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At the turn of the month October–November 2001 the USA stepped up its bombing raids against what were suspected to be bin Laden’s hiding-places in caves and tunnels in Afghanistan. What was only hinted at in the press was that these tunnels, as well as being hiding places for the Taliban (and earlier for the Mujahedin forces’ resistance against the Soviet Union), primarily serve as irrigation channels. In Pashto they are called karez and in Arabic qanats. This type of irrigation system is to be found, among other places, in a continuous area of southern Afghanistan, the neighbouring Baluchistan in Pakistan and in Iran. In Iran they were developed over 2000 years ago and since Roman times they have also been found in large parts of the Mediterranean area. In arid Afghanistan these historic irrigation systems are of quite decisive importance for agricultural production and as a guarantee for food supply in years of drought.

The news of bin Laden’s refuge in these tunnels brought into immediate focus two quite different time-perspectives in the global situation. One time perspective is represented by the brief headlines in the newspapers: the air-war against
the Taliban, the question of the terrorism network and of Afghanistan’s immediate future. In the other time perspective we are confronted with the fact that the tunnels constitute an important part of the solution to the fundamental question of global food production in a long-term perspective. Human beings and societies have throughout the millennia invested in the land, by clearing stones and building terraces and irrigation channels for a sustainable agriculture long before the concept of sustainability was coined in its present usage. Both in the short time perspective and in the long we can see such choices, which for a long time will govern the lives of human beings and states. Current decisions about war and peace and the question whether democracy can really be secured through military interventions present such choice of paths in world history. Another—and less noted decision, which lies further back in history—was when people began to develop sustainable agricultural systems like the irrigation system in Afghanistan. Why do they exist there and not in all the drylands of the world? The global distribution of irrigation systems is in no way determined by nature; they exist in areas with good conditions for rain-fed agriculture, but are lacking in many arid and semi-arid lands, where their presence might seem obvious. In both these time perspectives history is therefore open.

Food production in Afghanistan is thus dependent on the irrigation systems. Of Afghanistan’s 3.9 million hectares, two-thirds are irrigated and these areas provide more than two thirds of the country’s agricultural production. In the North the irrigation system exists in the form of open canals which lead from rivers in the mountains and that kind of irrigation
system forms the overwhelming part of the irrigated area. In the South, along the border to Iran and Pakistan, on the other hand are the tunnel systems which hit the headlines during a few autumn weeks in 2001.

Neither the open canal systems in the North or the karez-tunnels in the South are primarily the result of large-scale modern irrigation projects. Their origins lie far back in history and they are well integrated in the local society. Common to this type of irrigation system throughout the world is that their development, their survival and their efficiency is intimately linked with comprehensive sets of social rules. Whether it is a question of a hierarchical organisation or one based on kinship, ownership of the canals and the productive water, is dependent on a social infrastructure. The canals are intimately linked with culture, power relations, world-view and social attitudes in local societies (see, for example, Aase 1999). These investments in the land, landesque capital, is often the result of a long historical development, a continuing investment of labour in the tunnels, canals, viaducts which—if maintained—can be used for hundreds and thousands of years after the original investment.

The question whether they can also continue to play a part in the food supply depends therefore not only on how many canals and tunnels were bombed by the USA in 2001 but equally on how the whole cultural infrastructure around the canals (clans, water committees, overseers) survives or is resurrected in new forms after the social turbulence in the wake of the war. There are strong indications that maintenance of the irrigation system was already behindhand before the latest Afghan war in 2001, as a result of the previous wars.
Irrigation systems, agricultural production
and the openness of history

In the history of geographical thought a central role is played by ideas of environmental determinism and its opposite possibilism. Ideas about how human beings, cultures and settlement patterns are governed by natural conditions can be criticised on a number of aspects, not least for their link with racism and with theories about Lebensraum. The opposing view is possibilism—a view that focuses instead on the different possibilities of humankind and on the cultural and historical factors without denying the limitations set by nature.

Within geography ideas about environmental determinism are mainly a part of the history of discipline, but the ideas live on in the popular consciousness. Ideas based in environmental determinism are often just under the surface in opinions about the cause of the gap between North and South in today’s world, about the fundamental questions concerning the link between population growth and the world’s limited resources, and not least in the discussion of possible paths of development. In his book *The colonizer’s model of the world* (1993) James Blaut has shown that 19th century environmental determinism, which was the school of geography accessible to Karl Marx and later to Max Weber, has through them and their successors in the social sciences even come to be encapsulated in part of the radical theories on underdevelopment and imperialism in the 20th century.

