the concept of ecological modernisation as a reference for analysing the policy and institutional structures that control waste management and sustainability policy. It examines the relevance of the institutional dimension of the ecological modernisation theory to the Malaysian context and non-western countries generally, and to the particular characteristics of the waste management system. The nature of waste generation, flow and management is outlined and found to be complexed. The methodology reflects this complexity by investigating the institutional organisations and by testing the understandings and attitudes to sustainability and action of all the actors in the waste management system namely policy makers, local authorities and individuals. In this study, the theory of Ecological Modernization is found to be a partially satisfactory approach to explaining the policy and institutional organisations but it does not in Malaysia provide answers for future policy intervention or indeed readily identify the direction of previous policy development. The National policy system of Solid Waste Management (SWM) in Malaysia needs a transformation of institutional structures and role of government to deliver sustainability policy of Solid Waste Management (SWM). Thus, in order to deliver sustainability national policy of solid waste the Malaysian government has to take some actions to shift the institutional structures of Solid Waste Management (SWM) and improve the Solid Waste Management (SWM) system in Malaysia. The role of government has to become more open and flexible to deal with complexity social of Solid Waste Management (SWM) in modern societies. The government also should consider waste management as one of its target field in the policy for sustainable national development. To set up a national waste policy and guidelines, sustainable approach and commitment should be introduced in Malaysia.

KEYWORDS: Solid Waste Management (SWM), sustainability, Ecological Modernization Theory (EMT).

Introduction

In 1990, the idea of ‘sustainability’ had grown out of concerns about global environmental pollution and degradation. In one form, sustainability is recognition that, without intervention, the global environment will not be able to provide a reasonable standard of living for future generations. In the now famous Brundtland definition, Sustainable Development (SD) is ‘development that meets the needs of the present without compromising the ability

of future generations to meet their own needs’ (World Commission on Environment and Development, 1987, p.43). The essence of SD is threefold: it acknowledges the link between environmental and social issues; it proposes an integrated response; and it offers a framework strategy for the prevailing institutions of power to be redeemed (Howes, 2005).

The concept of Ecological Modernisation (EM) provides a theoretical underpinning for SD policies. The ideas of EM have been used

to describe the ways in which environmental problems come to be framed as issues that are politically, economically and technologically solvable within the context of existing institutions and power structures and continued economic growth (Murphy and Gouldson, 2000). This paper will examine the potential of the theory of EM to provide a useful analysis with respect to the sustainability of Solid Waste Management (SWM) and the policy in the Malaysian context. The Ecological Modernization Theory (EMT) requires a national approach and system of SWM to deliver solid programmes in a more sustainable way. However, the current institutional arrangement, managerial process and policy formulation of Solid Waste Management in Malaysia has not delivered a cohesive sustainability policy of SWM. Thus, the paper examines why this is the case by applying an institutional dimension of EMT and examination of the policies and the actions in the process of SWM.

The National Problem of Solid Waste Management

Waste management is currently one of the key areas of public policy. Population growth in cities usually results in corresponding increase in waste generation. Basically solid waste generation has always been related to the economic status of a country and the lifestyle of its population. This turning also affects the management style of the waste generated. In Asia, the management of waste materials requires immediate attention, especially in countries such as China, South Korea and Malaysia which have been categorised as emerging industrialised countries. (L. Lau, 2003).

Asia consists of two groups, developing and developed countries. Generally, the higher income countries generate more waste, recycle more and have the money to employ advance technology to treat their waste. On the other hand, countries with lower income and greater rural populations are expected to produce more organic waste, such as kitchen wastes, and fewer recyclable items, such as paper, metals, and

plastics. Table 1 shows that countries with low income have the lowest waste-generation rates, averaging 0.64kg per capita per day, while for the middle- income countries this rate averaged 0.73 kg per capita per day in 2003. High-income countries, such as Singapore, tend to have higher waste generation in comparison to other countries. For example, in Singapore the current urban waste generation is 1.1 kg per capita per day which is the highest rate among the ASEAN countries. National governments in Asia are spending about US\$ 25 billion per year (1999-2000) on Urban Solid Waste of which more than 90% in high-income countries is spent on the collection of waste. In middle- income countries this rate is in between 50% to 80% of federal SWM budget allocation and in low-income countries it is 30 to 60% of total budget of SWM. Waste-generation rates also increased in Malaysia averaging 1.2 kg per capita per day. The Malaysian government also spent almost 80% of the budget per year on urban solid waste services and management (MHLG, 2003). The World Bank also considers SWM as one of the major problems faced by Malaysian municipalities (World Bank, 1999).

