

**World Forum of Mayors  
on Cities and Desertification  
Bonn, 11-12 June 1999**

***Six Case Studies  
from Asia, Africa and  
Latin America***



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# Cities and Desertification

On the invitation of the Mayor of Bonn, Ms. Bärbel Dieckmann, the Second World Forum of Mayors on Cities and Desertification took place in Bonn on June 11<sup>th</sup> and 12<sup>th</sup>, 1999. Desertification is assuming ever more threatening proportions worldwide; with a view to controlling and resolving the resulting problems, cities and municipal authorities are desperately looking for support on the basis of an exchange of experience and cooperation. The United Nations have taken an interest in the subject and the UNCCD-Secretariat with its head office in Bonn was one of the driving forces behind this special-subject conference.

The Friedrich Ebert Stiftung supported this Forum in various ways, including six case studies in English, French and Spanish which represented 2 countries of Asia, Africa and Latin America respectively.

The six studies still describe the prevailing situation and have therefore been collected in this brochure in English in order to make them available to a larger public. In so doing, it is our intention to ensure that greater attention is being paid to this important issue which superficially may appear to concern the regions only. But as a matter of fact, desertification concerns us all and thus represents a crucial problem in global development policy.

Bonn, October 2000

*Peter Schlaffer*

Department for International Cooperation

## Summaries of six Case Studies on Desertification



Mexico (Carlos de la Parra)

Peru (Juan Torres)

Morocco (Prof. Abdelaziz Sbaï)

Sudan (Ali Darag Ali)

China (Siegfried Pater)

India (Venkat Ramnayya)

World Forum of Mayors  
on Cities and Desertification

# Desertification in Tijuana (Mexico) Effects and Policies

by Carlos de la Parra

Summarized by  
Andreas Rechkemmer and Silke Speier, UNCCD Secretariat, Bonn

This study describes the effects of desertification in Tijuana, Baja California, Mexico, a highly urbanized area of the U.S.-Mexican Border which borders the North American drylands. The author argues that most literature describes desertification as a problem exclusively affecting global food sufficiency and agricultural production in rural areas. He, however, shows that land degradation and desertification are equally problematic in cities which suffer from effects of land degradation due to urbanization and urban practises in general. He illustrates this with the case of Tijuana.

Tijuana has about one million inhabitants, is the seventh largest and one of the fastest growing cities in Mexico with intensive economic activity. The author explains that Tijuana has developed by means of growing trade and services and increasingly of rapid industrialization. Consequently, land development has become critical, resulting in rapid and incomplete urbanization where sections of the town are left without services (unpaved streets, no water, sewage, parks, or open space) and a lower environmental quality. Due to Tijuana's low annual precipitation and high evapotranspiration rates, arid conditions and poor air quality prevail over the entire year. Eolic erosion occurs during summer months and hydrolic erosion during winter months. Both cause major expenses to municipal governments for sediment collection and control in streets, rain collectors, street sweeping and maintenance in general.

A storm that occurred in January 1993 changed the population's and authorities' perception of the risks that the city may be exposed to: it resulted in rivers of mud, landslides and flooding, and tons of consolidated sediment blocking storm sewers. Close to 80.000 people were directly affected and more than 40 people lost their lives. Although protective measures against storms in Tijuana have improved thereafter, the level of neglect of the environment remains a critical issue. The author describes that even though Tijuana does not depend on its rich soil for feeding its population, the impoverishment of its soil will reduce the likelihood of urban greenery, with serious consequences on people's security, quality of life, quality of air and the level of expenses incurred by the municipal government for preventive maintenance of the city's infrastructure.

Mexico is a member state to the UN Convention to Combat Desertification. The nation's action programme for the implementation of the convention consists of the following major items:

- (a) drawing-up of agro-forestry projects,
- (b) restoration and protection of areas previously damaged and degraded by natural disasters and/or land-use changes,
- (c) conservation of threatened and endangered species, and
- (d) recreation (e.g. reforestation).

