

## SUSTAINABILITY IN THE CONTEXT OF NATURAL AND SOCIAL ENVIRONMENTS

An actor-oriented interpretation from south-west Tanzania

With 7 figures

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*Zusammenfassung:* Nachhaltigkeit im Kontext naturräumlicher und sozialer Umwelten – eine akteurs-orientierte Interpretation aus Süd-West Tansania

Die Frage einer nachhaltigen Nutzung des Naturraums wird üblicherweise als Konsequenz geglückter oder missglückter Anpassung des Menschen an seine natürliche Umwelt interpretiert. Determinanten wie „Wissen“ und „strukturelle Rahmenbedingungen“ scheinen dabei über den Erfolg der Anpassungsbemühungen zu entscheiden. In Abgrenzung zu einem solchen Verständnis wird in dem vorliegenden Beitrag die Frage einer nachhaltigen Nutzung des Naturraums in den Kontext sozialer Einflussfaktoren für Handeln eingebunden. Die Anpassung des Menschen an den Naturraum wird aus der Perspektive strukturationstheoretischer Thesen zu einer Variable menschlichen Handelns, das sich an Alltagswelt-Interpretationen der Akteure orientiert, welche ihrerseits dem historischen Wandel unterworfen sind. Am Beispiel der Bewohner des Ufipa-Plateaus im Süd-Westen Tansanias wird illustriert, in welcher Weise eine historische Umwertung des Faktors „Arbeit“ vom „Gebrauchswert der Ernährungssicherung“ zum „Tauschwert auf dem Markt“ und damit einhergehend eine Umwertung der „Beschwerlichkeit der Feldarbeit“ auf das Handeln der Akteure Einfluss nehmen und auf verschiedenen Ebenen die Nachhaltigkeit der Nutzung naturräumlicher Ressourcen berühren. Tansania hat im Verlauf der letzten dreißig Jahre zwei grundlegende gesellschaftliche Transformationen erlebt, und es zeigt sich, dass mit den mehrfachen gesellschaftlichen Umbrüchen eine Verunsicherung der Akteure einhergeht, die ein Routinehandeln gemäß praktischer Bewusstseinsinhalte weitestgehend ausschließt. Je nach dem Grad ihrer reflexiven Durchdringung der sozialen Konsequenzen des gesellschaftlichen Umbruchs können die Akteure auf Situationen der Verwundbarkeit durch Nahrungsdefizite und damit schließlich auf die Nachhaltigkeit der Lebensabsicherung insgesamt Einfluss nehmen und mit ihrem Handeln neue Bedingungen einer Nutzung der naturräumlichen Umwelt schaffen.

*Summary:* Sustainable use of the natural environment is conventionally interpreted as a result of the successful or unsuccessful adaptation of the human being to the natural environment, whereby factors such as ‘knowledge’ and ‘structural conditions’ are taken to be decisive in the success of efforts to adapt. In contrast to this kind of interpretation, this paper takes the influence of social factors on people’s activities into account. People’s adaptation to the natural environment is shown from the perspective of structural theories as a variable within human actions that orient themselves according to the actors’ perceptions of everyday life, which in turn are subject to historical change. Using examples drawn from the Ufipa Plateau in South-west Tanzania, the paper illustrates how a historical re-valuation of ‘labour’, from a ‘use value for food security’ to an ‘exchange value on the market’, and the accompanying re-valuation of the ‘effort involved in labour in the fields’ has affected people’s actions, and how the use of the natural resources is affected by this re-valuation on different levels. Tanzania has experienced two fundamental social transformations in the last 30 years, and it appears that these multiple changes have been accompanied by a loss of confidence among the population that largely rules out practical consciousness as a guide for routine activities. Dependent on their level of reflection on the social consequences of the changes in the community, the actors can influence their vulnerability to food shortages and thus ultimately on the sustainability of their livelihood as a whole. Through their actions, they can create new conditions for the use of the natural environment.

1 *Sustainability*<sup>1)</sup>, *embodiment of a successful adaptation to a natural environment?*

*“The people in the villages simply don’t know how to use their land. They cultivate the same plot again and again and then are surprised that their harvests are poor and that they finally don’t have enough to eat. They don’t know how to use their land in the*

*right way and they won’t listen to us. Their own ignorance is their worst enemy!”* (BWANA SHAMBA, March 1995).

