



International Journal of Development and Sustainability

ISSN: 2168-8662 – www.isdsnet.com/ijds

Volume 3 Number 7 (2014): Pages 1595-1610

ISDS Article ID: IJDS14052601



A New Avenue to fight unsustainable development at the Lake Naivasha Wetland of Nakuru County in Kenya: The Role of Trade Associations

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Abstract

Wetlands sustainability can be pursued through stakeholders where business enterprises are confronted with social, economic and environmental claims. This paper looks at how the concept of sustainable development (SD) can be looped with the stakeholder relations management (SRM) theory to come up with a framework for wetlands sustainability. The main objective was to establish the main stakeholders in the Lake Naivasha wetland with specific objectives being to identify the main business activities around the wetland; the stakeholders that influence business sustainability; and to establish if wetlands sustainability can be achieved through SRM. The paper argues that stakeholders need to recognize the need for a common path to achieving improved wetland resource management economic and environmental sustainability. A survey was conducted in September and October 2013 to establish what the business community considered to be the greatest influence over their sustainability strategy in the next five years. Respondents were asked to rate on a Likert scale what they thought would influence their business/organization's sustainability. Discriminant analysis with the chi-square and degrees of freedom was used as inferential statistics. The study recommends the development of a Sustainability Assessment Model *signature* for each of the trade associations.

Keywords: Lake Naivasha Wetland; Unsustainability; and Trade Associations

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Cite this article as: Oribu, W., King'oriah, G. and Agwata, J. (2014), "A New Avenue to fight unsustainable development at the Lake Naivasha Wetland of Nakuru County in Kenya: The Role of Trade Associations", *International Journal of Development and Sustainability*, Vol. 3 No. 7, pp 1595-1610.

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1. Introduction

Lake Naivasha is a fresh water lake situated in the Kenya portion of the Great Rift Valley about 80 km North West of Nairobi within Nakuru County. The lake has achieved global significance as a Ramsar and UNESCO HELP (Hydrology Environment Life and Policy) status. Further, the Lake was declared an Eco-hydrology Demonstration site in 2005. As a result, it is now both a national and international conservation area. Because of its importance, there have been so many stakeholders who are interested in the way its resources are managed.

The Lake Naivasha catchment covers an area of approximately 3,400 km² and ranges in altitude from 1,900m to about 3,900m above sea level. The economic activities around Lake Naivasha include: pastoral farming, small-scale and large-scale agricultural farming, horticulture, ranching, tourism, fishing, wildlife conservation, local government activities, power generation, and basin inhabitants. Some of the basin inhabitants are dependent on the broader Kenyan economy and trade while others are basically dependent on the geothermal power production either as employees or entrepreneurs. Over 50 square kilometres of land around the lake is under intensive commercial horticulture and flower farming. The agricultural industry exports high value fresh vegetables and cut-flowers to the European and English markets. These activities provide livelihoods for over 500,000 people living within the basin (WWF, 2012).

Most of the identified sustainability threats emanate from poor land-use practices within the watershed, unregulated and excessive water abstraction for domestic, agricultural/horticultural and geothermal generation use, weak policy enforcement, population pressure, water pollution due to waste disposals and climate change due to the green house gas effects. These have resulted in degradation of ecosystem services, economic losses, worsening poverty and reduction of biodiversity (UN-water International Conference, 2011).

The risks and opportunities to be gained through concerted efforts towards sustainability are numerous. A reduction in water abstraction for commercial farmers, for example, affects employment, export earnings, livelihoods and brings about social tensions. The manifestations of the risks are uncertain but the implications are potentially significant (WWF, 2012). Due to the population pressure and economic growth in the area as a whole, the already significant development pressures on the increasing urban-agricultural abstraction coupled with the increasing temperature-climate variability will increase over time. In an ecologically sustainable environment, Lake Naivasha provides an opportunity to support social and economic development in Kenya given that vegetables contribute approximately Kshs. 6.65 billion (US\$ 95 million) while cut flowers contribute Kshs. 28 billion (US\$ 400 million) to the economy. These opportunities for social and economic development may be squandered if the risks and opportunities are not identified in order to direct resources towards their mitigation.

