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**ECOLOGICAL COMPARISON OF THE TOURISM RESORT OF WENGEN  
(SWITZERLAND) AND OBUDU (NIGERIA)**

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**ABSTRACT:** *Both Wengen and Obudu Resorts are blossoming areas in tourism, and also share similar characteristics of topography and climate. A comparison of the ecological interactions between the two resorts will bring out the potentials and problems of each resort; which is useful in recommending sustainable practices to strengthen the resorts. Field studies were carried out in both resorts on the Soils, Flora, Fauna and Human activities of land use, population and recreation. While the results of Wengen resort indicated a cautious use of the natural resources of soil, vegetation and wildlife, the Obudu Resort on the other hand records a negative trend in the exploitation of some resources. However, the study parameters of human population and land use were more favourable in Obudu with a population negative rate of 3.1 per annum against the growth rate of -2.6 in Wengen resort. Similarly the land use in Obudu falls within the ratio of 3:1:2 for recreational, residential and agricultural respectively, as against 5:0:2 in Wengen resort. The study came out with recommendations for sustainable development of the two resorts*

**KEYWORDS:** Recreation, land use, Obudu, Wengen, Tourism, Ecological, Resort

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## **INTRODUCTION**

Impacts of tourism on the environment have been researched and monitored by scholars across the world. For instance Bazzaz (1992) and Liu et al (2001) have accumulated literature about the impact of ski and ice-based recreational activities on the polar region and concluded that the continuous melting of the Arctic ice of especially Tundras is worrisome and in fact due to the ecosystem modification as a result of the winter recreational activities. In the same vein Molofosky (1986); Hansen et al (1991); Kelvin (1991); and Alyward et al (1992) have recorded that the devastation of forest resources across the tropical region especially Amazon, Congo and Sumatra were partly due to unsustainable recreational activities of hunting, construction, of canopy walkways, and exotic sites seeing; these they assert were responsible for opening hitherto protected landscape to the vagaries of soil erosion, leaching and nutrient loss.

Similarly; Russ (1985); Byrne (1986); Powel (1989) and Smith et al (1992) have explored many impacts of water recreation particularly that of sailing, sea surfing and fishing on the sea and other aquatic ecosystems. They concluded that the loss of aquatic mammals and other biodiversity are in fact due to recreational effects, hence assert that the effects are avoidable; if only human activities on these ecosystems are properly managed. The same conclusion was also drawn by Walker et al (1969); Saravia (1987) and Morton et al (1982) on their study of the dryland's recreational activities. They assert that the continuous and unabated desertification processes of especially Arabia (Dubai) and Australia are partly attributable to the desert safari;

sand ski and unsustainable hunting recreation. While various studies have covered the polar region, forest, sea and drylands' recreational activities, conversely only few studies were conducted on the impact of High Land's recreational activities on the ecosystems. This may be due to small number of such (Highland) recreational areas. However, the peculiarity of such ecosystems especially in terms of elevation, species, landslide/avalanches etc. call for equal attention like other recreational environments. Similarly, the increasing interest and influx of tourists to such unique terrains all over the world as pointed out by SCEP (1970); Hauseler et al (1990) and Liu (1992) will necessitate an ecological study of the sustainability or otherwise of these peculiar ecosystems.

An opportunity to achieve this is presented by Wengen Resort of Switzerland and Obudu Resort of Nigeria. The two resorts have similar characteristics of topography and climate, but with different development history. While Wengen resort is 'more than two hundred years old, that of Obudu is barely fifty years. An ecological comparison of the two areas is therefore aimed at finding the status of the environment in terms of soils, flora, fauna and the human factors of landuse, Population and recreational facilities. This is believed to lead into findings that will help in supporting good measures which will ensure the sustainability of the two resorts and others with similar characteristics.

### **Study Areas**

Obudu Cattle Ranch and Resort, covering an area of 732sq Km is located in a hilly and mountainous region of Northern Cross Rive State of Nigeria bordering the republic of Cameroon to the East. The ranch was established in the 1950s by enterprising and expatriate Scottish ranchers, which gradually developed into a tourist resort and attaining its peak of recreational facilities between 2002 and 2005; when government invested over two hundred million US dollars in the tourism development of the site.

