

Chapter 5

ICM and Sustainable Agriculture: Moving from rhetoric to practice

Jennifer A. Bellamy and Andrew K.L. Johnson

CSIRO Tropical Agriculture, St. Lucia. Qld. 4067

Originally Published as:

Bellamy, J.A. and Johnson, A.K.L. 1997. ICM and Sustainable Agriculture: moving from rhetoric to practice. Proceedings of 2nd National Workshop on Integrated catchment Management. Advancing Integrated Resource Management: Processes and Policies, 29 Sept. - 1 Oct. 1997, ANU, Canberra. (River Basin Society Inc.: Victoria)

Summary: Operationalising the concept of sustainability through community-based approaches to Integrated Resource Management (IRM) poses enormous challenges for both the agricultural communities and government agencies concerned. This paper reviews some of the challenges to change in agriculture and key impediments to the implementation of community-based IRM approaches. A relatively new community-led Integrated Catchment Management (ICM) process in an agricultural community in north Queensland is examined in terms of some of the lessons learned that may be relevant to other similar IRM processes. It reveals a pragmatic, opportunistic and adaptive approach to implementation rather than a process of 'rational' planning. In this case study, the strategy was emergent as the various actors came to know the problem and its context and their capability of dealing with it. We conclude by identifying some essential characteristics of an agricultural context that an IRM process can utilise to assist a community to adapt to and manage change for sustainable agriculture.

1. INTRODUCTION

Agriculture, as both a major "user" of natural resources and a "supplier" of environmental services, is a key sector in the move toward ecologically sustainable development (ESD) (Steenblik *et al.* (1)). In attempting to operationalise the goals of ESD, a number of Australian states have introduced and fostered community-based approaches to integrated resource management (IRM). The impetus for implementation has come from:

- the degradation of land, water and vegetation resources in many rural areas due to a combination of unrealistic expectations and inappropriate management over a long time period (eg., SEAC (2));
- federal government commitment to a range of international and national agreements and strategies on the environment (eg., National Strategy for Ecological Sustainable Development, Intergovernmental Agreement on the Environment; National Strategy for the Conservation of Australia's Biological Diversity);
- the move to greater diversification in the use of, and values placed upon, natural resource systems;
- the fragmentation of decision making and responsibilities for natural resource management across a multiplicity of public and industry agencies (including all three tiers of government);
- trends in state and federal governments toward the devolution of responsibilities for environmental stewardship to the local level (eg., ANAO (3)); and,
- increasing community expectations for greater involvement in decision-making and higher standards of accountability in environmental protection.

Translating the principles of IRM into practice has proved difficult and poses enormous challenges for both agricultural communities and responsible agencies. These challenges are compounded by the current crisis in agriculture as evidenced by deteriorating terms of trade coupled with financial inability to implement sustainable management practices (PMSEC 1995; ANAO 1997). The management of agricultural lands in Australia will continue to be undertaken in an environment of increasing demands for agricultural outputs (IC (5)). However, any intensification or expansion of agriculture is very likely to have environmental implications. At the same time, Australia as an agricultural exporter faces increasingly environmentally conscious international markets.

This paper examines how a community-led Integrated Catchment Management (ICM) process is attempting to facilitate the move towards sustainable agriculture. It reveals a pragmatic, opportunistic and flexible approach to ICM such that the strategy is emergent as the various actors come to know the problem and its context and their capability of dealing with it. We conclude by proposing how ICM or similar approaches may in the future contribute to best practice in agriculture.

2. THE RHETORIC

The well recognised core principles of ESD are to maintain ecological integrity, biological diversity and natural capital. The principles of sustainable agriculture however are much more focussed and narrowly defined. As recommended by the Standing Committee on Agriculture the five principles of sustainable agriculture 'against which policies at all levels of government could be judged' are (SCA (6)):

1. Farm productivity is sustained or enhanced in the long term.
2. Adverse impacts on the natural resource base of agriculture and associated ecosystems are ameliorated, minimised or avoided.
3. Residues resulting from the use of chemicals in agriculture are minimised.
4. The net social benefit derived from agriculture is maximised.
5. Farming systems are sufficiently flexible to manage risks associated with the variables of climate and markets.