The programme puts a strong emphasis on addressing the local level rather than a more global one, and tries to create strong partnerships with local NGOs, such as in Tijuana. The author quotes a large number of cases where such partnerships have successfully designed recreation areas (so-called neighborhood parks), in which land degradation could be reversed. Until today, a total of some 60 neighborhood parks have been created in Tijuana, thus re-introducing a natural and ecologically sound balance between vegetation and biodiversity-oriented areas and the residential and commercial areas of the city. Yet one critical point remains to be solved: wastewater, traditionally handled in a centralized way. In contrast, the author suggests a decentralized approach towards wastewater treatment systems.

In conclusion, the author recommends Tijuana's innovative strategy which adds an ecological dimension to the afforestation approach for cities, incorporating an integrated resource management strategy such as wastewater reclamation, in order to compensate for the limited availability of water in drylands. All these measures taken together could become an effective strategy in combating desertification-related problems of urbanizing cities in the developing world.

# Desertification in Piura (Peru)

by Juan Torres Guevara

Desertification is certainly a process in which many natural and social factors are involved. Both aspects are of particular importance in the case of Peru and are basically related to the incompatibility between the models of development applied up to the present and the peculiarities of the ecosystems existing in the country. This incompatibility has existed for more than 500 years. The natural factors are largely represented by the arid zones which in Peru make up one third of the territory of the country, including the arid coast, the semi-arid and sub-humid areas (36 per cent of the total territory: 479 174 km<sup>2</sup>), as well as by the mountainous character of our country. Ninety per cent of the Peruvian population live in these dry and mountainous zones and the majority of agricultural, industrial and mining activities are concentrated here.

Today, problems such as the salinisation of coastal lands affects 40 per cent of the cultivated area in this region. There is a serious problem of land degradation especially in the windy eastern part (Selva Alta) due to the great extent of desertification, such as by natural geological deterioration, which is responsible for 50 to 60 per cent of the degradation of the surface area of this region. In both cases, on the coast and in the mountain, desertification is caused primarily by the human factor and through agriculture activities, livestock-breeding, timber and mining industries which have caused salinisation, erosion caused by water, genetic erosion, water and air contamination etc.

In the case of Piura, where many of the above-mentioned facts are already known, the principal aim of current activities is to establish their effect on the dryland ecosystems of the flat coast where there are dry woodlands, and on those of the mountains (Sierra) where there has been mist forest from around 10 000 years B.C. with advances and retrogradations. "El Niño" is implicated in these processes: whether as an event or an episode, "El Niño" contributes to the natural rebirth of these natural occurrences. Piura is considered a vulnerable, fragile ecosystem.

Activities such as deforestation, poor management of water and inadequate use of land, overgrazing, forest fires, coupled with demographic pressure and the low standard of living as well as soil erosion, genetic erosion, salinisation, fragmentation of vegetation, destruction of natural habitats, reduction of the fauna population and the loss of species and – as a result, food insecurity and low standard of living (poverty), alterations in the water balance, in nutrition and micro-climatic changes create very arid conditions and give rise to different processes of desertification in Piura.

It is important to underline that there are no quantitative data on the above-mentioned processes. The systems for monitoring, expanding, classifying, interconnecting and disseminating are limited and are not widely known for any of these issues, thus creating a vacuum of information. However, it must be highlighted that this is not the whole story, but that the qualitative historic-cultural processes which form the background for the dynamics of regional desertification are equally important.

Finally, note is taken of other proposals for the struggle against desertification and also the role local governments can play in the process: integral management of water, the use



and conservation of water, soil and bio-diversity (forest and fauna), the development of appropriate clean technology (agro-ecology, systems of agro-forestry), recycling of waste water, systems for monitoring and prevention, education and training for principal initiatives, and identification of those who can prepare this work and how.

