Tackling Land Use in Samoa

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The Global Situation

Land degradation is a massive, global environmental problem (FAO/UNDP/UNEP, 1994; FAO/UNEP, 1995; Scherr, 1999). FAO/UNEP (1995) reported that degraded lands worldwide include 5.8 million km^2 degraded by deforestation - mainly for agricultural production, 6.8 million km^2 degraded by overgrazing, 1.37 million km^2 degraded for fuelwood, 5.5 million km^2 degraded by agricultural mismanagement (as a result of wind and water erosion; salinization and water logging; and soil nutrient loss), and 0.195 million km^2 degraded by industry and urbanization. Thus, overall, about 18.1 million km^2 of land (92% of total degraded land) has been degraded as a result of agriculture, with 32% of it due to deforestation, 30% to mismanagement and 38% to overgrazing.

The Local Situation

The Pacific islands and Samoa in particular are not immune from land degradation. In fact, the small island ecosystems are especially vulnerable to the problems of land degradation and unsustainable land use because their natural resource base is limited and fragile. Hughes (1998) referred to a number of issues common to inappropriate land use and management in the Pacific islands. However, according to Howlett (1996a), four of the key issues that needed addressing in Samoa are: (a) uncontrolled land clearing for agriculture on sloping land, (b) land tenure and land disputes, (c) attitudes of farmers towards impact of their activities; and (d) lack of information and agrotechnology for sustainable farming.

Some Basic Terms

For the purpose of this paper, the terms "land degradation", "land-use policy" and "sustainable land management" are defined as follows:

Land degradation.

Land which due to natural processes or human activity is no longer able to sustain properly an economic function and/or the original natural ecological function (ISO, 1996 (cited in Choudhury and Jansen, 1999)); or, the loss of the productive capacity of the land to sustain life (IFAD 1992 (cited in FAO, 1999)).

Land-Use Policy. An expression operception of the direction to be taken on major issues related to land use and the proposed allocation of the national land resources over a fixed period of time. It has a production and a conservation component. (FAO/UNEP, 1999).

Sustainable land management combines technologies, policies and activities that are aimed at integrating socio-economic principles with environmental concerns so as to simultaneously maintain or enhance production, reduce the level of production risk, protect the potential of natural resources and prevent (buffer against) soil and water degradation, be economically viable, and be socially acceptable (Smyth and Dumanski, 1993 (cited in Dumanski, 1997).

Types, Seriousness, Causes and Effects of Land Degradation in Samoa

Types and Seriousness

Various types of soil and land degradation have been explained by previous authors including FAO/UNDP/UNEP (1994) and Scherr (1999). As only to be expected, authors differ in their approach to describing and classifying land degradation. Douglas (1994) (in FAO, 1999) recognizes that land degradation has five main components: (a) soil degradation, (b) vegetation degradation, (c) water degradation, (d) climate deterioration, and (e) losses to urban/ industrial development. Each of these major components could be subdivided into more specific types of degradation.

According to Peteru's publication (1993:45) who stated that "Deforestation is perhaps the greatest single threat to Samoa's environment. The ranking also seems to agree with the results of a PRAP workshop held in Suva about five years ago (cited in Hughes, 1998). In this workshop, participants considered six land/ soil problems in the Pacific and, for the Samoan situation, ranked them, in descending order of importance, as follows:

Land pressure > soil fertility decline > soil erosion > poor soil drainage = water logging > drought

where *"land pressure"* may be equated with *"deforestation"* as *"land pressure"* is a major cause of *"deforestation"*.

Causes of Land Degradation

While discussing the causes of land degradation in the Pacific, including Samoa, Hughes (1998) recognized and distinguished between (a) natural degradation hazards, (b) direct causes of land degradation, and (c) underlying causes of degradation - as given below with some modification:

(a) Natural degradation hazards
- Cyclones
- Drought
- Volcanic activities

(b) Direct causes of land degradation
- Overcutting of vegetation
- Shifting cultivation without adequate fallow periods
- Overgrazing
- Non-adoption of soil-conservation management practices

- Extension of cultivation onto lands of lower potential and/or high natural hazards
- Improper crop rotation
- Unbalanced fertilizer use

(c) Underlying causes of land degradation
- Population increase
- Attitudes
- Economic pressure
- Land tenure
- Land shortage
- Poverty

Effects of Land Degradation

FAO/UNDP/UNEP (1994) has grouped the effects of land degradation as "effects upon production" and "consequences for the people" ashown below:

Effects of Land Degradation Upon Production
- Land is abandoned (where degradation is severe)
- Crop yields are reduced
- Inputs and costs of production are increased (where farmers attempt to combat reduced yields by increased inputs)
- Responses to inputs are decreased
- Flexibility of land management is decreased
- Risk is increased
- Labour, and technical and financial resources are diverted to reclamation

Consequences of Land Degradation for the People
- Landlessness is increased;
- Food supplies are reduced or less reliable;
- Labour requirements are increased; and
- Incomes are decreased.