When we today examine the connection between culture, security and sustainable social development, the absolutely central question concerns the choice of path and the possibili-
ties. For example, culture, institutions and, not least, security play a vital role as regards the limitations and possibilities for increased food production in the South. The possible paths of development for agriculture in Africa have been examined in, for example, the project *African food crisis: the relevance of Asian models* (Lund University). Why did the green revolution in Asia succeed, while African agriculture still struggles with falling per capita production? The project shows how neither environmental determinist explanations nor neo-Malthusian approaches provide any keys and that the history of agriculture can thus be seen as open, dependent on human choices, states and institutions (Djurfeldt and others, 1997).

Another example of the same problem, but in a much longer time perspective, is the comparison between the agricultural landscape in eastern Tanzania and that in Tamil Nadu in southern India. In an essay by a British geographer the question was posed why “lands in different parts of the world, but with closely comparable environments, may be used very differently by their inhabitants” (Morgan 1988:69). How does it come about that on the one hand Tamil Nadu—an intensively cultivated landscape based on irrigation—and on the other hand eastern Tanzania, with a population density less than one-twentieth of that of Tamil Nadu have developed in such different directions, despite the fact that they have comparable environmental conditions? In this case one must go back at least 2000 years, when the irrigation systems began to be developed in southern India and Sri Lanka. The different regions adopted different paths which were to determine the fact that today 20 times as many people can be fed in Tamil Nadu as in eastern Tanzania. That is a simple example of regional geo-
graphy advanced by Morgan, but it poses quite fundamental questions about what are the possible developments and how many people can the Earth feed.

*The massacre in the Kerio Valley*

In October 1998 I visited for the first time Marakwet in Kenya with a group of researchers from Sweden, Britain and Kenya to study an irrigation system in a part of East African Rift. In the mountain rainforests we visited inlets where the water had been conducted from a wild flowing stream to one of the main canals. Sometimes these canals are constructed of concrete, sometimes of stone and earth reinforced with wooden poles. The canals have then been led down towards the Kerio Valley. Falling about a kilometre in height over several kilometres in length the canals descend towards cultivations which have transformed the dry savannah into a green orchard with mangoes, bananas, sorghum and maize (Östberg 2003). If the transport facilities had been better this would have been a region of major surplus.

In our field trips in the valley we met hungry Pokot women who were making their way to the neighbouring Marakwet people to exchange milk for grain. In the town we listened to Marakwet stories about a Pokot cattle raid that developed into a wild western shoot-out on the market place. At the end of the fieldwork a goat was slaughtered for a farewell party and one of the elders read the future in its entrails, in the same way as in Sweden one might at New Year read the grounds in a coffee cup. The goat’s stomach could be read as a map of the rivers in the Kerio Valley. It emerged clearly from a red spot by
one of the rivers that a Pokot man would die a violent death. Just then however the fighting between the pastoral Pokot and the agricultural Marakwet had quietened down and in the market they were trading with one another.

We returned in October 2000 but for safety reasons we carried out our research in a village on the escarpment to keep a good distance from the disturbances in the valley. I met a young Marakwet and we talked in broken English about the conflicts between the Pokot and the Marakwet. “Where do the Pokot get their weapons?” I asked. “It says ‘Made in Yugoslavia’ or ‘Made in France’ on them, just as it does on ours.”

There was an outright arms race in the valley and young Marakwet men were armed against the cattle raids and attacks by the Pokot. Cautious estimates published on the internet by Human Rights Watch suggest that in 2001 there were at least 4000 firearms among the Pokot and Marakwet, including a fair quantity of AK-47s and G3 automatics.

Safely home in Sweden in March 2001 the surprising news reached us that more than 50 Marakwet had been killed by Pokot warriors. At dawn on Monday 12 March up to about 600 armed Pokot first surrounded the state security forces’ camp and then attacked five Marakwet villages. Hundreds of houses were set alight and thousands of cattle stolen.

The fighting between Pokot and Marakwet goes back over a long history, with periods of hostilities and periods of peaceful co-existing between the two groups, which have different economies but a common language. Wilhelm Östberg has described the historic background of the development of separate ethnicities (Östberg 2003). The conflicts are not new, but the escalation of violence which occurred during the 1990s and
which culminated in the massacre of March 2001 would not have been possible if money for weapons had not flooded in from influential politicians with an interest in stoking up the ethnic antagonisms. As early as 1992 a parliamentary commis- sion in Kenya pointed to the links between the government party, KANU, and the disturbances (Kagwanja 1998). The background to the massacre in 2001 can be described in similar terms (Human Rights Watch Kenya, on the internet).