In order to identify the risks and opportunities, there is a need to have a closer look at the following initiatives: improvement of institutional arrangements to support a clear definition and management of the availability of water inclusive of the rules for its use in different parts of the catchment; fostering the innovative partnerships between government, private sector and civil society organizations to address problems in and around the Lake; and development of Lake Naivasha-specific wetland management

standards through trade associations. The wetland management standards will thereafter need to be accredited by a recognized body before they are adopted by all enterprises that operate in the ecosystem. In a study conducted to assess Community Based Natural Resource Management (CBNRM), Usman et al. (2011) notes that the development of a wetlands standard reflects more of rhetoric than success in the case of Lake Naivasha catchment. This is because the many assumption of CBNRM as conceptualized in theory is being violated with the consequence of environmental degradation (Usman et al., 2011).

A project was initiated at the Lake Naivasha basin over ten years ago to demonstrate how economic incentives for both ecosystem service buyers and sellers can be used to achieve significant land and water management improvement (UN-Water International Conference, 2011). In the project, Lake Naivasha Water Resources Users Association (LANAWRUA) agreed to compensate the small-scale landowners. Lake Naivasha Growers Group (LNGG) who are currently the major contributors to the LANAWRUA represents the ecosystem service beneficiaries (notably the major floricultural/horticultural industry based around the Lake) while the small-scale landowners/farmers are represented by the Upper Turasha-Kinja and Wanjohi Water Resource Users Association (WRUAs). The small-scale growers are said to forgo some potential income to manage their land to provide good quality water to the downstream users.

Some of the associations that have been formed at the Lake Naivasha basin to promote the members' interests. These include; Lake Naivasha Growers Group (LNGG), Lake Naivasha Riparian Owners Association (LNROA), Central Rift Tourism Circuit Association (CERITOCA), the Fishermen's Association, Imarisha Naivasha Trust among others.

1.1. Objectives of the study

The main objective of this paper is to establish whether the main stakeholders in the Lake Naivasha wetland have any influence in the strategic thinking of businesses that operate at the Land Naivasha wetland area. The specific objectives are to identify the main business activities operating around the Lake Naivasha wetland; identify the stakeholders that may have influence in various businesses' sustainability strategies in the next five years; and to establish if wetlands sustainability can be achieved through SRM.

1.2. Research Questions

In order to achieve the objectives of the study, the researcher sought to answer the following questions:

- Which are the main business activities that operate in the Lake Naivasha wetland?
- Who are the main stakeholders that may influence the business sustainability strategic thinking in the next five years?
- Will wetlands sustainability be achieved through stakeholder relations management?

1.3. Significance of the study

Lake Naivasha was declared an Eco-hydrology Demonstration site in 2005. This has made it both a national and international conservation area. Because of its importance, there have been so many stakeholders who are interested in the way its resources are managed. In this regard, the risks and opportunities to be gained through concerted efforts towards sustainability are numerous. A reduction in water abstraction for commercial farmers, for example, will affect employment, export earnings, livelihoods and bring about social tensions. This calls for an urgent need to re-look at ways to bring about sustainable use of the resources. Further, the 'Wetlands Monitoring and Assessment Strategy for Kenya (2012) developed by the National Environmental Management Authority does not appear to appreciate the role of stakeholders.

2. LITERATURE REVIEW

Bossel (1999) notes that the human social system, its component systems, and the resource and environment system on which they depend, are complex dynamic systems. They therefore require comprehensive sets of indicators providing essential information about; the state of the individual systems, and their position with respect to individual and societal goals in order to understand the developments. Bossel thus argues that systems depend on subsystems thus sustainability has two separate aspects: sustainability of the subsystem, and the subsystem's contribution to the performance of the total system. It is therefore important to understand the relationships that exist between all the subsystems that may be identified in a given area if sustainability is to be addressed.