On the other hand the Wengen Resort is located within the Oberland mountainous region of the Central Swilzerland; in the western part of Europe. The area was once a sleepy farming village which over the last 200 years have been transforming into what is described by tourist as a beautiful holiday resort.

The presence of highland mass at Obudu has modified the zone, thereby supporting a vegetation with different characteristics from that of the surrounding area. Presently, tropical alpine grassland occurs at altitude above 1300 metres and montane forests are found on steep slopes and along water courses. Livestock population of mainly cattle is over 200,000, while wildlife is also rich and diverse and include "typical" forest species. The soils of both Obudu and Wengen are characteristically padrolic. Similarly, the factors of high altitude 1400 metres, rich vegetation in summer and abundant ice cover in winter make Wengen resort a holiday haven from across the world. It enjoys a typical temperate climate that hosts abundant flora and fauna.

The two ecosystems present a unique feature of interaction between man and nature. While in Obudu there is rapid expansion of native settlements taking place in the montane forest, with modern development of tourism facilities and activities affecting the plateau; amidst high dependence of livestock on the grassland. On the other hand, the Wengen resort is experiencing a decline of agricultural activities; giving way to recreational activities in a ratio of 10:90. There is

also a remarkable decrease in nature settlements in favour of tourist lodges. Both resorts are experiencing landslide due to negative exploitation or natural resources.

## **MATERIALS AND METHODS**

### **Justification**

Physical properties of soil in the two areas were studied, which was according to Barret (1988) a good parameter for measuring ecological stability. Similarly, selected flora and fauna of the two areas were studied as asserted by Gregory et al (1985) can give a clear direction as to the ecosystem integrity of a given area. The landuse, facilities and population of a given area were also considered by Harding (1968), Ives et al, (1988); Krautkremer (1985) and May (1988) as good means of measuring the human interaction with the nature. Therefore the three variables were considered in the study areas.

### **Sampling**

**The soil** samples were collected in the two study areas using transects method, which according to Agboola and Corey (1956) is a better way of sampling than the random methods. Two perpendicular transects of 500m were laid in which soil samples were taken within 0 - 15cm depth at regular intervals of 25m along the two transects, Thus, a total of 40 samples were taken at each ecosystem. General landuse and Recreational facilities land-cover were inventoried using previous and existing land use maps (1987 and 2007) of each site. Both maps were at a scale of 1:2500, and cover a period of 30 years; which according to McNeely (1988) is the recommended period for studying landuse changes of any given area.

Population records over a period of 50 years and natural resources statistics of wildlife and Biomes over 30 years period were collected from the management offices of the two resorts. The two parameters according to Hall (1989) And Hecht et al (1989) respectively are good measures of evaluating density changes over time, hence decided to be studied here.

### **Laboratory Works**

The sampled soils of Wengen were investigated in an Agric Laboratory in the neighboring Lauterbrunen, while that of Obudu at the Science Laboratory of the Federal College of Education, Obaniku (12km away). The dry weight of the samples was determined using the volume of the core method, the bulk density then calculated. The infiltration capacity was determined by packing method. The organic matter was determined by chronic Acid Oxidation procedure; while the particle size was done by the Hydrometer method.

## **RESULTS**

The summary of the analytical results of the physical factors of the soil in the two environments are shown on table 1.0. The results in general indicate very wide variation in the physical characteristic between Wengen and Obudu. While the result from Wengen shows stability in edaphic processes that of the Obudu indicated an active disturbance which signified serious challenges in the soil, water and plants interaction in the ecosystem

Table 1: Physical characteristics of Soils in Wengen and Obudu

PARAMETER	WENGEN		OBUDU	
	Studied	USSD Standard	Studied	USSD Standard
Organic Matter	15%	20%	1.6%	3.7%
Bulk Density	2.5g/cm <sup>3</sup>	3.0g/cm <sup>3</sup>	1.7g/cm <sup>3</sup>	2.5g/cm <sup>3</sup>
Infiltration Rate	1.7cm/min	1.3cm/min	0.68cm/min	1.5cm/min
Texture (% Clay)	23%	30%	15%	30%

Source: Author's Field Work, Sept. - Nov. 2007

The landuse pattern of the two study areas is shown on table 2 below. The records of 30 years period were obtained. It clearly showed an opposite direction of the landuse pattern. While both in 1987 and 2007 the Wengen resort has recreational landuse as dominant, on the contrary the Obudu resort has agric landuse as the dominant in the same period.