What brought us—geographers, anthropologists and archaeologists—to the Kerio Valley was the locally developed and extensive irrigation system. We were interested in it as an example of a locally developed solution to the African food crisis. The irrigation system in Marakwet and similar “islands” of labour-intensive and highly productive agriculture in East Africa can be seen as the living proof that there are local, historically developed and sustainable solutions to the question of food production and that the African food crisis is neither determined by environmental conditions nor by history (Widgren and Sutton 2003).

But what we experienced during the last three years in our study area is thus that the real threat to sustainable agriculture is not unsustainable land use and land degradation, but the lack of peace. With the escalation of the violence in the Kerio Valley people have abandoned their homes for periods of varying lengths and the irrigation canals cannot be properly maintained. A large part of the population has left the Valley, many schools have closed and the irrigated areas are shrinking. The political game in Nairobi, cattle traders who buy stolen goods and unscrupulous arms dealers have come to play a greater role for agriculture and food production in the Kerio Valley than
soil conservation, terracing and the management of nutrients and water. It remains to be seen whether the new political situation in Kenya after the election in 2002 will change this situation.

If one takes a more general look at the examples of success and failure in Africa as regards locally developed investments in soil conservation and irrigation (and hence intensification of agriculture) it seems as if we have a complicated interplay between history, culture, institutions, the market and a relationship, which is more difficult to understand and which concerns how the different factors interact in either a fruitful or a destructive fashion.

*Security and sustainable agricultural development – different discourses*

My introductory example with bin Laden’s hiding-place in the ancient irrigation tunnels in southern Afghanistan has as its starting-point the fact that we often look at global problems through two very different pairs of spectacles. There is on one hand the short-term perspective, which concerns peace and war, and on the other hand the long-term perspective, which relates to how we are to build up a sustainable and equitable material situation for the majority of people on earth. The meeting between these two perspectives forms in conclusion the basis for some reflections on the role of research at the meeting point of culture, security and sustainable social development.

In the international political arena it seems as if it is still difficult to bring these two different perspectives together. In
Johannesburg in 2002 there was discussion of sustainable social development, with admittedly major and welcome openings towards combating poverty and questions of democracy, but the question of sustainable social development seems nevertheless to have focused on environmental questions in the traditional sense. To the extent that the conflict and security perspective comes into environmental questions there is a strong tendency to choose to look first at the question how increased competition for renewable sources and a weaker resource base can lead to conflicts. It is, for example, that perspective on the connection between environmental questions and security which is taken up in the Swedish report to the Johannesburg meeting (Folke and others, 2002, 37ff). It is no surprise that the UN system is limited by sector-thinking, but the research community has cause for critical self-examination of its ability to make analyses which dare to burst the bounds between these two time-perspectives—and not least between the various scientific cultures.

In the perspective of the natural sciences it is, for example, right to assert that the fundamental bio-physical cause of stagnating agricultural production per capita in Africa is the exhaustion of the soil (Sanchez 2002), but policy decisions must reasonably be based on a broader understanding than that. In a peace research perspective the agricultural crisis and environmental degradation can be seen both as the cause of armed conflicts (de Soysa and Gleditsch 1999) and as their effects (Messer et al. 2001). It is clear that non-renewable raw materials play a major role both in the driving forces of war and as regards the continuation and stubbornness of many conflicts. Gold and diamonds have sustained many long drawn out civil
wars in Africa and oil is a central factor in world security. It is more doubtful whether environmental degradation, and conflicts over renewable resources, can be an equally important factor behind armed conflicts. There can, however scarcely be any doubt that war and weakened states can be seen as one of the more important causes of a restricted development of productivity in agriculture.

An American anthropologist, Abe Goldman, has shown that the accepted understanding of the concept of sustainability and sustainable agriculture in Africa south of the Sahara does not accord well with an analysis of what in reality have been the threats to sustainable agricultural systems. Goldman questions whether the threats to the sustainable development of agriculture, as they have been defined from the perspective of the industrialised countries, really are applicable to the situation in Africa and he seeks to exploit the concept of "sustainability" empirically rather than normatively. Such an examination of what actually happened with African provisioning systems during the 20th century results in a picture quite different from the established one. Shortcomings in the conservation of soil, water and nutrients, and the consequent land degradation, provide only a small part of the explanation of the African food crises. Instead it is the rapid, unexpected, extreme events which have constituted the real threats to sustainable agricultural production: both the social threats, such as war, massacres and population movements, and those determined by nature such as, above all, extreme drought (Goldman 1995).

The normative concept of sustainable social development presents comprehensive theoretical problems and the question is whether Goldman's empirically-based concept of sustain-
ability can instead be the challenge that can gather humanists, social scientists and natural scientists around the two perspectives sketched in the introduction to this essay.

Bibliography