Cobb, Halstead & Rowe (1995) argues that Gross Domestic Product (GDP) does not capture all aspects of sustainable development. This is because with current technology, each of the goods and services is associated with significant consumption of non-renewable resources and generation of environmental pollution. They recommend that each system be assessed as to its sustainability and contribution to the total system.

Wackernagel & Rees (1996) argues that in order to measure ecological footprint as a barometer of sustainability, the only aggregate indicator that makes physical sense is the Ecological Footprint or the almost equivalent Sustainability Progress Index (SPI). Although this is an excellent summary indicator of the major environmental impacts of economic activity, it does not capture the social dimensions of sustainability development.

In order to simultaneously evaluate both the environmental and social components of sustainable development Prescott-Allen (1997) has developed a barometer of sustainability (Manitoba Environment, 1997). The United Nations (DPCSD, 1996) has criticized the extensive lists of indicators on the following accounts:

- They are derived *ad hoc* without a system theoretical framework to reflect the operation and sustainability of the total system,
- They always reflect the specific expertise and research interests of their authors,
- They are overly dense in some areas (multiple indicators for essentially the same concern), and sparse or even empty in other important areas.

This criticism implies that the aggregate indicators are not a systematic and complete reflection of the total system that is human society in interaction with its natural environment. In this regard, there is a need to involve all stakeholders when it comes to issues to do with sustainability.

OECD (1993) in an attempt to be more systematic introduced the PSR (pressure, state response) and PSIR (pressure, state, impact, response) frameworks. In these approaches, isolated chains of cause and effect are identified for a particular environmental problem and corresponding indicators are monitored. These frameworks have been widely applied to sustainable development problems (Swart & Bakkes, 1995). According to Meadows (1998) the frameworks neglects the systematic and dynamic nature of the processes and how they embed in the larger total system that contains many feedback loops. Meadow further argues that representing the impact chains by isolated PSIR-chains may not be permissible, and more often than not they are not adequate approximation. The impact in one causal chain can be pressures and in another can be states, and vice versa implying that multiple pressures and impacts are not considered. The implication is that the real, usually nonlinear relationships between the different components of a chain cannot be accounted for. States and rates of change (stocks and flows) are treated inconsistently.

In order to cover for the shortfalls of the previous frameworks the Bellagio Principles have been formulated as guidelines for practical assessment of progress toward sustainable development (Hardi & Zdan, 1997). This involves the analysis of entire complex of problems and tasks more carefully. It therefore requires that reasonable details (mental or formal) model of the total system and its components by looking at three separate tasks: identification of the major system; developing an approach for identifying indicators of viability and sustainability of these systems; and thinking about how to use the information gathered for assessing viability and sustainability of human development at different levels of societal organization (Bossel, 1996).

Figge et al. (2002) notes that although there is growing importance of environmental and social issues, with most of the companies implementing specific environmental or social management systems, the systems have rarely been integrated with the general management system of the firm. As a consequence, environmental and social management is in mostly not linked to the economic success of the firm. This leads to the economic contribution of environmental and social management remaining unclear. Fagge et al. (2002) recommends the use of the Sustainability Balanced Score Card (SBSC) which integrates environmental and social aspects into the successful implementation of both 'conventional' corporate strategies and explicit corporate sustainability strategies.