The agricultural advisor (*bwana shamba*), quoted above complaining about the ignorance and stubbornness of farmers on the Ufipa-Plateau in south-west Tanzania (Fig. 2) in the mid 1990s and citing them as causes for nutritional problems in the area, is in fact using a line of argumentation that is relatively widespread. In this understanding, food deficits among individuals and households – the foolproof indicator of poverty, also in the eyes of the people at the centre of this study – are fundamentally connected with people’s deficient adaptation to their natural environment. De-

<sup>1)</sup> The term ‘sustainability’ is taken from the development policy debate and in this paper signifies a state of stability and the maintenance of a set of balanced safeguard measures into which human actions and their ecological and social effects and consequences are integrated.

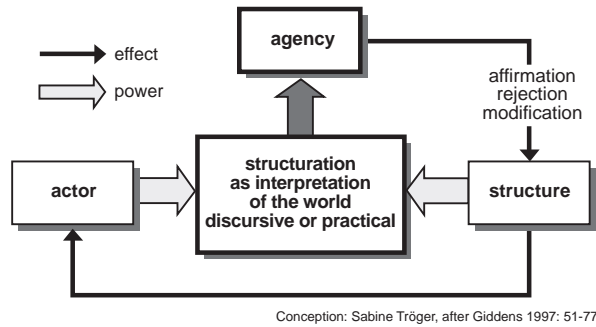


Fig. 1: The process of structuration – field of mediation between „agency” and „structure”

Der Prozess der Strukturierung – Vermittlungsfeld zwischen „Handeln” und „Struktur”

pending on the point of view, different causes for these mis-adaptations can be advanced. Human ecologists, such as BURTON and KATES (1986), argue that the instable balance between the natural resources, population growth and technological capabilities in a region leads to a situation in which food supplies for the people in the region cannot be guaranteed via sustainable means. Whether one sees the people themselves as responsible for their own existential problems and thus as victims of their own – self-inflicted – ignorance, as the above-cited agricultural advisor does, or whether one sees the people as being at the mercy of the ‘structural power’ (GALTUNG 1975) of their circumstances which force them to act destructively, as argued e.g. by SUSMAN, O’KEEFE and WISNER (1986), does not ultimately alter the basic assumptions about the relationship between human being and natural environment in which the defining factors are the “ecological load-bearing capacity of the natural environment” on the one hand and the “ecological actions, appropriate or not, of human beings” on the other.

In the following, this polarised way of thinking is rejected in favour of an approach that, rather than seeing a state of equilibrium between constants, prefers to understand ecological systems as being in a permanent state of adaptation to external forces, whether the result of human action or not (ELLIS 2000, 126). Accordingly, human action is not measured against an ‘ecologically correct’ yardstick. Instead, the starting point for the analysis is the theory of a human creative power that to varying degrees itself influences what is to be understood as an appropriate and thus sustainable use of a given natural environment. In such an understanding, a sustainable use of a natural environment cannot be defined according to the conditions set

by the environment itself, but rather according to the interaction between the natural and social circumstances surrounding humans, which the humans affect through their actions and which, finally, can itself become subject to change. In this context, special attention needs to be paid to the way in which the relationship with the natural environment is adapted to the social structure of the actors, how it is maintained by society and, on the other hand, how it contributes to the stabilisation of the system as a whole. The following data analysis is based on social theory, at whose centre stands the issue of man’s actions and his ability to affect the world through them, and also ‘work’-related arguments, both of which are important agents in human beings’ dealing with their natural environment.

## 2 Actors in the “structuration” process

According to KASPERSON (2001, 3), we should not generally think of actions undertaken as part of survival strategies as constituting a rigid, fixed pattern. Confrontation with historically changing frameworks is in fact accompanied by a process of social learning – “social learning involved in continuing encounters with stress” – which serves to energise survival and crisis management strategies. As a consequence, what is meant by ‘action’ in conjunction with existential threats receives a specific vector that points to the question of what degree of freedom and power of self-determination exists within the concept of action in such situations. This means that we are not accepting the idea that the threat to the security of human food supplies is fundamentally determined by external conditions, but are rather looking for the conditions that lead to the actions which accompany these developments and influence them, and the forms these actions take.

