REHABILITATION OF DESERTIFIED LAND IN YAMBAWA MISSED CHANCES FOR FARMERS

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In northern Nigeria, serious desertification occurred in the fifties and sixties due to the usual combination of drought and unadapted land use caused by poverty in low external input agriculture. In long dry seasons the overgrazed sandy soils, where the traditional density of scattered trees mentioned in oral history has strongly diminished over time, were exposed to hot advected air and topsoil loss from wind erosion. Off farm employment in the wake of the oil boom encouraged abandonment of cropland.

In the seventies forestry authorities decided to try rehabilitation by the planting at Yambawa, 75 km northeast of Kano and not far from the borders with Niger, of more than 20 km of rainfed multiple shelterbelts, eleven in total, of *Eucalyptus camaldulensis.* This settled drifting sand and the undulations that had formed, and encouraged the return of soil protecting grasses. Off farm employment dwindled and farmers returned to their abandoned land, trying to make use of the improved microclimatic and soil conditions between the belts.

Design errors

Without access to design rules and as a compromise to the wind directions changing over the seasons, the belts were established at an angle with the prevailing winds, diminishing their wind protective functions in both the wet and the dry seasons. Distances between the belts, in a rule of thumb for protection against mechanical damage advised to be in the order of 10 times the height of the trees, were generally between 15 and 25 times that height. This was a compromise to occupy less farmland, but it kept large parts between the belts unprotected. It was not realized that the main agronomic function of the belts was protection of crops against advected hot air. The width of the belts was arbitrarily chosen as 30 m, still taking about 20% of farmland, which could have been used better by halving the width and halving the distances between the belts.

Planning errors

At the time of establishment of these belts, participatory approaches were uncommon and the programme is therefore a good example of the problems this caused. Farmers disliked the farmland being occupied without compensation. Farmers did not like the Eucalyptus trees, because of their aggressive roots and possible allelopathy. While there are scores of indigenous tree species giving food, fruits, fodder or medical products that could have been selected. Farmers were not allowed to do any maintenance management of the belts, such as pruning of the front branches that shade the front rows of crops, or coppicing, that would have delivered fuel wood high in demand. Most farmers therefore resented the belts.

Extension errors

Research, started in the late eighties, showed that root pruning was a necessary precaution to reduce competition between the millet grown and the trees. It became only clear from our questionnaires in the nineties that farmers had not returned to the area because of the belts but because of reduced off farm employment opportunities. Farmers had to find for themselves that only close to the belts the crops were sufficiently protected. Only much later, our participatory experiments demonstrated why this was the case. At this same very late stage, while the farmers had long complained about allelopathy of the trees, was it shown that it did not exist and that root pruning and branch pruning did indeed away with all competition for resources between trees and millet. This showed the maximum benefits of the rehabilitation as originally designed.

Future errors?

Together with higher inputs of organic fertilizers, solutions to higher yields should come from (i) better design of multiple shelterbelts, (ii) addition of farmer friendly scattered trees of appropriate densities between too wide belts, and/or (iii) replacement of shelterbelts by systems of scattered trees, so called parkland agroforestry, traditionally in use in the area, but with considerably improved densities. No commitments of that kind have been shown by any extension organization.

Our research also proved that a scientific determination of sowing time, using near-farm rainfall and routine evaporation data, improved yields considerably above those of the traditional methods. On-line determination of sowing time, using local soil moisture determinations or climate forecasting methods, in so-called response farming, would secure such yield increases. However, no organization of such agrometeorological services appears possible under present day Nigerian extension conditions. Although local adaptation strategies and contemporary science are jointly available, the policy environment is not conducive to useful information transfer.

It confirms the view held for now close to 20 years by some political economists that a soil management and rehabilitation policy must be formulated in the context of wider development objectives and a well-defined direction of social change. Without a conducive policy environment, in which intermediaries trained by either the government or NGOs, backed by scientists, make sure that appropriate services and information are made available to the farmers, their livelihood will not improve in a sustainable way.

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