The stakeholder theory posits that corporations have duties to its stakeholders. Stakeholders can be internal, such as stockholders, and employees, including management; or external, such as customers, suppliers, stockholders, banks, environmentalists, governments and other groups. They can also be divided into primary and secondary groupings where primary ones have a more direct influence or are influenced by the company directly while secondary ones are not influenced directly (Lindfelt, 2002). Under this theory, the corporation's fundamental obligation is to ensure its survival and thrive be benefiting and balancing the needs of multiple stakeholders, instead of purely maximizing its financial success (Kaku, 2003). Cespedes-

Lorente et al. (2004) proposes four stream of research within stakeholder theory that touch on the natural environment:

- The role of external stakeholders in assessing environmental performance and corporate environmental risks;
- The importance of pressure on environmental reporting practices and communication;
- The influence of stakeholders on environmental strategy of firms; and
- The development of environmental cooperation between the firm and stakeholders.

This informs this study which postulates that trade associations have a role to play in sustainable development in their respective areas of operations.

Baxter et al. (2003) developed a Sustainability Assessment Model (SAM) which identifies performance indicators with both negative and positive impacts that arise from a project. The pattern established through the life cycle of a project is referred to as Sustainability Assessment Model *signature* (SAMs). The performance indicators are grouped into four as follows:

- Economic impact; Tax paid (both local and foreign); dividends, social investments and all other expenditures incurred. The sum of these impacts represents the total income generated within a given financial year.
- Resource impact; Value of resource produced, value of water used, value of energy used, value of raw materials used, value of intellectual capital used and estimated value of physical infrastructure developed. These captures the intrinsic of inherent value of the resources used in the course of the financial year.
- Environmental Impact; Emissions to the environment, nuisance (noise, odour& visual), footprint and waste disposal costs. These represent the damage costs for the pollution externalities.
- Social impact; Grouped into three categories:
 - Financial value of employment created (both direct & indirect) minus the negative health and safety impacts of job creation.
 - Tackling poverty and social exclusion, reduction of unfit housing stock, reduction of crime & fear of crime. This category establishes the link between the taxes generated and the social benefits arising from the use of those taxes.
 - Social impact of products which represents the external benefits arising from the use of the product.

All the above indicators are monetized to allow for comparison on a like-for-like basis after which they are combined into a single measure, the Sustainability Assessment Model *indicator* (SAM i) which reflects the overall contribution to the wetland sustainability. The total value of each of the four indicators is then converted into a percentage of the overall return from the project. The percentages are then summed to arrive at the SAM i thus:

$$\text{Economic Impact} + \text{Resource impact} + \text{Environmental Impact} + \text{Social Impact} = \text{SAM}_i$$

When adopted by individual groups of trade associations it will form part of the Sustainability Assessment Model *signature* (SAMs) for the respective association which is then subject to disclosure in the annual reviews.

3. STUDY METHODOLOGY

The data for the study area was collected through a variety of instruments such as questionnaire administered to individual respondents, checklists and focus groups. The checklist was used to identify the main businesses that operate in the Lake Naivasha wetland. The questionnaire and focus groups were used to establish the stakeholders that may influence the strategic thinking of most of the businesses operating in the area. Purposive random sampling was used to determine the sample size from the population of interest (flower farms, fishermen and hoteliers). Descriptive survey research design was used in order to pick behaviours that may influence business strategic thinking. A questionnaire was administered to two hundred respondents who were purposively chosen to represent senior management, middle level management and other employees in the sampled businesses as follows: farming community - ninety seven (97) respondents, fisheries – forty eight (48) respondents and the hotel industry - fifty six (56) respondents. The respondents were asked to state if they agree or disagree that the identified eleven types of stakeholders will have the greatest influence on the company's sustainability strategy over the next five years. The responses were rated on a five-point Likert scale where, 1 = strongly agree, 2 = agree, 3= undecided 4 = disagree and 5 = strongly disagree.

Table 1 below indicates the results of the determinants of sustainability strategy for the chosen categories of businesses in the next five years.