In this context, the GIDDENS’ (1997) theoretical considerations offer help in interpretation. Following GIDDENS, ‘agency’ and ‘structure’ are linked together in the process of ‘structuration,’ whereby it is of central importance that structures both produce actions and are reproduced by them, a concept that GIDDENS (1997, 78) highlights with the term “duality of structure” (Fig. 1). In the process of structuration, the protagonists make decisions regarding the continuation or the modification of structures, and thereby influence the reproduction of social systems and interaction relationships. Consequently, we must assume that actors who find themselves confronted with a range of different and sometimes mutually exclusive structural norms will pick out those which appear to them to be most applicable to their own concrete situation. In this



continuity, actors can rely on the norms of their “practical conscience” (GIDDENS 1997, 56) for many decisions, and these allow them to orient themselves within the routines of society. At times of social disruption, however, when structural frameworks of action partially dissolve or situations occur which are characterised by structural multiplicity and contradiction, the actors’ practical conscience is soon unable to provide socially standardised solutions in decision-making processes. Only if the actors engage in a reflexive-discursive dialogue with the range of possible norms can a guideline for actions be established. The potential for and process of redefining structural norms is enhanced by a special kind of dynamic in time of social change and this will manifest itself in a complex pattern of structural norms, structuring actions and concurrently formed structural elements.

Having painted this backdrop of general thoughts and theories regarding the relationship between agency and structure, let us now turn to the field of action which always fundamentally defines the relationship between man and environment, namely humans’ work on and with the (agricultural) land, the importance of which the former president of Tanzania described as, “a basic gift from God to satisfy a human need” (NYERERE 1966, 53).

Unlike a sociological approach, which understands work as being related to the specific economic and ecological conditions surrounding the people involved, this paper sets out from the previously outlined premise that any work action observed can be explained neither as deriving simply from material needs, nor as a function of natural environmental factors, nor as a function of the tools used for the work. In other words, this paper rejects a structure-theoretical understanding of work. Like BECK and SPITTLER (1996, 5), the paper focuses on the prioritisation, the motives and also the (self-)perceptions that accompany any work action observed. It assumes that work action will manifest itself in the context of the relevant intersubjective everyday understanding of ‘work’.

Theoretical considerations of the factor ‘work’ can assist in getting closer to such interpretations, which ultimately find their expression in concrete, observable work actions: according to the economist TSCHAJANOW (1987, 53), work is characterised by toil and arduousness, and these can be tolerated to a limited degree within certain socio-culturally defined limitations which depend on the value assigned to the result of the work. Whenever the relationship between toil and value-gain is biased in favour of the former – in other words, the effort is seen as being out of proportion to the results achieved – the human being retreats from the work.

This means that the motives which ultimately prompt the human to work are dependent on the value of the product of the work in the subjective or intersubjective scale. On the other hand, the effort required to attain the product also influences the inclination to engage in work. However, this effort is itself subject to social interpretation, depends on the value assigned to both the work product and also other possible alternatives, and cannot be explained solely or even primarily as a physically measurable quantity.

In the context of the question of the environmentally related actions of human beings which is under examination here, we must base our reflections on the assumption that measures to stabilise the ecological structure of the natural environment will only be undertaken on condition that the product of this work be valued and that the work undertaken to achieve it will not be interpreted as too arduous. Social values are subject to social change whose dynamic is in turn shaped by the speed with which norms and surrounding circumstances replace, overlap or modify each other. In the context of ‘work’, special attention needs to be paid both to such processes of change and to subsequent re-valuations which assign the products of work their social values and thus allow them to be measurable in their relation to the acceptability of work effort (RÖSSLER 1997, 505–510).

### 3 Characteristics of transformation processes in Tanzania

Having detailed these theoretical considerations, we now turn to the actions and actors in south-west Tanzania, an area which has found itself confronted with a range of very different and even contradictory structural guidelines. However, the following corner stones of the social transformation processes must be seen as particularly relevant to the issue of environmental action:

- The indigenous structures of rural communities were founded on internal stabilization and external demarcation. This was achieved through a collective solidarity and a complex production system based on an institutionalised and strictly controlled power hierarchy with the elders as the acknowledged and ultimate authorities.

- In the Arusha Declaration of 1967, the Tanzanian government under President Julius Nyerere committed itself to the ideal of ‘African Socialism.’ The central constitutional element of this new social order was the construction of a new political power structure at the expense of indigenous authority and control structures. In addition, the inhabitants of the research area were

forced to congregate in large settlements in 1974–75. The aims of this ‘villagization’ were to ensure better political control, to better enforce national production programmes – especially the production of maize to safeguard basic supplies for the cities – and to improve educational and medical infrastructures.