Notably, these principles do not make specific reference to the maintenance of biological diversity. With over 80% of Australia's agricultural land in private hands (SEAC (2); ANAO (3)), the protection of biodiversity and the maintenance of ecological integrity and natural capital have to be seen as an integral part of agricultural land management if ESD is to remain a national goal. Agriculture must not be considered in isolation of other resource uses, rather it needs to be considered within a broader regional or catchment context. Recognition of these issues has led to increasing calls for integrated systems approaches to resource management (eg. RAC (7)).

In parallel with the move to ESD, the emerging paradigm of IRM is one which recognises the interdependencies of natural systems, political systems, social systems, and technology. This new paradigm recognises:

- an integrated systems approach;
- a long term perspective and broad spatial scale focus;
- the concept of 'the whole being more than the sum of the parts';
- technical solutions to biophysical complexity;
- the need to deal with both complexity and uncertainty;
- non-linear processes and connectivity between problems;
- people as part of the problem and not external to it;
- the need for coordination of decision-making amongst stakeholders in government, industry and the community; and
- the need for active involvement of the whole community that leads to community ownership of the problem and its solution, and ultimately the adoption of sustainable resource use and management practices.

This new paradigm has emerged from a recognition of the failures of current approaches (RAC (7)), and from insights from domains other than agriculture. These insights are challenging assumptions underlying the more traditional 'rational' approaches to management and provide an emerging learning paradigm based on an adaptive approach to ecosystem management and collaborative decision-making.

A number of Australian states are attempting to implement IRM approaches, such as ICM in Queensland, Total Catchment Management (TCM) in NSW and catchment management in Victoria. Although approaches to implementation and organisational structures for IRM vary significantly across the different states of Australia, the rhetoric underlying these approaches requires the integration process to move beyond a purely coordination function to one that involves roles and responsibilities for both the implementation and the monitoring of integrated planning strategies and decisions on resource management at the catchment level.

3. RESPONDING TO THE RHETORIC

Australian agriculture is taking a number of positive steps towards addressing public and private concerns for the environment. At industry level, it has, for instance, conducted environmental audits of farming activities (eg, cotton, sugar) and developed industry best management practices (eg., sugar, dairy). At a national level, the 1992 Intergovernmental Agreement on the Environment, commits all state and territory governments, the Commonwealth Government and Local Government to the principles of ESD. However land degradation continues to be the major issue for resource use and management in Australia (SEAC (2); IC (5)).

3.1 Challenges to Change in Agriculture

In responding to the rhetoric on sustainability and in attempting to achieve real change, Australian agriculture faces a number of significant challenges. These include:

- inadequate incentives for the adoption of more sustainable agricultural practices resulting in poor linkage of land and water management issues to market signals such that short term incentives for the adoption of more sustainable agricultural practices are lacking (AACM (8); ANAO (3));
- agricultural "technology" is typically single issue or problem oriented and does not necessarily lend itself to a systems focus;
- "selling" the adoption of environmental management practices and "selling" commercial innovations in agriculture are different processes;
- options for achieving change are long term and do not match the typical business and political timeframe of agriculture and government processes;
- the diversity in, and the dominant individualistic approach of, farm enterprises mitigates against the achievement of "integration" (eg. a pastoralist's decision-making is predominantly focussed within farm gates) except where there is a clear off-farm focus around processing infrastructure (such as the sugar industry);
- significant difficulties are associated with balancing public and private costs and benefits of IRM and the associated issue of "who should pay"; (ANAO (3))
- Australia's national origins give rise to a culture that places a high value on the right of individual landowners to determine land use, which creates a major obstacle to internalising the external costs of agriculture (Reeve (9));
- the 'not in my back yard' syndrome in the agricultural community (AACM (8));
- the effects of changes in management on complex natural systems take a long time to appear, and they are frequently hard to directly link to causes; and,
- declining funding and general resourcing with state and federal governments scaling down their support for agriculture, while industry funding is still not recognising its natural resource management obligations.