Table 1. Results for the determinants of sustainability strategy for the next five years

Variable	Strongly agree	Agree	Not Sure	Disagree	Strongly Disagree	Total Respondents
Gov't & Policy makers	81	59	34	25	2	201
Competitors	36	60	60	42	3	201
Customers outside the country	85	53	34	27	2	201
Regulators	67	64	38	31	1	201
Employees	67	67	38	29	0	201
Shareholders	81	59	34	25	2	201
Media	73	66	34	28	0	201
Business Associates & Codes of Ethics	66	63	36	34	2	201
Community Leaders	55	79	38	28	1	201
Local Customers	63	70	38	27	4	201
NGOs	60	62	40	36	3	201
Total Respondents	734	702	424	332	19	2211

(Source: Field data by Author, 2014)

The data collected was analyzed using discriminant analysis with the chi-square and degrees of freedom as inferential statistics. Step-wise analysis was used and the results are as shown in Tables 2(a), 2(b), 2(c), 2(d), 2(e), 2(f), and 2(g) below.

For purposes of analysis business sustainability strategies were identified as dependent on the influence of the stakeholders. Business sustainability strategy was therefore the dependent variable in the analysis while the perception on the respective stakeholder influence is the independent variables. Discriminant analysis was used because it helps identify which continuous variables discriminate between two or more naturally occurring groups. In this study we sought to investigate which type of stakeholders discriminate between business sustainability strategy. The results were therefore used to determine which group of stakeholders are the best predictors of whether a business will adopt a sustainability strategy in the next five years.

4. RESULTS AND DISCUSSIONS

Below is the summary of the discriminant results.

Table 2(a). Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		201	100.0
Excluded	Missing or out-of-range group codes	0	.0
	At least one missing discriminating variable	0	.0
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	.0
	Total	0	.0
Total		201	100.0

The preferred ratio for valid cases to independent variables is 20 to 1. In this analysis there are 201 valid cases and 11 independent variables. The ratio of cases to independent variables is 18.27 which is still within the minimum ratio of 5 to 1.

Table 2(b). Prior Probabilities for Groups

Type of industry	Prior	Cases Used in Analysis	
		Unweighted	Weighted
Farming	.483	97	97.000
Hospitality	.279	56	56.000
Fisheries	.239	48	48.000
Total	1.000	201	201.000

The number of cases in the smallest group as shown in Table 2(b) is 48 which is larger than the number of independent variables (i.e. 11). In addition it exceeds the preferred minimum number of 20 cases.

Table 2(c). Eigen values

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	4.329(a)	99.2	99.2	.901
2	.036(a)	.8	100.0	.187

a First 2 canonical discriminant functions were used in the analysis.

The maximum possible number of discriminant functions is the smaller of one less than the number of groups defined by the dependent variables and the number of independent variables. In figure 2(c) we have two discriminant functions which is within the requirements.

Table 2(d). Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 2	.181	335.779	8	.000
2	.965	6.997	3	.072

The step-wise analysis identified one discriminant function that is statistically significant. The Wilks' Lambda statistic for the test of function 1 (chi-square 335.779) has a probability of .000 which is less than or equal to the level of significance of 0.05. The significance of the maximum possible number of discriminant functions supports the interpretation of a solution using 1 discriminant function.

Table 2(e). Functions at Group Centroids

Type of industry	Function	
	1	2
Farming	-1.996	.070
Fisheries	2.815	.162
Hospitality	.749	-.330

Unstandardized canonical discriminant functions evaluated at group means

The two discriminant functions divide the dependent variables into those who feel that identified stakeholders have no influence in the businesses' sustainability strategy for the next five years and those who feel that the identified stakeholders will have influence in the businesses' sustainability strategy in the next five years.

Table 2(f). Structure Matrix

	Function	
	1	2
COTC	.856(*)	.219
GPM(a)	.808(*)	.186
SHARH(a)	.808(*)	.186
MEDIA(a)	.804(*)	.230
BUSA(a)	.798(*)	.023
EMPER(a)	.775(*)	.267
NGO	.754(*)	-.206
REGU(a)	.746(*)	.158
LOCC	.698(*)	.314
COMLE	.664(*)	.346
COMP(a)	.625(*)	-.039

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

* Largest absolute correlation between each variable and any discriminant function

a This variable not used in the analysis.