– In the 1980s, people discovered that the promises made in conjunction with the promotion of maize production in particular had been less than fully kept. As an example of the disappointment that the inhabitants experienced, we can take the support of chemical fertilizer production, which is particularly relevant for the context dealt with here. With the beginning of the promotion of maize production in the 1970s, indigenous methods of increasing production were expanded using modern agricultural technology such as chemical fertilizers – and it is these that are meant when the villagers reject alternative production methods because of a lack of means. According to the statistics regarding the use of chemical fertilizers in the whole *Rukwa* region, of which the *Ufipa* Plateau is the main maize-growing area, an average of 4,497 tonnes of fertilizer was distributed annually in the 10 years between 1980/81 and 1990/91 (REGIONAL STATISTICAL OFFICE 1991, 22). What is particularly noteworthy here is the large variation in the amounts of fertilizer delivered: the highpoint was reached in the growing season 1986/87, when 11,114 tonnes were used, whereas in the years 1980/81 (161 tonnes), 1982/83 (2,999 tonnes), 1989/90 (1,779 tonnes) and 1990/91 (2,930 tonnes) the usage was far lower. According to FRANKE (1984, 87), even extensive production of local maize varieties requires between 40 and 80 kg of fertilizer per hectare, and Rasmussen (1986, 194–195) puts the level for hybrid maizes at 150 kg per acre.

– The 1990s were the years of deregulation. Socialistically-inspired regulation gave way to market liberalisation and structural adaptation. Faced with the realization that socialism’s production targets were impossible to achieve and with the deepening national debt, a new ideological course was plotted according to the terms laid out by the IMF and the World Bank. Since then, Tanzania has committed itself to turning its back on the ideals of African Socialism and has left people’s fates very largely in the hands of capitalist-influenced self-regulation. The consequences of this political transformation can be seen even in the remotest of rural settlements, in individualisation tendencies, in an increasing orientation towards money and in a widespread desire for ‘modernity’.

In summary, it can be said that the people were exposed to the kind of upheavals that rocked the very foundations of the previously binding social order. A

socialistic order of society was imposed on an indigenous African social structure, only to be displaced itself by the regulation of the free market. It was therefore almost inevitable that the result has been widespread insecurity affecting people’s practical conscience. The actors can no longer orient themselves and their actions according to established patterns, and they feel they have to reflect on their actions and to evaluate their appropriateness in every situation. In the process, patterns of action that previously defined the relationship between people and environments – both natural and social – are called into question.

#### 4 The case study

After a summary of the methodological approach taken during the field work, the analysis starts with an evaluation of the environmental productivity potential of the research area. Against this background, two systems of land use are then compared; the older indigenous system of “assured sustainability” is contrasted with the “threatened sustainability” system of the present day.

##### 4.1 Observations on the methodological approach during field work

The results presented in the following are based on field work involving a survey of a total of 385 households in 8 villages over three and half years between 1992 and 1996. The prime interest of the study was the actions of people under the influence of the structural changes that affected the study area from the 1960s until the middle of the 1990s.

An initial historical dimension in the change appears in the perceptions of everyday life and the actions of the inhabitants in different periods throughout the duration of the study. In order to gain an insight into this change, which articulates itself in the chronology of historical events and in structural policies which succeed older ones or build upon them, villagers in three age groups were questioned.

A second historical dimension can be found in what we might call ‘the simultaneity of historical disparity,’ which includes regional variations in the influence of the above-mentioned structural policies. Based on the thesis that, depending on the degree of their integration in the market, villagers will be differently affected by modern structures such as marketing options, consumer incentives, monetarism and other general, non-indigenous value judgements, the choice of villages to be studied was made according to the criteria of market

integration. The study began with two so-called ‘main research villages’, one of which was a settlement with a high degree of market integration on the main communication axis connecting *Sumbawanga* and *Tunduma*, the Zambian border and *Dar es Salaam*. The other village is located in a peripheral area towards *Lake Tanganyika*. It was affected late by integrating influences and, until the 1990s, even then only partially. The findings from these two main research villages were then used to select 6 more villages according to the market integration criteria. Two of these were to correspond to the peripheral settlement *Mtuntumbe* as far as possible, and two to the example of market integration, *Mkima*. A third category was added, represented by two villages close to a urban developments. This last category served to underscore the findings in a context of completed market integration.

In view of the questions already mentioned in this paper, both quantitative and qualitative methods were used, the former in the form of a standardised questionnaire, the latter in narrative- biographical interviews and group discussions of village history (TRÖGER 2002, TRÖGER 1997). The reliability of the results was ensured with the principle of “multi-perspective triangulation” (KÖCKEIS-STANGEL 1980, 363).