# Topic Aspects of Desertification in Morocco

by Abdelaziz Sbaï

The phenomenon of desertification is most often associated with the advancement of the desert and, consequently, one tends to believe that it concerns only arid and semi-arid zones. Desertification, however, also means the degradation of natural resources in general. This affects ecosystems that are natural (forests, grazing lands) or developed (lands for pluvial or irrigated agriculture, oases) and, finally, the coast. The origins of such a process may indeed be found in natural occurrences, but human activity greatly contributes to its acceleration. It is estimated that, at a world level, approximately 2 billion hectares of agricultural land have been degraded by the doings of mankind since 1945; in other words, 11% of the surface of the Earth covered by plants has partially or completely deteriorated, thus seriously reducing agricultural productivity in these areas. In the case of Morocco, the aridity of the climate as well as the scarceness and fragility of water and soil resources are the principal natural factors involved in the desertification process. By contrast, the human factors are based on a rampant population explosion, evident disparities between the urban and the rural world, and a poverty factor that increases land utilisation in a manner incompatible with its destined purpose and capacity. These two determining factors (natural and human) are compounded by a land management policy that is unfavourable to development and an administration with little concern for the well-being of future generations. Reforestation, for example, takes place at a rate of merely 8%, i.e. well below the generally accepted standard of 20% required for maintaining a healthy ecological balance. Forest resources display a disturbing degree of degradation that is jointly caused by excessive logging, forest fires, land clearing, and the excessive collection of firewood. The excessive collection of firewood, the equivalent of 30 000 ha per year, represents more than three times the production capacity of the forests. The mountainous regions are currently subject to a triple imbalance that condemns them to perpetual desertification: excessive exploitation of their resources (flora and fauna) by an ever-increasing population; the constantly decreasing productivity of their scant soils, thus making for poorly paid labour; and finally, the mountains remain under-equipped due to their remote location and the low return on investments. Grazing lands, which play a crucial economic and social role, are subject to overgrazing; this results in the impoverishment of their vegetation layers and thus provides favourable conditions for water and wind erosion as well as for the salinization of a number of streams and rivers. The pluvial agricultural lands, in turn, are subject to different types of wind and water erosion which result in a decrease of fertility and arable soil layers estimated at 22 000 ha per year. Irrigated lands are not spared by the degradation phenomenon either, salinity being the most widespread result. It is estimated that 500.000 ha of land are threatened by excess water and salinity and that 37 000 are seriously affected by salinization.

The oases are threatened by two scourges, namely salinity and sanding-up. In addition to the rigours of the climate, these forms of degradation are exacerbated by overgrazing of

spontaneously growing vegetation and by an excessive removal of ligneous plants for firewood which is used in the grazing zones surrounding the palm groves. Dwellings, agricultural lands, irrigation channels, road infrastructure, and the Moroccan palm groves are permanently threatened by encroaching sand. In order to fully understand the extent of the damage which might be caused by sanding-up, the example of the sandstorm which raged for three hours in 1977 in the region of Jorf, destroying 16 ha of palm groves and 78 dwellings, is enlightening. The ultimate expression of soil salinization and sanding-up of oases is a drastic decline in the yield of crops and a shrinkage of cultivated lands in zones where soil is already a rare commodity.

With respect to the coast, where 50% of the population is concentrated, the destruction of vegetation and wind erosion are promoting the disappearance of dunes. Sections of the border dune suffer from trampling and from aggression caused by vehicles. A study on the erosion of the beaches, which was carried out by the Ministry of Public Works, showed that in 1993 -1994 seven out of 47 beaches had disappeared and 16 were in a state of advanced erosion.

The only solution to desertification is in a global approach that regroups the various socio-economic, technical, legislative, and organizational aspects of the problem. The projects implemented by the departments of the ministries are necessary. On-site solutions, however, in this case at the communal level as well as the projects undertaken by NGOs, have a more immediate impact on behaviour and practices.

# The Case of Elodaya Desertification Control Project Western Kordofan (Sudan)

by Ali Darag Ali

Summarized by Silke Speier, UNCCD Secretariat, Bonn

Elodaya town is the most densely populated town in Western Kordofan State in Sudan. It is a permanent water supply centre and provides drinking water for humans and live-stock of the surrounding villages. Elodaya town and its surroundings are part of the low-rainfall Savannah Ecological Zone, and the town surroundings are severely affected by land degradation, drought and desertification.