Table 2: Land Use Pattern in the last 20 years at Wengen and Obudu

LANDUSE	WENGEN		OBUDU	
	1987	2007	1987	2007
Agricultural	6%	4%	55%	40%
Recreational	55%	60%	5%	20%
Residential	15%	6%	5%	15%
Conservational	20%	15%	20%	5%
Others	4%	15%	15%	20%

Source: Author's Map Analysis, Sept. - Nov. 2007

Similarly, the population trend of the two resorts are at opposite direction as shown on table 3. While that of Wengen is decreasing from 30 000 in 1960 to 1800 in 2007, that of Obudu is increasing from 500 in 1960 to 97 00 in 2007.

Table 3: Population Record of Wengen and Obudu in the last 50 years

<b>YEAR</b>	<b>WENGEN</b>	<b>OBUDU</b>
1960	30,000	500
1970	25,000	780
1980	20,000	3,000
1990	10,000	9,000
2000	5,000	14,000
2007	1,800	97,000

Source: Wengen Tourism Board  
2006 Nigerians population Census.

The biological diversity in terms of Wildlife and Biomes of the two resorts were documented from the records of the local authorities over the last 30 years (1980 - 2000). As shown on table 5 and 6; while there is an alarming rate in the biodiversity of the two resorts in year 2000, it was however less between 1980s and 1990s; infact the Birds population in Obudu had raise in the 1980s from 40 individuals hectre to 44 in the 1990s. Table 4: Percentage Abundance of Wildlife in the last 30 years

Table 4: Wildlife Abundance/ha in Last 30 Years.

WILDLIFE	WENGEN			OBUDU		
	1980s	1990s	2000s	1980s	1990s	2000s
Insects	50/ha	50/ha	35/ha	75/ha	72/ha	50/ha
Birds	10/ha	4/ha	3/ha	40/ha	44/ha	20/ha
Reptiles	10/ha	5/ha	2/ha	20/ha	15/ha	5/ha
Mammals	7/ha	7/ha	2/ha	20/ha	29/ha	35/ha

Source: Author's Field Work, Sept. - Nov. 2007

Table 5: Percentage Cover of Biomes in the last 30 years

BIOME	WENGEN			OBUDU		
	1980s	1990s	2000s	1980s	1990s	2000s
Tree Cover	30	29	28	35	30	25
Shrub Cover	30	26	26	0	7	10
Grass Cover	30	35	35	65	60	55
Soil Cover	10	10	11	0	3	10

Source: Author's Field Work, Sept. - Nov. 2007

The recreational facilities cover as shown on table 6 indicated that with the exception of indoor facilities, the two resorts are within same range. However, while Obudu has 30% of indoor recreation, Wengen has only 10%. This may be due to winter sports that are usually outdoor.

Table 6: Recreational Facilities Land-Cover

<b>FACILITIES</b>	<b>WENGEN</b>	<b>OBUDU</b>
Outdoor	60%	40%
Indoor	10%	30%
Support Services	30%	30%

Source: Author's Map Analysis, Sept. - Nov. 2007

## **DISCUSSION**

The soil edaphic properties in Wengen and Obudu were used to evaluate the landscape stability of the two resorts. Soil results from Wengen fall within normal levels, while those from Obudu tilt towards negativity. This is a pointer to potential problems of leaching, erosion and consequently landslides and avalanches. While recreational landuse remain dominant in Wengen for the last twenty years, the agricultural landuse in Obudu is still leading by 40% with an average increase of 7% in ten years. However, the agricultural landuse in Wengen has remain low with only 6% in 1997 and 4% in 2007, while conservational landuse of both Wengen and Obudu stood at 20% in 1987; that of Obudu has dwindled to 5% in just 20 years; an indication of unsustainable practices. Such practices according to Fisher at al (1972) are capable of pushing an ecosystem's species to extinction.