Key for Table 2(f):

COTC – Customers outside the Country

GPM – Government and Policy Makers

SHARH – Shareholders

MEDIA – Media (i.e. good or bad publicity)

BUSA – Business association/codes of practice

EMPER – Employees

NGO – Non Governmental Organisations

LOCC – Local Customers

COMLE – Community Leaders

COMP – Competitors

Since we did step-wise analysis, our interpretation will be limited to function 1 which was found to be statistically significant. The results indicate that all loading in the structure matrix are above 0.3 or higher thus will have influence in the businesses' sustainability strategy in the next five years.

Table 2(g). Classification Results (a)

		Type of industry	Predicted Group Membership			Total
			1	2	3	
Original	Count	1	85	0	12	97
		2	0	47	9	56
		3	0	17	31	48
	%	1	87.6	.0	12.4	100.0
		2	.0	83.9	16.1	100.0
		3	.0	35.4	64.6	100.0

- a. 81.1% of original grouped cases correctly classified.

4.1. Main Business that operate within the Lake Naivasha Wetland:

There were several business that were found to be operating at the Lake Naivasha wetland including; pastoral farming, small-scale and large-scale agricultural farming, horticulture, ranching, tourism, fishing, wildlife conservation, local government activities, power generation, and basin inhabitants. For purposes of this study, the researcher grouped the businesses into three groups (Farming, Fisheries and Hospitality). Hospitality was classified to include all businesses that have been established to offer services and those that have come up due to the availability of other related activities.

4.2. Stakeholders:

Through the use of a checklist, eleven groups of stakeholders were identified as follows; Customers outside the Country, Government and Policy Makers, Shareholders, Media (i.e. good or bad publicity), Business association/codes of practice, Employees, Non Governmental Organizations, Local Customers, Community Leaders and Competitors. From the results shown above, all the identified stakeholders will have some influence on the sustainability strategy of businesses in the next five years. This implies that for sustainable development to be achieved all business concerns must adopt goals that are; global, rights-based approach, acceptable worldwide as best practice, all inclusive and ensuring concrete legal and financial commitments. These five elements require that stakeholder be involved if sustainable development is to be achieved.

4.3. Stakeholder Management Relationships as a method for wetlands sustainability management

From the literature review it is clear that an increasing number of authors are addressing environmental issues through the stakeholder theory such as environmental management (Cespedes-Lorente et al., 2004; Onkila, 2009), environmental regulations (Cespedes-Lorente, et al., 2004), and protection of the natural environment (King, 2007). Cespedes-Lorente, et al. (2004) proposes four stream of research within stakeholder theory that touch on the natural environment:

- the role of external stakeholders in assessing environmental performance and corporate environmental risks;

- the importance of pressure on environmental reporting practices and communication;
- the influence of stakeholders on environmental strategy of firms; and
- the development of environmental cooperation between the firm and stakeholders.

Based on its bases, stakeholder theory provides a large potential to contribute to sustainability by encompassing different stakeholders. In this regard, it can address the economic, environmental and social dimensions. Furthermore, the stakeholder theory provides chief executives of companies with a more holistic perspective on how to understand the firm's relations with other parts of the social and environmental systems. This however provides challenges to chief executives who are used to considering that their company's only duty is to generate profit.

5. CONCLUSIONS AND RECOMMENDATIONS

Lake Naivasha provides goods and services which bring about a range of economic benefits that contribute to economic activity thus enhancement of human welfare. These Lake benefits can be grouped into direct, indirect, option and existence. Direct benefits comprises of raw materials and physical products which are used directly for production, consumption and sale including those providing energy, shelter, foods, agricultural production, water supply, transport and recreation. There are also indirect benefits which comprise of the ecological functions which maintain and protect natural and human systems through services such as; maintenance of water quality, storage and flow, storm protection and flood control, microclimate stabilization and nutrient retention, and the production and consumption activities they support. Option benefits represents the premium placed on maintaining a pool of the Lake Naivasha species and genetic resources for future possible uses such as leisure, commercial, industrial, agricultural and pharmaceutical applications and water-based developments, some of which may be unknown currently. Lastly, existence benefits represents the intrinsic value of the Lake species and areas regardless of their possible current or future uses such as cultural, aesthetic, heritage and bequest significance.