Solid Waste Management in Malaysia also has a number of implementation problems, including low collection coverage on average due to the inaccessibility by vehicles of some areas, irregular collection services, inadequate equipment used for waste collection, crude open dumping and burning without air and water pollution control, institutional deficiencies, inadequate legal provisions and resource constraints (Azni, 2004). These problems are caused by complex factors, which mitigate against the development of an effective national policy of a SWM system. Institutional deficiencies have been identified as a major problem in SWM. Even though several agencies such as the state department of SWM and Municipal Councils are involved in waste management, they often have no clear functions in relation to waste management and there is no single agency designated to coordinate their projects and activities. The lack of coordination among the relevant agencies often results in

Table 1: The Trends of Solid Waste Generation in Urban ASEAN.

Country	Population		Waste generation rates		Predicted urban waste Generation	
	Total (millions)	Urban (% of total)	Generation rates (kg/cap/day)	Total (tons/day)	SWM (kg/cap/day)	Total (tons/day)
<i>High income</i>						
Singapore	4.4	100	1.1	4840	1.1	4840
<i>Middle income</i>						
Malaysia						
Thailand	26.6	72.7	0.81	15,663	1.4	26,812
Indonesia	62.8	39.1	0.64	15,715	1.5	36,738
Philippines	212.0	60.7	0.76	96,672	1.0	127,200
	87.0	74.3	0.52	33,477	0.8	51,504
<i>Low income</i>						
Myanmar	57.3	47.3	0.45	12,118	0.85	22,891
Cambodia	14.2	48.6	0.52	3544	1.1	7497
Loas	5.7	44.5	0.55	1379	0.9	2257
Brunei	383.0	59.0	0.65	149,140	0.95	216,931
Vietnam	84.0	39.0	0.61	19,983	1.0	32,760

Source: The state-of-the-art of waste management in Vietnam, 2003.

duplication of efforts in waste management, wasting of resources, and unsustainability of overall waste-management programmes (J. Jahi, 2002). Thus, SWM is not only a technical problem but it is also strongly influenced by political, legal, socio-cultural, environmental and economic factors. Moreover, these factors have interrelationships that are usually complex in the waste-management system.

The Theoretical Framework

In broad outline, EM refers to a series of institutional, operational, economic, governance, social and political shifts that are set in motion by environmental drivers. These drivers push new social arrangements, new discourses, new scientific and technical developments, and a shift in responsibilities and interests between public and private sectors, between governments and their citizens, between civil society and other economic actors, and between the formal and informal sectors and arrangements within a wide range of disciplines. Although political institutions have contributed to poor environmental outcomes in the past, EMT argue that they can be readily reformed to better address ecological issues (Mol, 2000; Mol and Sonnenfeld, 2000). Proponents hope that, through marginal shifts in focus, political

actors could be responsible for building new and different coalitions to make environmental protection politically feasible. Thus, EM research has examined the institutional changes that accompany a shift from government to environment governance. For example, EM argues for a more substantial transformation towards decentralised, consensual forms of governance, and a focus on new forms of political intervention. Advocates consider the role of the nation-state to be central to achieving more sustainable societies. There is a focus on “open, democratic decision-making, maximising participatory opportunities for broader social interests” (Berger *et al.*, 2001). These opportunities will only occur alongside increasing activism by non-governmental organisations, economic agents and changes to the institutional structure of society.

Ecological Modernisation has a good chance of influencing decision makers since it frames the debate in non-threatening terms by supporting industrial development, the market and liberal-democracy. EM argues that economic growth can be decoupled from environmental harm through institutional transformations. In essence EM supports the existing institutional of power and modest initial reforms and also prepares the groundwork for substantial transformations

later. EMT suggests that the market will play a central role in the transmission of ecological ideas and practices, with producers, financial institutions and consumers all playing their parts. The government can provide such an incentive by applying the polluter pays principle, notably through the use of market-based instruments such as eco-taxes and tradable permits which penalize environmentally damaging activities.

Ecological Modernisation also advocates greater public disclosure and community participation in decision making. Devotees argue that globalization and new international market dynamics have shifted the away from traditional top-down influences of supranational bodies towards greater emphasis on the sub-national level. This regional and local focus is in line with increasing prominence of local initiatives such as *Local Agenda 21* programs. In EM, the government takes the role of 'contextual steering' and policy-making changes from 'curative and reactive to preventative'. While international agreements can set the broad policy goal of SD, it is regional planning and changes to management systems in local businesses that translate these goals into real changes on the ground.