Population size per given area is a good indicator of human influence in an ecosystem. The 50 years population record of Wengen however, shows a continuous decline of the number of native resident at an alarming rate from 30,000 in 1960 to 1500 in 2007. The opposite is however the case of Obudu with only 500 permanent residents in 1960 and by 2007 it skyrocketed to 97,000. Both population trends with -2.6 and 3.1 growth rates respectively are however of serious ecological concerns.

Biological diversity is another good indicator of ecosystem health and stability; in that the diverse the bio-resources are, the more functional an ecosystem is (May,1988). However, from the study, Wengen seems to have less resource but stable functionality, while Obudu has higher biodiversity but with a disturbing stability trend. This is explained through the rate of decline over the last 30 years, while for instance the number of insects and mammals (Table 4) at Wengen stands unchanged between the 1980s and 1990s, that of Obudu showed drastic reduction even though with higher quantities. The same thing with trees and grass cover of the two resorts (Table 5).

Tourism standards according to the World Recreational Code (2005) recommend that a resort shall have indoor, outdoor and support services at the ratio of 30:40:30. This was found by the

study to be so in Obudu but not in Wengen; which has 10:60:30. However, the question is whether the Obudu resort can maintain such standard; given its records in other parameters studied.

## **CONCLUSION AND RECOMMENDATIONS**

A major revelation from the study is that while the Wengen resort had a Master-Plan since 1912, the Obudu resort has none till date. Therefore, physical developments are not according to any scheme. The need for a master-plan in Obudu is therefore important nay necessary.

Similarly, the population trends in both resorts raise a lot of concerns. An increase of more than 2000% in the last five years in Obudu cannot be ignored, with such growth rate of 3.1 % annually, a migrant population explosion is therefore imminent. On the other hand, a catastrophe of the native resident's decrease in Wengen is also imminent, given the statistics that only 3 out of the 200 native fanning families are now living in the area with -2.6 growth rate. Although the Swiss government has recently introduced a policy of 1/3 ownership of property for the Wengen natives, the problem of "cold bird" remains significant.

The dwindling of biological diversity of the resorts is attributable to the increase in human activities and recreational facilities. For instance, only 80 out of the 700 Ibeks and 2000 out 9800 chamois of the Wengen resorts are remaining. A lot of biomes are being cleared in Obudu in place of buildings and other facilities. While over-grazing in Obudu causes soil compaction that leads to landslides and avalanches, under-grazing due to lack of farmers in Wengen is causing reduction of flowers during spring. The Wengen Tourism Board had to employ laborers to maintain the aesthetics of the lawns.

While local environmental pollution from Automobiles and fuel wood is gradually changing the "Cold Climate" of Obudu; the effect of global warming and air pollution from Zurich and Brussels is melting the Wengen ice; which can affect the tourism potentials of the resort if unabated. The following recommendation should therefore be pursued.

There should be a master-plan for the Obudu resort; so as to guide a wise and sustainable use of the natural resources. In the same vein, the data from Wengen have indicated some ecological problems; which calls for a review of the existing Master-plan to accommodate the new realities,

The environmental problems of species' disturbance and atmospheric pollution need urgent attention as well. It is therefore recommended that biodiversity conservation projects be introduced into the two resorts. On one hand, the atmospheric pollution of Wengen could be minimized if the planned introduction of Automobile transport in the resort by 2010 is abandoned. On the other hand, it is recommended that embargo should also be placed on the use of automobiles in Obudu, and in its place, electric locomotive be introduced.