#### 4.2 Environmental suitability of the research area for agricultural production

In order to evaluate the environmental suitability of the research area for agricultural production, it is necessary to examine the requirements of the plants that are to be grown or – as here – are to be cultivated on a larger scale as part of national policy. In the research area, these plants include four field crops which are of enormous significance nutritionally, psychologically and physically (i.e. in terms of the area of cultivation). These are small-seeded millets, especially finger millet (*eleusine coracana*, see FRANKE 1984 for classification), maize (*zea mays*), cassava (*manihot esculenta*, also known as manioc), and the sweet potato (*ipomoea batatas*). All four crops can survive on the average annual rainfall of 800–950 mm experienced throughout the research area.

The distribution of the rainfall is a further important variable affecting plant growth. For example, maize yield decreases – to the point of total failure – as rainfall decreases, particularly in the period of blossoming and pollination. By contrast, dryness is very welcome when the grain ripens (REHM a. ESPIG 1984, 26). Local maize varieties ripen in 85–120 days, while hybrid maize is much slower. According to FRIIS-HANSEN (1989, 11, 35, 41), the particular variety of hybrid

maize seed available in the research area needs at least 170 days of rainfall to produce average yields. However, this number of rainy days is not seen even in years with a wet season of average length, which is 135–150 days. Cassava and sweet potatoes ripen in just 90 days, and this explains the fact that they are commonly classified as “hunger crops” in the region. In addition, the cassava harvest never fails totally (GURA 1986, 22).

All four crops are remarkably unfussy as far as soils are concerned, although maize yields less on extremely sandy, gravelly and clayey soils and on acidic soils (FRANKE 1984, 80–87, 117–119, 312–313, 319, 335–341; REHM a. ESPIG 1984, 26). Maize is particularly responsive to the use of fertilizers, in contrast with the other crops (HEISEY a. MWANGI 1997, 193); even if it makes relatively few demands of the soil, maize’s yield is directly proportional to the amount of nutrients available, and so the use of chemical fertilizer is directly reflected in an increased yield.

There has been only one evaluation of the environmental potential for the production of these crops that can be used to make a statement relevant to the research villages. In the years 1976–1978, a survey of the environmental potential of the *Rukwa* region, including the *Ufipa* Plateau, was carried out with the support of the Norwegian development agency NORAD. The aim of the survey was to evaluate the agricultural potential of the region in order to assist smallholders to adopt more intensive production methods and to improve their integration into regional and national market structures. For land use planning purposes, areas were catalogued according to commonalities of relief energy, height above sea level, soil type and water storage capacity (INSTITUTE OF RESOURCE ASSESSMENT 1984, 2). Following the classification set out by the Food and Agricultural Organisation (FAO), the land was classified into four grades of quality. Areas in which satisfactory yields could be expected even with a minimum of soil-improving measures were graded as having “good suitability”. Areas with “limited suitability” were, in contrast, those which would require a higher input of fertilizers and other soil-improving measures, thus involving more labour and, should chemical fertilizers be necessary, higher costs. Areas referred to as “marginally suitable” were considered considerably less environmentally favoured and the relationship between input and output was assessed as poor. However, this evaluation was based on the areas’ potential for growing nationally and internationally marketable crops such as maize, coffee and cotton and not on their suitability for traditional crops, and so it is possible that certain areas may have been classified as having “marginal suitability” and an “unfavourable cost-yield relation-

ship”, yet still provide a perfectly satisfactory return when used for indigenous crops such as cassava and sweet potatoes on a smallholder basis. The fourth and last of the categorizations is that of “unsuitable” for agricultural use; this was applied to land which does not permit sustainable use (INSTITUTE OF RESOURCE ASSESSMENT 1984, 2–4).

The map of the research area’s agricultural potential (Fig. 2) shows that the land around all of the research villages can be graded only as “marginally suitable.” This classification is explained by the sandy to clayey soils that are found throughout the region; these soils are not able to hold water and are also low in nutrients, and so severely limit plant growth if no countermeasures are undertaken. The soils originate from highly weathered eroded material which is only limitedly supportive of plant growth (INSTITUTE OF RESOURCE ASSESSMENT 1984, 1). This means that the producers must compensate for the shortcomings of the environment with input of their own in order to achieve satisfactory yields from their plots. In view of the price-cost ratio at the time of the study, the kind of commercial, input-intensive production that dominated national plans for maize production was considered to be uneconomic (INSTITUTE OF RESOURCE ASSESSMENT 1984, 24).