Ultimately Ecological Modernisation treats all environmental issues, solid waste included, as a challenge to eliminate inefficiency via better design. It promotes the use of more eco-efficient technology as well as the redesign of economic and political institutions to create incentives that will effectively decouple economic growth from raw material use, waste and environmental damage (Berger 2001; Dryzek 2003; Howes, 2005). Waste is seen as an indicator of inefficiency. Businesses use their desire to cut costs by innovating to find new ways of reducing their raw material and energy use, cutting pollution in the process. Governments correct markets failures that encourage environment damage and create incentives to innovate by penalizing damaging behavior and rewarding eco-efficient improvements. They also act as a clearing house for information about the state of the environment and support the research,

development and deployment of better technologies. The actions of the market and the state together work in partnership to develop a cleaner, low cost future that is good for both business and the environment.

The Malaysian government considers the adoption of a comprehensive waste management policy including the installation of incinerators for safe and efficient disposal of waste as well as to formulate strategies for waste reduction, reuse and recycling. However, SWM approach in Malaysia seems not successfully implemented and institutional framework relate to SWM still fragmented. Thus, an approach to SWM in Malaysia is required which is an integrated approach under sustainability policies. The study argues that EM offers a theoretical framework that supports the national policy of SWM in Malaysia. EMT allows research into institutional and policy, how the management has evolved and worked and what the outcomes of the current approach have been implemented in Malaysia. EMT can be used to examine what has transpired in waste management in Malaysia, to look at the process of management, the opportunities of such an approach to achieve sustainability of SWM.

Much of the early investigation of Ecological Modernisation ideas was based on European case studies and less work has been done on applying the theory to developing countries particularly in Malaysia, providing an opportunity for some original research. However, the three studies in Vietnam and likewise the two studies in Thailand as outlined in the EMT showed the limited role and the obstacles faced by the states and industry in policy matters in relation to ecological restructuring (Sonnenfeld, 2000; Rock, 2002; Yang, 2006). Institutional development of SWM in Malaysian context also facing the similar problems and there is less participation from stakeholders in the policy decision making process by both the state and the industry. Ecological Modernisation theoretical framework feeds into broadly accepted policy goal of SD and it can generate programs for change that constructively engage with the

existing institutions of power. Therefore, for the purpose of the study, it is useful to focus on the institutional dimension of the EMT for analysing the policy and institutional structures that control waste management and policy in Malaysia. The study argues that EMT is a useful tool for providing a theoretical framework for analysing sustainability and efficient policy and management in solid waste policy in Malaysia but the adaptation of EMT need to be modified to suit the Malaysian political and economic context and creates a framework for future research.

Discussion

Adaptation Ecological Modernisation Theory to Solid Waste Management in Malaysia

The integration of environmental policy goals into all policy areas of government is considered as central to a programme of EM (Mol & Spaargaren, 2000; Howes, 2005). SD also requires radical changes in functional systems and changes not only in government policy but also in current systems of governance. However, there is lack of coherence and integration of policy in different levels of governance in SWM in Malaysia. The existing policy frameworks with fragmented policy areas in Malaysia are also not suited for dealing with social complexity and desired long-term change. Recent policies in Malaysia have adopted an incremental rather than radical response to reducing waste and improving overall Malaysia response to sustainable SWM. There is also a clash between the very capitalist system of production and consumption which drives the national economy and the efficiency of the operation of the SWM system. In order to integrate policy, the role of the government has to be seen as more flexible, decentralized and a consensual style of national governance with less top-down hierarchic command, and control regulation emerge. The government also should encourage more participation from the private sector and NGOs in SWM in Malaysia. However, the study found that there is little evidence of a substantial restructuring of government institutions, no

apparent increase in flexibility, only limited public input, and no decentralization to empower local communities.

Transforming the role of social movements is the theme of institutional dimension of EM that relates to the political and institutional changes. The idea is to empower non-government organisations so that they are able to provide an effective early warning system for emerging problems and feed innovative ideas into the decision making process (Hajer, 1995; Mol, 2000; Mol & Sonnenfeld 2000; Fisher & Freudenberg 2001). The goal is to generate an effective social and environmental feedback mechanism for policy makers. However, transforming the role of social movements in Malaysia will be difficult. Malaysian political culture is far less corporatist. For example, participation from private sectors, community groups, civil society and stakeholders in SWM and policy seems not be successfully achieved in Malaysia.