3.2 Challenges for IRM Implementation

For IRM approaches to move beyond principle and to effect action, they must also overcome significant impediments to implementation. These include:

- the lack of certainty and/or coordination of many government priorities, policy and institutional arrangements relating to natural resource use and management;
- the lack of government support for IRM (for example state government rhetoric is not matched by the resources provided, and Commonwealth funding is allocated to States frequently on a basis unrelated to the programs they are trying to address (AACM (8));
- the lack of tangible incentives for institutional reform or behavioural change that will effect changes that move either organisations or land managers towards sustainable development (AACM (8));

- the absence of institutional and statutory underpinning for IRM approaches in many states to indicate long term government commitment and financing (eg., ICM in Queensland and WA);
- poor recognition of local government as an integral part of catchment management in state and federal policies (AACM (8));
- the current limited capacity (ie., human, financial, and knowledge-base) at the local level to address natural resource management problems and implement action;
- the lack of appropriate cost-sharing mechanisms to accompany the transfer of resource management responsibilities to regional and community groups (ANAO (3)); and,
- significant disparities in wealth and power at the local level that makes it difficult to put IRM into effect in a more inclusive way.

In addition to these impediments, attempts to address sustainability within existing community and institutional frameworks have met with mixed success due to their inability to account for, amongst other things, multiple objectives, multiple players, poorly defined objectives, unclear outcomes and multiple pathways (eg., Syme *et al* (10)). Much of the literature on ICM has focussed on its conceptualisation and alternative organisational structures, but it lacks practical guiding principles for effective implementation of an integrated systems-based approach. Many IRM approaches have tended to be *ad hoc* responses to urgent and emerging problems rather than being focussed on achieving strategic change. In other words, operationalising the concept of sustainability remains a significant challenge given that in many ways IRM does not fit the traditional 'rational' planning approach to decision making.

4. THE REALITY: A COMMUNITY RESPONSE IN THE WET TROPICS

The Queensland initiative on ICM which commenced in 1991 is a policy or planning process that has no legislative basis but is implemented through administrative and financial arrangements by the state government. As such, its success will ultimately reflect the ability of relevant public and private interests to voluntarily effect required action.

In the following sections we examine how an agricultural community in north Queensland has attempted to bridge the gap between rhetoric and practice within an ICM context and in so doing comment on how this experience may lead to best practice in the future. The discussion draws on research findings from a LWRRDC-funded project to evaluate the implementation of an ICM process in the Herbert River catchment of north Queensland.

4.1 The Context: ICM in the Herbert River Catchment, Queensland

The Herbert River catchment has an area of nearly 10,000 km² and is located on the southern end of the wet tropical coast of north Queensland. It drains directly into the Hinchinbrook Channel, part of the Great Barrier Reef Marine Park. Agriculture is the dominant land use in the catchment consisting of mainly beef production on native pastures in the upper catchment and intensive sugarcane production on the lower coastal plain. Other significant land uses are forestry, conservation areas (ie. significant parts are within the Wet Tropics World Heritage Area), and smaller areas for horticulture and fodder cropping. There are no 'critical' issues in the catchment of the magnitude of for example salinity, rather the key natural resource management issues prior to the ICM initiative related to:

- (a) concerns for the potential impact of agriculture on the Great Barrier Reef and nearshore environments (eg., mangroves and seagrass beds in the Hinchinbrook Channel) and the potential implications for conservation, tourism and commercial fishing; and

- (b) community conflicts relating to flooding and drainage issues, as well as future land development for sugarcane and its potential impact on production particularly in the lower Herbert catchment.

The sugar industry dominates the lower Herbert both socially and economically, with the two processing mills being owned and operated by CSR Ltd. The contrasts in the physical and socio-economic contexts of the upper and lower parts of the catchment are very strong, with little interaction between authorities or community members. Landcare has been active in the upper catchment pastoral areas for some time but has not succeeded in obtaining a foothold within the lower catchment. The sugar industry in general, however, has been a dominant player in ICM in the lower Herbert since its inception.

ICM in the Herbert River catchment is a voluntary process initiated by key actors in the local community. Commencing in 1993 with the formation of the Herbert River Catchment Coordinating Committee (HRCCC), it is a relatively new process which is still in its formative stages. The impetus for ICM in the Herbert catchment was twofold: (a) broad community-based concern over the ineffectiveness of the fragmentation of government decision-making on river management issues and the perceived need for better community participation, and (b) the personal and political agendas of influential stakeholders in the lower Herbert catchment, who to a large extent were motivated by a desire for 'a piece of the action' (ie. ICM in Queensland), including potential funding opportunities for 'pet projects'.

Current representation on the HRCCC includes industry (sugar, cattle, fishing, horticulture), local government and other statutory bodies, conservation and community interests. Most of the 15 members have multiple allegiances and/or responsibilities. The HRCCC has no state government departmental representation, however the Catchment Coordinator (CC) is an NLP-funded position based in the Department of Natural Resources (the lead government agency for ICM in Queensland).