Sudan's soil conservation committee concluded (1994) that soil degradation and desertification were mainly caused by general land misuse rather than by major climatic changes. The author states that the most severe human activities leading to land degradation and desertification in Sudan are drought-related, coupled mainly with extensive rainfed farming on marginal land, overgrazing, wood cutting, deforestation, up-rooting of shrubs and burning of grasslands and forests shrubs. The impact of land degradation and desertification is particularly serious within areas that surround towns and villages where permanent water supplies are available because of the intensive pressure on natural resources for crop production, forage for livestock grazing, and fuel and wood for other purposes. Land degradation led to a decline in food production per unit and encouraged a horizontal expansion of rainfed farming to compensate for low yield. It also led to migration to big towns and cities.

The Elodaya Desertification Control Project was initiated by UNSO during the period 1982-1997 with funding from the Swedish Government and was executed jointly by the Sudanese Government and FAO. The author describes that it was the ultimate goal of the project to establish a self-sustaining continuous programme of locally-organized environment rehabilitation and management measures. Long-term objectives were the restoration of land productivity through rehabilitation, improvement and systematic management of rangelands within the surroundings of Elodaya town; alleviating grazing pressure around the town; and contributing to the diversity and quality of cropping and livestock production, thus promoting the area's overall economic and social development.

The project included areas of six grazing paddocks around Elodaya town. A rotation system was put into place based on the actual carrying capacity of each paddock and a stocking rate which corresponded with the actual grazing capacity to prevent overgrazing and rangeland degradation. Another three fenced enclosures were established within three villages to demonstrate rangeland rehabilitation for desertification control. Fencing was used to encourage range rehabilitation through the process of natural succession, and seedlings of adaptable forage seeds were used to accelerate the process of range rehabilitation. In addition, new watering points were established in the surrounding villages to alleviate the heavy pressure exerted on Elodaya town water resources.

An Environmental Impact Assessment showed that major botanical changes occurred due to range rehabilitation and improvement within the fenced areas and enclosures, compared to the open range. These changes included: plant cover, frequency, density and total forage biomass production per unit area. The author also describes a positive social impact when the areas were opened at a later stage for town dairy and sheep grazing according to the rest-rotation grazing management system. The grazing system gave a rest period to each of the grazing paddocks for a complete year for natural recovery. The use of this system led to an increase in milk and meat production which stimulated both the economic and social development of Elodaya town.

The author concludes that a combination of factors, involving fragile ecosystems developed under a harsh and fluctuating climate and human activities around big residential centres which are increasing in irreversible magnitude, are the actual causes of urban desertification problems in many countries. This process could only be reversed if the actual causal factors were removed. Genuine public support and involvement of the target population and resource users would also be crucial to the implementation of desert encroachment control programmes.

# Combating the expansion of the Gobi Desert – A Case Study on the Shaanxi province (China)

by Siegfried Pater

Summarized by Andreas Rechkemmer,  
UNCCD Secretariat, Bonn

Although China is blessed with a rich variety of non-renewable natural resources, only 10 percent of the country's territory is of agricultural quality, which is supposed to feed a growing population. At the same time, agricultural areas are threatened by rapidly expanding cities and industry. Moreover, misuse of soils and disregard for sustainability contribute severely to a serious loss of agricultural resources.

Land degradation is a significant overall phenomenon in China and consists of several processes (like soil erosion or salinization) that either occur separately or jointly, but ultimately lead to desertification in the arid zones of the country. In the province of Shaanxi, all these phenomena occur simultaneously. In Yulin district, desertification is by far the worst problem.

Natural deserts in China are 1.0 to 1.7 million years old and cover 11.4 percent of the country, mostly in the northern areas. Desertification in China is to some 95 percent due to human causes (inadequate agriculture, overgrazing, deforestation, misuse of water resources) and has already affected an area of 334,000 square kilometers, putting 35 million people at risk. One of the results stated by the authors of the study, in addition to the loss of agricultural resources and food insecurity, is growing urbanization of cities neighboring desertification-affected areas.