There is little evidence of involvement of non-state organizations and private sector in SWM in Malaysia. If EM were to become the prevailing framework for analysing sustainability of solid waste in Malaysia, governments would be inclined to support community empowerment as a way to harness its problem solving potential. Business resistance to such a change might be tempered by the idea that bringing these groups into the process might actually reduce resistance to future projects (Dryzek, *et al.*, 2003). It would also allow for constructive partnerships between government, business and community groups to be formed that could actually facilitate policy implementation and industrial development. Environmental movements and NGOs, to be effective, need to transform not only government policies, but also the environmental 'common sense' or field of discourse of a society. Transforming common sense requires, in essence, powerful cultural change, sometimes affecting deep values. That is a form of cultural politics- the clash between coalitions supporting different values and visions about issues such as the environment. Through the emergence of

new ideas and dialogues, often carried by social movements and NGOs, a transformation occurs. As movements turn into NGOs, and conflicts turn into negotiations, tensions go down and inter-coalition learning can occur. In this way, society can learn new collective goals through less conflictual means.

From political strategies perspectives and in order to make radical shift towards a stronger form of EM, Malaysia will most probably need to make fundamental changes to the current approach. Thus, the role of government needs to shift to be open and more flexible dealing with SWM. It is also important to make sure that waste is optimally managed, so that the costs to society of dealing with waste, including the environmental costs, are minimized. There may be market failures and other barriers that prevent this ideal situation from occurring.

There are many factors to take into account when considering the environmental impacts of waste. There is a case for government intervention where the market alone does not produce the optimal situation. The landfill tax is the most obvious example of an instrument which tackles externalities, through reflecting the environmental damage from landfilling, although there are also other interventions operating across the waste hierarchy. Intervening with the right instrument for the particular situation is necessary to deliver the desired outcomes in a cost-effective manner. The potential for greater use of environmental taxes to deliver better environmental and economic outcomes is recognized in the Government's commitment taxes to increase the proportion of revenues accounted for by environmental taxes. Thus, the study would suggest that Malaysian government should introduce market based-instruments such as taxes and trading system for better SWM policy in Malaysia.

Market-based instruments such as taxes and trading systems are an efficient and cost effective way of pricing in the value of environmental resources. By giving certainty over the price of these resources, they create new opportunities

for businesses in markets for environmental good and services. However, an environmental tax will not be the most appropriate policy instrument in every circumstance. For example, when the environmental risks are large, such as with hazardous wastes or when the problem is fairly specific to a sector or waste stream, direct regulation could be more effective. When appropriate, consideration will be given to taxes in waste policy that can support the implementation of the waste hierarchy reflecting the environmental benefits of shifting waste up the hierarchy. Such instruments will be developed in the context of wider Government levers, such as voluntary agreements and regulations, ensuring that the approach is simple, efficient and cost effective while supporting growth and maintaining a sound fiscal position.

Ecological Modernisation advocates technological innovation that decouples economic growth and industrial development from environmental damage to a cleaner industrial revolution. The theory aims to encourage industry to research, develop and deploy more eco-efficient technology. This new technology should reduce raw material and energy use, cut emissions, eliminate the use of hazardous material, wean production off the depletion of non-renewable resources, sustainability of harvest renewable resources conserve biodiversity and protect essential environmental materials, energy use and waste disposal (Mol 2000; Berger, *et al.*, 2001; Fisher & Freudenberg, 2001; Welford and Hills 2004; Cohen, 2006). Thus, Material Flow Analysis (MFA) may be a tool for more effective understanding of resource use and efficiencies but also for driving political and social transformation. On the other hand, part of technological transformation, the government should explore the potential of new technologies to achieve eco-efficiency of SWM. In so far as technical innovation is concerned, clearly Malaysia has less capacity in terms of research, development and deployment something that could affect its ability to ecologically modernize. The study suggests that the Malaysian government should encourage

private companies and international investors to invest for new technology. There are many opportunities for 'win-win scenarios where firms invest in energy efficient technology that also reduces their operating costs. (Hargroves & Smith 2005; Mc Neil, 2009). EM therefore has a potential to reconstruct the technology barriers as opportunities and gives policy makers some guidance as to what should be targeted. It might also win business over by identifying new opportunities for profit making. Thus, in order to achieve the policy target for SWM in Malaysia, the government should generate more of technology innovation and encourage more private sectors and businesses to invest in new technology towards efficiency of SWM in Malaysia.