The HRCCC have identified a challenging set of objectives as detailed in its Draft Catchment Strategy (HRCCC (11)) recently released for community comment, namely:

- coordinate government agencies and the community to pursue common goals;
- seek community involvement in catchment management;
- identify and rectify natural resource degradation;
- promote ways to prevent and reduce natural resource degradation;
- promote the wise use of all natural resources within the Catchment;
- identify key indicators of biodiversity and monitor as a measure of catchment health; and
- encourage the retention of significant natural habitats within the Catchment.

4.2 The Process To-date: An emergent strategic approach

Initially, ICM in the Herbert was hampered by diverse HRCCC member perspectives on ICM and a lack of a common understanding of what the HRCCC might realistically be able to achieve. There was also a lack of shared understanding of natural resource management issues in the Herbert and their relative importance. As previously noted, personal objectives and 'pet projects' frequently clouded the agenda. The process was also inhibited by an initial lack of clear direction and strong leadership within the HRCCC, including a one-year delay in the appointment of a full time CC until April 1994. The CC adopted an initial aggressively proactive role within the HRCCC in setting the agenda to gain personal credibility with the 'established' Herbert community leaders of the HRCCC. Over time the CC has moved to play a more facilitatory role within the HRCCC, particularly with the appointment in 1996 of a new Chairman who has taken a more proactive approach in setting and negotiating the role and

agenda for ICM in the Herbert. Hence the HRCCC has undergone what might be called a process of 'evolving reality' largely in response to the novel situation members found themselves in.

In addressing this situation, the HRCCC adopted a pragmatic and opportunistic approach to ICM implementation. This approach has focussed in the first instance on building a credible and influential relationship with the Herbert community. This is demonstrated in a number of ways:

- (i) The composition of the HRCCC membership recognises the *influential groups, power structures, and local interest groups* in the Herbert community, including recognising the situation that community actors (both individuals and agencies) generally have multiple allegiances and/or responsibilities. Although the ICM initiative originated in the lower catchment, the HRCCC from the start actively sought the involvement of representatives from the upper catchment. In respect of the latter, the HRCCC negotiated funding for on-ground works to address issues relating to derelict mining dams which were a potentially divisive issue between the upper and lower catchment communities (ie., poor domestic water quality and reduced river capacity due to increased sedimentation in the lower catchment).
- (ii) To *raise awareness of ICM within the Herbert community and get 'runs on the board'*, the HRCCC has undertaken and supported a number of *ad hoc* but focussed land management activities including: (a) raising the profile and even 'creating' resource management issues in the catchment, eg. the HRCCC fostered the construction of over 50 owl boxes on farms for rat management and promoted them as a key element of integrated pest management for improved sugarcane production and nature conservation; (b) supporting on-farm tree planting of commercial hardwoods and rainforest species on odd-shaped or difficult caneland blocks; (c) undertaking with canegrowers the removal of para grass blocking drainage lines and replanting with riparian vegetation; (d) developing artificial wetlands both on-farm (with canefarmers) and on public lands (eg. jointly with the CSR mill and Hinchinbrook Shire Council to establish a wetland using sugar mill waste).
- (iii) The HRCCC initially focussed its on-ground action on *symptoms of natural resource problems rather than causes* such as the revegetation of riparian lands rather than tackling the more contentious issue of management of remnant vegetation on private lands. For example, during a highly politicised controversy about the clearing of Mahogany Glider habitat, given the highly emotive nature of the issue within the local community and state government politicisation of the issue, the HRCCC chose not to fully engage in the community conflict. It was perceived to be beyond their control and there was significant internal conflict within the HRCCC membership. It opted in the first instance to lobby state government for a technical expert to be based in Ingham to provide appropriate expert advice and improve the communities capacity to deal with these issues in the future before they reach a crisis situation. Secondly it negotiated with landholders a flexible system of riparian zone width assessment.
- (iv) More recently the HRCCC has adopted *a lead role as broker for external funding of community projects* that would initiate a move toward addressing the fundamental causes of natural resource management problems in the longer term. For example, the HRCCC undertook a process to develop a catchment management strategy predominantly to ensure eligibility for the catchment community for state and commonwealth project funding. The HRCCC also acted as the broker and coordinator for all new proposals submitted for National Heritage Trust funding from the catchment providing the catalyst for community activity in Commonwealth and state-funded initiatives.
- (v) The HRCCC commencing to be *an information provider and distributor* within the Herbert catchment with some mixed success in terms of outcomes. For example, in attempting to improve and integrate the available knowledge-base in the catchment on ICM related issues and to improve the communities' capacity to deal more proactively with natural resource management issues, the HRCCC has initiated or contributed jointly with other local