**REFERENCES**

- Aylward. B. and Edward Bardier. 1992. "Valuing Environment in Developing Countries". *Biodiversity and Conservation* 1, pp. 34-50.
- Barrett S. 1989. "Deforestation, biological conservation and the optimal provision of wildlife Reserves." LEEC paper 89-06
- Bazzaz, F.A. 1990. "The Response of National Ecosystems to Rising Global CO<sub>2</sub> Levels" *Annual Review of Ecological Systems* 21. pp. 167-96.
- Byrne J. 1986. "Large Marine Ecosystems and the Future of Ocean Studies," In K. Sherman and L.M . . Alexander. Eds. *Variability and Management of Large Marine Ecosystems*, pp. 229-308. AAAS Selected Symposium 99. Boulder. Colo.: Westview Press.'
- Fisher A.C, Krutilla J.V. & Cichetti CJ. 1972. "The economics of environmental Preservations: a theoretical and empirical analysis." *American Economic Review* 62 pp. 605-19
- Hall A.L. 1989. "Developing Amazonia: deforestation and social conflict in Brazil's Carajas programme" Manchester University Press
- Hansen. AJ. T.A. Spies, F.J Swanson, and J.L Ohmann. 1991. "Conserving Biodiversity in Managed Forests: Lesson from Natural Forests" *BioScience* 41,pp.382-92
- Harding O.1968. "The tragedy of the commons" *Science* Vol. 162
- Hecht S. and Cockburn O. 1989. "The fate of the forest-developers and destroyers fo the Amazon".  
Verso.
- Hunsaker. C.T, R.L. Graham, G.W. Suter, R .. V. O' Neil L.W. Bamthouse, and R.H. Gardner, 1990.  
"Assessing Ecological Risk on a Regional Scale." *Environment Management* 14, pp.325-32 Ives J. & Pitt D.C. 1988. "Deforestation: social dynamics in watersheds and mountain ecosystems" Routledge.
- Kelvin M.DJ. Jacob. S.c. Wofsy, and R.C Harris. 1991. "Effects of Tropical Deforestation in Global and Regional Atmospheric Chemistry" *Climate Change* 19,pp145-58.
- Krautkraemer J.A. 1985. "Optimal growth, resource amenities and preservation of natural environment" *Review of Economic Studies* 52 pp. 153-170.
- Liu, Jianquo. 1992. "ECOLECON: A Spatially Explicit Model for Ecological and Economics of species Conservation in Complex Forest Landscapes, "Ph.D. diss University of Georgia. Athens
- Liu Jianquo. 1992 "ECOLECON: A Spatially Explicit Model for Ecological and Economic Effects of polar Landscape Structure and Rotation Length: Simulation Studies Using ECOLECO." *Ecological Economics*.
- May R.M. 1988. "How many species are there on Earth?" *Science* Vol.24 September 16 1988.
- Mcneely J.A. 1988. "Economics and biological diversity: developing and using economic incentives to conserve biological resources" IUCN.
- Molofosky, J, c.A.S Hall and N. Myers. 1986. "A Comparison of Tropical Forest Surveys" DOEINB 0078. Department of Energy. Washington, D.C.
- Morton. S.R. D.M. Stafford Smith, M.H. Friedel; G.F. Griffin, G.F. G Pickup, and A.S. Sparrow. 1992 ... Sand-dune, Saltbush. And stock. A Vission for the Stewardship of Arid Australia. Processed.

- Powell. T.M. 1989 ... Physical and Biological Scales of Variability in Lakes, Estuaries, and the Coastal Ocean" in J Roughgarden. R.M, May, and Simon A, Levin. Eds. *Perspectives in Theoretical Ecology*. pp 157-80 Princeton. N.j.; Princeton University Press.
- Russ. G. 1985. Effects of Protective Management on Coral Reef Fishes in the Central Philippines .. Proceedings of the fifth international Coral Reef Congress, Tahiti, vol 4, pp.219-24 SCEPT (Study of Critical Environmental Problems) 1970. *Man's impact on the Global Environment* Cambridge's Mass: M.I.T. Press.
- Smith S.V. and R.W. Buddemeier. 1992. "Global Change and Coral Reef Ecosystems." *Annual Review of Ecology and Systematic* 23.pp.89-118.
- (SRFS) "Savannah River Site Wildlife, Fishers, and Botany Operations Plan" Savannah Rivers Forest Station. Forest Service, U.S. Department of Agriculture.
- Saravia Toledo. C. 1987. "Restoration of Degraded Pasture in the Semi-arid Chaco region of Argentina. In *Proceeding of the UNESCO International Symposium on Ecosystem Redevelopment: Ecological Economic and Social Aspects*. April 1987.pp 25-37. Budapest: UNESCO.
- Walker. B.L.L. D. Ludwig. C.S. Holling and R.M. Peterman. 1960. "Stability of Semi-arid Savanna Grazing Systems." *Journal of Ecology* 69, pp,473-98.
- WRC World Recreational Code (2005). Guidelines for Sustainable Facilities in Resorts and Parks. Cambridge press. UK.