Conclusion

Ecological Modernisation is a theory of environmental sociology, which provides a sociological interpretation of environmental reforms. The theory suggests that the need of a national policy of SWM and effective system for sustainability of SWM. However national system of SWM in Malaysia seems to be not working effectively to deliver sustainability due to lack of responsiveness of governmental officials, policy and institutional gaps, privatisation process failures and managerial aspect problems. The study argues that EMT provides a new framework for understanding and analysing sustainability of SWM in Malaysia. The EMT has identified good options for strategies to overcome the deficiencies of the traditional bureaucratic state in environmental policy-making. Thus, a transformation in the role of the state is one of the core elements addressed in EMT that could be adopted for sustainability of SWM in Malaysia. The study pointed out the need for more transformation in environmental governance particularly in SWM. The study suggests the government needs to become more open, flexible and less top-down approach to deal with the social complexity and policy in SWM in Malaysia. At the macro level, the state need to initiate policy reforms to affect

the full devolution of environment and SWM functions, enabling Local Government to legally allocate funds and provide technically qualified personnel. EM also implies a partnership in which governments, business, moderate environments, and scientists cooperate in the restructuring of the capitalist political economy along more environmentally defensible lines. However, the evident shows that Malaysian political culture is far less corporatist and involvement from non-organization state also not active in SWM. Thus, the role of government in Malaysia is most important to integrate and cooperate with all stakeholders to achieve a sustainable policy of SWM.

References

- Azni Idris. (2004). Overview of Waste Disposal and Landfill/ dumps in Asian Countries. *Journal of Material Cycle waste Management*, 3: 48-59.
- Berger, G., A. Flynn, F. Hines, & R. Johns. (2001). 'Ecological Modernisation as a Basis for Environmental Policy: Current Environmental Discourse and Policy and the Implications on Environmental Supply Chain Management.' *Innovation*, 14(1): 55-72.
- Charles Hostovsky. (2006). The Paradox of the Rational Comprehensive Model of Planning. Tales from Waste Management Planning in Ontario, Canada. *Journal of Planning Education and Research*, 25: 382-395.
- Cohen, J.(2006). 'The Greenhouse Mafia'.Four Corners. Sydney: ABC. Retrieved from <http://www.abc.net.au/4corners/content/20006/s1568867.htm>. on21 July 2009.
- Dryzek. (2005). *The Politics of the Earth: Environmental Discourses*. (2nd ed.). Oxford: Oxford University Press.
- Fisher, D. & Freudenberg, W. (2001). Ecological Modernisation and its Critics: Assessing the past and Looking Toward the Future. *Society & Natural Resources*, 14(8): 701-709.

- Hargroves, K. & M. Smith. (eds). (2005). *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*. London: Earthscan.
- Howes, M. (2005). *Politics and the Environment: Risk and the Role of Government and Industry*. Sydney: Allen & Unwin.
- Jamaluddin Md. Jahi. (2003). *Environmental Issues in Malaysia*. Bangi: UKM.
- Jamaluddin Md. Jahi. (2002). *Environmental Management in Malaysia*. Bangi: UKM.
- Lina Lau. (2003). *Case Study on the Management of Waste Materials in Malaysia*. Malaysia: Universiti Putra Malaysia.
- McNeil, B. (2009). *The Clean Industrial Revolution: Growing Australian Prosperity in a Greenhouse Age*. Sydney: Allen & Unwin.
- Mol, A. (2000). 'The Environmental Movement in an Era of Ecological Modernisation.' *Geoforum*, 31: 45-56.
- Murphy, J. & Gouldson, A. (2000) 'Environmental Policy and Industrial Innovation: Integrating environment and Economy through Ecological Modernisation? An Assessment of the Impact of Environmental Policy on Industrial Innovation. *Geoforum*, 31: 33-44.
- Sonnenfeld, D. (2000). Contradictions of Ecological Modernisation: Pulp and Paper Manufacturing in South-east Asia. In A. P. J. Mol & D. Sonnenfeld (Eds.), *EM around the World*. 235-256. London: Frank Cass Publishers.
- Welford, R. & P. Hills. (2004). 'Ecological Modernisation, Environmental Policy and Innovation Priorities for the Asia-Pacific Region.' *International Journal of Environmental and Sustainable Development*, 2(3): 324-340.
- Zaini Sakawi. (2011). Municipal Solid Waste Management in Malaysia: Solution for Sustainable Waste Management. *Journal of Applied Sciences in Environmental Sanitation*. 6(1): 29-38.