#### 4.3 *The indigenous land use system: an example of ensured sustainability*

The most striking characteristic of the village societies in the research area is their social and geographical stability that lasted right into the 1960s. This was demonstrated by, among other things, the considerable number of village headmen and their succession that older village inhabitants mentioned in conversation. WILLIS (1981, 119) considers the then typical production system based on compost heaps as a (although not *the*, see below) necessary pre-condition for this stability: the compost heaps helped to increase the yield from the preferred main crop millet and to reduce soil exhaustion and had, from WILLIS’ ethnological point of view, been adopted from north Zambian people and dominated the research area by the end of the 19<sup>th</sup> century, possibly even much earlier (WILLIS 1981, 107, 109).

The production system can be characterised by the following steps undertaken to improve and exploit the soil: After a plot has been cleared for planting, earth mounds are first built up at the end of the wet season and these are then split up into separate heaps into which the grass is incorporated. Then the heaps are arranged into regular rows approximately half a metre apart and, with the last rainfalls, beans and groundnuts

are planted on them. At the end of the next dry season, the woman pulls out the weeds that have grown on the heaps and leaves them there to decompose. Well into the next rainy season, when the rains have really started, the man breaks up the heaps and spreads them on the field and the woman sows millet, sometimes maize. The woman harvests the millet in June or July before, at the start of the next rainy season, the man builds up the heaps again, although smaller this time. These are broken up again after only two months, in January, and spread on the field. If the harvest from the field was satisfactory, the woman will sow millet again, otherwise she will choose maize, beans or another crop that is of minor importance than millet. After this second crop is harvested, the plot is left fallow. According to the research conducted for this study, the fallow period in the 1960s lasted about 5 years.

This indigenous system for cultivating soils that were notably unfavourable for agricultural production was complex and labour intensive throughout the year. In view of the stability of the settlements over a long period of time, we can conclude that the inhabitants were prepared to make such efforts until the 1960s. However, it was still necessary that this readiness to take work was not left to the individual’s discretion, and so concrete regulation of the work was reinforced.

*“When I was young, people worked hard, not like today when they don’t make the effort to feed their families. If someone really had to work in someone else’s field to get his meals, he was seen as lazy. People were ashamed to work for other to get food in those days. Everyone tried to feed his family, and there was hardly anybody who didn’t manage. Of course, we did do work for others. For example, if you needed a hoe and you didn’t have the money to pay for it, you could work on the blacksmith’s land and you got the hoe in return. Working for a hoe or a piece of cloth was no reason for shame.”* (ESTHER KIMITI, 83 years old)

According to this old woman’s memory, work was ‘compensated’ in two fundamentally different ways. The first way was of existential importance for the physical existence of the people. It safeguarded the survival of all the members of the household by providing sufficient food and, in economic terms, can be called “use value”.<sup>2)</sup> In addition to this, the “exchange value” of work already existed in the old woman’s youth, when it was used for things that were not directly connected to safeguarding food supply.

In the traditional local understanding, the individual’s willingness to take on the high work load required by the environmental conditions in the research area

<sup>2)</sup> I use the same economic differentiation between use and exchange value that RÖSSLER (1997) uses in his interpretation of “work”.

is dependent less on education and external circumstances and more on the innate disposition of the individual. The contrast between ‘good’ and ‘bad’ children – *itambi zisuma* and *itambi züpe*, freely translated as “children are either good or bad workers, there’s nothing in between” – symbolises a view of people that judges them on a perceived will to work that is deeply rooted and virtually impossible to influence from the outside. Such an understanding of people necessitated social mechanisms that could direct different innate dispositions into controlled channels if the system was to be stable. As a result, every community member who was capable of work was expected to do enough work that under normal circumstances his own food supply and that of his dependents was safeguarded and that the household did not burden the community at large. This system was enforced by neighbours watching each other, and the workload was measured by the amount of stored grain necessary to guarantee the food supply for all household members for the whole year.

According to their own statements, the people generally accepted their responsibility for ensuring their own food security as a work ethic. However, it was necessary that the individual readiness to work was not left dependent on a subjective perception of the effort involved. In order to counteract this, subjective prioritisations of labour were limited by concrete rules reinforced by abstract concepts such as “shame” and “sloth” which prevented the community’s rules regarding social redistribution from being overtaxed. Someone who was not prepared to do enough to guarantee his own food supply was seen by the others as not being worthy of their support. This meant that strict, socially controlled rules were put in place to stop an all too liberal attitude towards the “effort clause” in the context of survival issues. By the same token, however, the wealthier members of the community were also threatened with sanctions if they did not come to the aid of the victims of an acknowledged emergency.