In the last 50 years, erosion and desertification in Shaanxi province were mostly addressed by centrally planned administrative-technical means, without a chance for the local population to bridge economic gaps that would repeatedly force them to overexploit their territories. Moreover, exaggerated taxation and legally-binding quantitative trading obligations forced the rural population to behave in an unsustainable manner. Only recently has soil conservation been addressed in a much more holistic and sustainable way, leading to a revolution in the nation's agricultural policy: farmers are now responsible for their land, taxation is more balanced, the trading obligation is cancelled, communities are provided with nutrition in economically-difficult times, and administration and production are separated.

The authors suggest the following immediate measures to directly combat desertification in the affected areas: stabilization of dunes, fencing, reduction of the influence of winds and sands, melioration of the soil quality, sound water management, prevention from overexploitation. As a reference, they provide a case study of Yulin district where a remarkable success has been achieved in combating desertification on a rather more holistic basis in the course of the last 40 years with the set of measures described above. All this has led to a situation where the desert of Yulin is even decreasing by some 1.62 percent per year whereas soils, vegetation and especially forests are steadily increasing.

Despite these achievements, the authors do not, in fact, seem euphoric about the overall Chinese situation. The recent tendency towards fast industrialization in many vulnerable areas leads to severe pollution and further loss of soils in China. As a bottom line, they suggest to introduce an enabling political, legal and administrative environment, decentralized and participatory, in combination with a holistic and empirically-proved set of means and measures to combat desertification in China like the ones mentioned above.

# Strategies against Desertification (India)

by E.Venkat Ramnayya

This study discusses the approach adopted by an Indian non-governmental organisation, *Youth for Action*, to address the interlinked issues of poverty and desertification in two drought-prone districts in the states of Andhra Pradesh (Mahboobnagar) and Karnataka (Gulbarga). It highlights the efforts made by *Youth For Action* from 1986 onwards in mobilising community participation, particularly of women, for community development and sustainable natural resource management in partnership with other agencies. Based on an analysis of local poverty issues and the semi-arid conditions of the region, this paper describes the socio-economic and political conditions for participatory natural resource management in a poverty-stricken area.

The author describes how the institutional system promulgated by the Indian Government in 1992 in order to strengthen local self-governance (73<sup>rd</sup> Constitutional Amendment to the Indian Constitution) has brought about structural changes, but he argues that mere rules and regulations will not ensure empowerment of the people. He stresses that it is the political will of state governments and the commitment of bureaucracy as well as the determination of the people that can lead to the effective empowerment of communities.

Regarding past government initiatives in watershed management, the author points out several constraints in scaling up participatory programmes: the increase in the number of programmes, yet the need to keep them small and to expand them only by repeating the same slow, costly in-depth techniques in successive villages; the lack of local 'ownership' and group coherence necessary for sustainable management; and the need to identify the preconditions for scaling up and to integrate those into the design of projects and programmes. The author argues that the most sustainable way forward is by facilitating, ensuring and increasing community participation in development projects. The case studies discussed in the paper highlight the crucial role played by women and demonstrate that, given the choice and the opportunity, wherever women are involved in the planning and decision-making process the results seem to be better than where their participation is restricted.

The author points out that the UNCCD requests concerned parties to ensure the participation of the people and of local communities in decision-making processes and in the implementation of programmes to combat desertification. He stresses that the 'missing link' to the grassroot level must be put in place in order to successfully implement the Convention. Involvement of affected people in the planning process of the National Action Plan (NAP) is, in his view, an absolute prerequisite for any programme to succeed. He particularly emphasises the important role of NGOs and their possible contribution to the effective implementation of the Convention. Finally, a Strength, Weaknesses, Opportunities, Threats (SWOT) analysis has been undertaken which demonstrates the responsibilities of each actor in implementing the Convention at the local, national and international levels.