In this regard, the starting point will be to undertake the Lake Naivasha wetland benefits valuation. The Ramsar Technical Report No. 3 "Valuing Wetlands" provides "*guidance for valuing the benefits derived from wetlands ecosystem services*" (De Groot et al., 2006). There are several methods that can be used for this purpose depending on the wetlands service and the type of value associated with it (Freeman, 2003) although the economic value that may be arrived at represents a fraction of the total wetlands value (Turner et al., 1994). Among the methods that can be used to value the benefits of a specific wetland include: Contingent valuation method (e.g. Farber, 1988; Bateman and Longford, 1997); Hedonic pricing (e.g. Lupi et al., 1991; Doss and Taff, 1996); Travel cost method (e.g. Ramdial, 1975, Cooper and Loomis, 1993); Production function approach (e.g. Acharya and Barbier, 2000; Bell, 1997), Net factor income approach (e.g. Amacher et al., 1989; Schuijt, 2004); Total revenue estimation (e.g. Costanza et al., 1989; Raphael and Jaworski, 1979); Opportunity cost (e.g. Leitch and Hovde, 1996; Sathirathai and Barbier, 2001); and Replacement cost (e.g. Breaux et al., 1995; Emerton and Kekulandala, 2002) among others.

The benefits valuations obtained can then be categorized into economic, resource usage, environmental and social indicators in order to come up with the sustainability Assessment Model *indicator* (SAM_i) to be adopted by all enterprises that operate at the ecosystem. The indicators are generally classified into two: internal (economic) and external (resource usage, environmental and social). The economic indicators are split into capital expenditure, operations expenditure, taxes, dividends, social investment and profit. They represent the total income generated by an enterprise within a financial year.

Resource usage indicator will attempt to capture the intrinsic and inherent value of the resources used in a given financial year. They include natural consumable resources as well as intellectual capital and infrastructure. Environmental indicators on the other hand are split into four areas namely; pollution impacts (such as greenhouse gas effects and combusting fossil fuels), nuisance impacts (such as noise, odour and visual impact), footprint and biodiversity impacts around the firm and waste impacts. To assess their impact reference will need to be made to the National Environmental Management Authority guidelines. Lastly, social indicators can be captured from three categories of impacts namely; positive social value arising from the direct and indirect jobs generated subtracted from the negative health and safety impacts of jobs, taxes generated and social benefits arising from their use, and external benefits arising from use of the productive or service. The social benefits arising from tax use will need to be estimated from the published data to get a series of factors to be multiplied by the amount spent on health, safety housing and other social services.

Once all the indicators have been established, the data can be combined to produce a pattern of positive and negative impacts which arise from the business activities in a given financial year. This elegant presentation of the internal and external impacts of an enterprise's activity is then combined into an overall measure to provide an indication of how the firm is contributing to the sustainability of the ecosystem. In cases where the indicator is negative the firm in question is prevailed upon to reduce the negative impacts. Further, the indicator should be seen to be improving in order to show continuous sustainability contribution of the enterprise in question.

The Sustainability Assessment Model (SAM) is a versatile and relatively easy tool to use given the fact that it makes visible the significant factors which contribute to sustainable development. Once the factors become visible, there is increased awareness of sustainability issues which influences behaviours forcing questions to be asked before decisions are made. In the case of Lake Naivashawetland the SAM can be used to; assist in determining the direction of both short term and long term company strategies as well as assessing the performance trends of industry sectors.

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