Figure 3 illustrates the most important pillars of this system, one of which is the concrete behaviour of man towards the natural environment. The other pillars apply to the whole system for stabilising the social make-up and the controlling institutions and mechanisms safeguarding it. The three pillars each have a function that guides action, and these three functions are reinforced primarily by three perceptions of everyday life which, following on from the argumentation thus far, are called “safeguard clause”, “use value of food security” and “independent versus joint responsibility.” At the very centre of the whole system was the confidence engendered in members of the community regardless of their socio-economic standing and in the

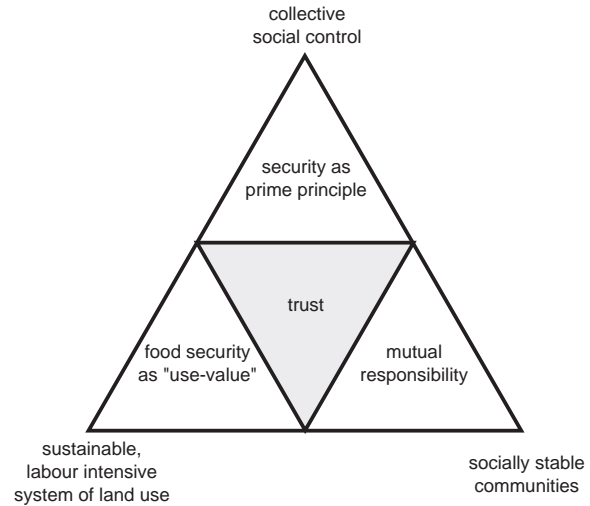


Fig. 3: The collective work ethic system

Das System kollektiver Arbeitsethik

functioning of the system that was deeply anchored in the practical conscience. In summary, it can be said that the indigenous model of sustainability is to be understood as the most frictionless interaction possible of social and natural environmental system elements on the basis of perceptions of everyday life that channel the actors’ actions towards a stabilisation of the system as a total entity.

#### 4.4 The modern land use system: an example of endangered sustainability

Before going on to consider the modern land use system, two points need to be mentioned: firstly, the actors obviously possess an awareness that their environment is weak as far as agricultural production is concerned and, in the absence of means such as chemical fertilizers and improved seeds, that this weakness can only be counterbalanced by a higher labour input. In addition, we can assume that there is appropriate knowledge available in the communities – although perhaps not from every individual – on how to improve the soil effectively. The process of increasing the nutrients in the soil by composting, and particularly the method of raising the nitrogenous content by planting legumes, was an integral part of the heap system and a widely held knowledge.

Against this background of experience and knowledge, the current system of land use appears even to the affected actors to have gone slightly off the rails. A large majority of villagers complain that soil fertility has declined in comparison with before, and that they harvest less as a result. The prevalence of this opinion can be



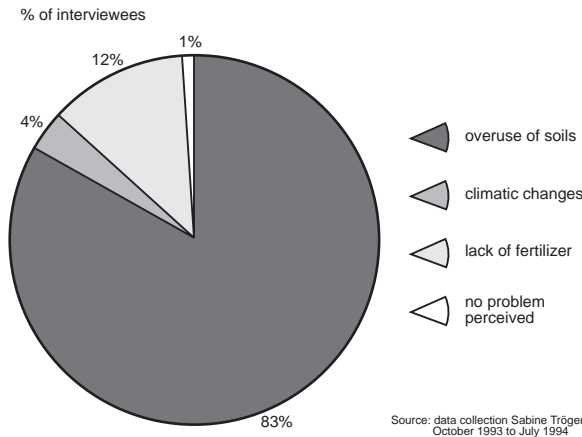


Fig. 4: Perceived reasons for the decline of soil fertility

Wahrgenommene Gründe für den Rückgang der Bodenfruchtbarkeit

demonstrated in the fact that only 1% of the farmers denied that it was a problem (Fig. 4). Asked to explain this negative development, four out of five heads of household in the two main research villages referred to an overexploitation of the land and the consequently insufficient recovery periods for the soil. For 12% of farmers, the explanation for the reduction on soil fertility is the lack of chemical fertilizers – and thus ultimately the result of insufficient fallow periods – whereas 4% blame climate change.