However, there are other possible consequences of land degradation, e.g. reduced vegetation cover to the soil, reduced return of organic matter, and less biological activity in the soil; increased pollution from increased use of agrochemicals; and migration of young people elsewhere to search for employment opportunities. While referring to deforestation, Peteru (1993:45) reported that: *"Its effects include: top-soil loss; watershed destruction with subsequent water shortages; drinking water contamination; biodiversity loss; coastal flood damage during the rainy season; marine pollution; and cultural impoverishment".*

Technical Solutions to Major Problems

It is most likely that technical solutions to the problems of land degradation and unsustainable land use are already known, e.g., agroforestry, mulching, cover crop, crop rotation with legumes, etc. For this reason, it is important that the huge body of literature in this field be thoroughly reviewed so that workers in Samoa do not end up spending scarce resources trying to "re-invent the wheel". The challenge is to identify and fine-tune technical solutions that are appropriate for the Samoan situation in terms of the country's biophysical as well as socioeconomic and cultural makeup. For this reason it is important to engage social scientists in

projects and activities that try to tackle the problems of land degradation and unsustainable land use, as has been pointed out by Lawrence *et al.* (2001) and others.

Section III of this paper shows that the three main types of land degradation problems in Samoa are (a) deforestation, (b) fertility decline/ nutrient depletion; and (c) soil erosion due to rainwater. With our limited resources, it may be wise to focus our activities on tackling these three major problems. Possible activities that we may consider are given below.

Deforestation: According to Peteru (1993), there are two causes of deforestation in Samoa apart from natural degradation hazards or "acts of God". These two causes of deforestation are agricultural clearing or agrodeforestation and, only on Savaii, commercial logging. To tackle the problem of agrodeforestation, the following activities could be considered:

- Practice agroforestry;
- Practice corridor clearing (where corridors or strips of forests rather than the whole forests are cleared);
- Increase the intensity and/or effectiveness of current farming/cropping practices to reduce the need for more clearing;
- Increase public awareness of this problem; and
- Put in laws and regulations at the national, sub-national and local levels.

Fertility Decline/ Nutrient Depletion: To tackle this problem the following activities could be considered:

- Use of organic (composts, prunnings, farmyard manure, etc.) and inorganic inputs;
- Intensive fallowing (which includes application of lime, planting of legumes, etc. on fallow lands - to quicken rejuvenation of degraded lands);
- Practice agroforestry, particularly with the use of nitrogen-fixing trees such as *Erythrina* species (dadap or *gatae*), etc;
- Crop rotation using nitrogen-fixing plants (such as peanuts etc) in the rotation; and
- Liming where appropriate (i.e., especially where pH<5.5).

Soil Erosion: To tackle this problem, the following activities could be considered:

- Practice agroforestry; consider planting of trees and shrubs along contours;
- Practice bench terracing where appropriate;
- Plant grassy strips;
- Contour ploughing and/or planting; and
- Conservation (/minimum/zero) tillage.

Childrens Corner

TRUE/FALSE QUESTIONS

Circle the correct answer:

1. Land Degradation refers to Agricultural land. **True or False**
2. Natural processes or human activity causes land degradation **True or False**
4. Small island ecosystems are especially vulnerable to the problems of land degradation and unsustainable land use. True or False
5. Land Degradation is not a serious problem around the world. **True or False**
6. Land biodiversity is in great danger from activities on land. **True or False**
7. Population increase is another cause of land degradation. **True or False**
8. Natural degradation hazards are; cyclones, drought and volcanic activities. **True or False**
9. One of the effects of land degradation upon production is crop yields are reduced. **True or False**
10. To tackle the problem of agrodeforestation, public awareness about the problem should consider. True or False

Word Find

Find the following words from the puzzle!

Soil erosion	Disaster	Policy	Lanotoo	Sustainable
Management	Awareness	Vegetation	Development	Deforestation

A	G	R	I	C	U	L	T	U	R	A	L	P	D	D	D
M	W	I	E	O	S	N	O	I	T	A	T	E	G	E	V
E	M	A	N	A	G	E	M	E	N	T	E	G	F	V	L
G	K	O	R	R	I	E	T	C	S	N	A	O	B	E	I
A	L	O	T	E	M	C	U	E	O	N	R	L	B	L	B
Z	A	B	E	A	N	R	R	I	I	E	P	R	C	O	Q
I	N	L	E	B	I	E	S	C	S	O	E	P	A	P	A
N	O	U	U	T	A	O	S	T	D	E	A	E	O	M	T
E	T	A	Y	T	R	A	A	S	D	M	T	L	D	E	D
Y	O	J	I	E	R	T	L	I	A	T	I	O	I	N	W
O	O	O	L	M	I	A	N	L	A	C	V	E	R	T	X
M	N	I	I	O	G	G	O	R	Y	N	G	Y	B	P	L
I	O	N	N	T	E	L	B	A	N	I	A	T	S	U	S
S	G	Y	W	T	A	R	F	R	E	T	S	A	S	I	D