government and industry organisations to a number of activities, such as: the preparation of a Herbert Catchment Atlas for use in schools and the general community; publicised the issue of the risk of acid sulphate soils including distributing available pamphlets in the community; initiated and conducting a Wetlands Forum in the catchment with key invited speakers from government, the research community and industry; and formally linking into the Herbert Resource Information Centre (HRIC) which is providing a community-based and sponsored resource to coordinate spatial/non-spatial, technical and socio-economic information on the catchment to underpin local decision-making.

The HRCCC's perception of its role appears to have evolved over time from one of delivering natural resource outcomes and solving natural resource management issues on the ground to a more strategic role (McDonald and Bellamy (12)). This emerging role involves establishing a decision-making culture relating to natural resource use and agricultural development based on ICM principles as 'a way of doing business', and providing a strategic direction on resource management for the catchment.

The HRCCC's response to the difficult task of moving the Herbert community toward more sustainable agriculture and development in general has been one of adopting: (a) an initial approach of predominantly *ad hoc* responses to opportunities or urgent issues that arose in the catchment which involved engagement in on-ground works; and (b) a concurrent emergent role that is more coordinative and strategic in focus, in particular one of raising and progressing issues rather than developing prescriptive solutions. Notably, the Herbert community is moving its prime focus from a concern with disaster management (ie. issues of river management including flood mitigation and drainage) to one that embraces the broader concept of natural resource management (McDonald and Bellamy (12)). This has been achieved largely through raising the HRCCC's profile amongst established and influential catchment actors, such that it is now becoming a central player in decision-making on natural resource management issues in the Herbert community.

To date the key achievements of ICM in the Herbert may be summarised as (McDonald and Bellamy (12)):

- (i) Initiating a range of focussed or single issue land management projects to get runs-on the board and raise awareness of ICM with the Herbert community (rather than focussing on issues of strategic importance to catchment management).
- (ii) Recognition as a key community referral agency for the state and local government authorities on proposed projects and other natural resource issues and projects in the catchment.
- (iii) Development of a draft Herbert River Catchment Management Plan for public review and comment that provides the essential elements of a 'sustainable' vision for the catchment.
- (iv) Establishing a role as principal broker for negotiating funding for others to undertake natural resource management projects and activities in the catchment.
- (v) Serving as an effective community forum for discussing, 'airing' and progressing catchment issues, including revealing the range of different stakeholder perspectives on these issues as well as highlighting potential areas of community conflict.

The strategy for ICM implementation that has emerged in the Herbert ICM's first 4 years meets many of the elements of what Mintzberg (13) refers to as a visionary approach to deal with an uncertain world in a flexible way, to set the broad outlines of a strategy, and to provide the basis for adaptive learning. In essence, the strategy for ICM implementation has evolved through pragmatism, opportunism and adaptiveness on the part of the HRCCC.

4.2 The Response: 'The art of muddling through'

The Herbert ICM process has many common elements with Lindblom's (14) concepts of learning in complex policy contexts. It has not been a controlled process of rational planning but a messy one of trying to cope with a complex and dynamic world and much uncertainty regarding the problem at hand and the means of dealing with it and the goals to be aiming for. It has been essentially a process of learning over time with the various actors working it out by mutual adjustment, that is a process in which learning informs planning and strategies emerge as the key actors come to understand the problem and its context and their capability of dealing with it (Mintzberg (13)). The Herbert process being much more one that can be described as 'the art of muddling though ' than a 'science'. Reflecting on this experience, an IRM process may contribute to a move towards sustainable agriculture by:

- *Fostering communication* across sectoral and community interests facilitated through the establishment of an effective community based forum that reveals the diversity of perspectives and the importance attributed to specific catchment issues.
- *Providing a framework/ structure that fosters cooperation* amongst community and industry groups and government organisations that leads to more equitable decision making and more sustainable natural resource outcomes on the ground.
- *Facilitating coordination* of effort across government, industry and community organisations to achieve outcomes that have benefits to a broad range of catchment stakeholders as well as the environment, and which could not be achieved by any one group alone.
- *Integrating* IRM principles into Local Government planning that provides a basis for implementing a strategic direction for the catchment.
- An IRM implementation process that supports an *emergent strategic approach* of adaptive learning involving key and influential community actors and moves the community towards a sustainable process of integrated planning of natural resource use.

There are still very significant challenges for ICM in the Herbert. In particular it has a long way to go to achieve tangible outcomes in respect of the key natural resource management issues. However, significant progress is being made in a long term process. The Herbert catchment is not unique, and its experiences in implementing ICM are relevant to other similar community-led IRM approaches; in particular, those catchments where there is not one critical issue of the magnitude of salinity, but rather a diversity of significant land and water management and biodiversity protection issues relating to sustainable agricultural development.

5. MOVING FROM RHETORIC TO PRACTICE: TOWARDS BEST PRACTICE

What is unsustainable in agriculture is a lot easier to establish than what is sustainable. The challenge therefore for IRM and sustainable agriculture is to deal with a situation in which the goal posts are shifting, and the goals are unclear, multiple and contested. This paper has identified a number of challenges to change in agriculture. However, significant opportunities exist for IRM to contribute to sustainable agriculture arising from a number of attributes of an agricultural context. These include:

- the strong culture of mutual support and information exchange in agricultural systems;
- locally-based industry regulations (eg. sugar assignment system) and industry codes of practice (eg. land clearing in grazing areas) which could be supported by incentive systems.
- the current move to operationalise the principles of ICM in local government planning schemes (McDonald and Bellamy (12));
- extension and other industry networks and new opportunities in information technology that can improve the capacity of communities to address resource management issues (including access to technical knowledge, people and group management skills, policy understanding);

- the traditional agricultural business concept of managing an asset that can be developed to establish strong market linkages for land and water resources management with enterprise outcomes.

The challenge for IRM is to utilise these opportunities to assist agricultural communities to adapt to and manage change and move towards sustainable agriculture.

6. REFERENCES

1. Steenblik, R., Maier, L. and Legg, W. "Sustainable Agriculture", In: Sustainable Development: OECD Policy Approaches for the 21st Century. OECD: Paris, 1997, pp. 117-128.
2. State of the Environment Advisory Council (SEAC). "Australia: State of the Environment 1996", CSIRO Publishing, Victoria. 1996.
3. Australian National Audit Office. "Commonwealth Natural Resource Management and Environment Programs. Australia's Land, Water and Vegetation Resources", The Auditor General, AGPS, 1997.
4. Prime Minister's Science and Engineering Council. "Sustaining the Agricultural Resource Base", AGPS, Canberra, 1995.
5. Industry Commission (IC). "Land Degradation and the Australian Agricultural Industry". AGPS, 1996.
6. Standing Committee on Agriculture (SCA). "Sustainable Agriculture", SCA Technical Series No. 36. CSIRO, Australia, 1991.
7. Resource Assessment Commission (RAC). "Integrated resource management in Australia", RAC Coastal Zone Inquiry, Information Paper No.6, March 1993.
8. AACM. "Enhancing the Effectiveness of Catchment Management Planning", Final Report for DPIE, AACM International, Adelaide, 1995.
9. Reeve, I. "Sustainable Agriculture", The Rural Development Centre, UNE, Armidale, 1990.
10. Syme, G.J., Butterworth, J.E. and Nancarrow, B.E. "National Whole Catchment Management: A Review and Analysis of Process". LWRRDC Occasional Paper Series No. 01/94. LWRRDC, Canberra, 1994.
11. Herbert River Catchment Coordinating Committee. "Herbert River Catchment Management Strategy (Draft)", 1996
12. McDonald, G. and Bellamy, J. "ICM in the Herbert River Valley", Paper to be presented at the RAPI, Queensland Planners Conference, Roma, Sept. 1997. (Also this publication Vol. 3, Ch. 1, pp. 1-16).
13. Mintzberg, H. "Strategy Formation: Schools of Thought". In Frederickson, J. (ed), Perspectives on Strategic Management, 1990, pp.105-235.
14. Lindholm, C.E. "The science of 'muddling through'", Public Administration Review, Spring 1959, 79-89.