If we look at the current use of fallow periods, it is easy to confirm the farmers' perceptions. In the 1960s, the plots of two thirds of the farmers were cultivated for 4 to 5 years and left fallow for a period of between 3 and 5 years, before being ploughed and built up into compost heaps again. By contrast, nowadays almost half of the households in settlements near urban developments give their land no break in cultivation at all (Fig. 5). In this context, many of the farmers complain that the widespread cultivation of maize has caused the disappearance of many of the weeds such as *mlenda* (*hibiscus acetosella*), *mgagani* (*cleome monophylla*) and *lulenzi* (*solanum nigrum*) that used to help them know the right time to plough the fields and, in their experience, are fundamental to the improvement of the soil when incorporated into the heaps. At first sight, it might seem that this change in land use can be explained by a reduction in average size of plot available, and it is indeed true that, as a result of villagization at the beginning of the 1970s and the high rate of population growth (4% annually), plots close to urban developments have shrunk to 5.6 acres, a quarter of their size in the 1960s. What is surprising in this connection is the observation

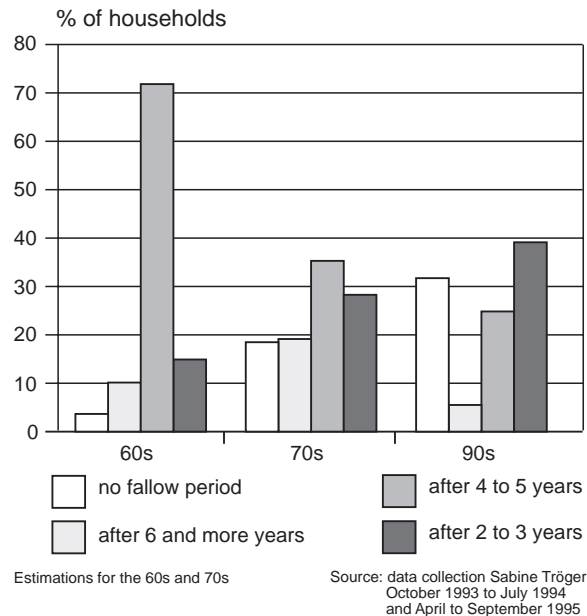


Fig. 5: Use of fallow periods in historical perspective

Anwendung von Brache in historischer Perspektive

that almost a third (29%) of households in the peripheral settlements also disregard fallow periods, despite having an average of over 20 acres per household and thus enough land to permit breaks in cultivation.

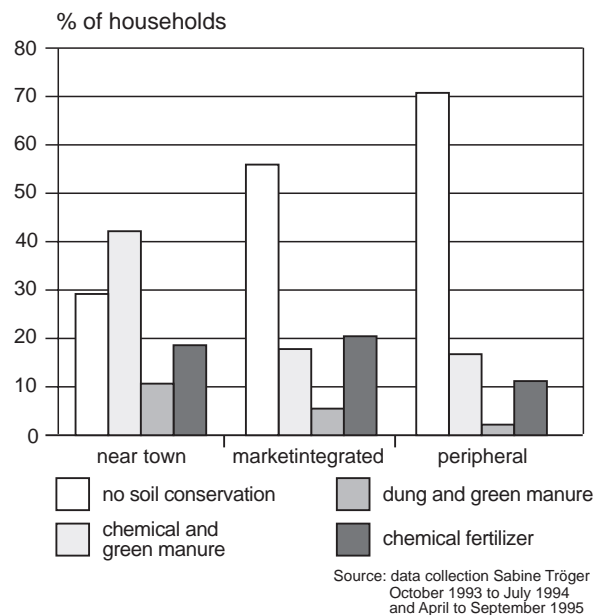


Fig. 6: Methods of soil conservation in maize cultivation in regional-historical comparison – the situation in the 90s

Methoden der Bodenverbesserung in regional-historischer Perspektive – die Situation der 90er Jahre

If we now look at the measures undertaken by the actors to improve the productivity of their land, we find that there are different strategies and that the dividing line is between settlements with a high degree of market integration on the one hand and settlements with a low level of integration on the other. The use of chemical fertilizer was promoted as part of the national maize development program when it was demonstrated on 'on farm trials' and subsidised for a number of years, but this kind of intensification was used by comparatively few households. During the first half of the 1990s, a bare fifth of households in villages close to urban developments and only 11% of households in peripheral settlements used chemical fertilizers as the sole method of soil improvement, and a further 10% close to towns and 2% in the periphery used chemicals in combination with mulch and compost (Fig. 6). According to the field research for this paper, a large proportion – 70% – of households in peripheral areas today do nothing at all to improve their land. Even the traditionally known and trusted methods of using green and cattle manure are used by only 16% of these households despite a relatively high level of livestock<sup>3)</sup>. The same methods are applied by 42% of households in villages close to towns. Individual conversations with farmers in peripheral settlements in which the households generally have sufficient land available for production, but only half of which is used, showed that a kind of rotation system is used in the majority of cases. Under this system, the crops grown on the plots that lie further away from the house are alternated. This simple rotation system, which does not demand long-range planning of land use over a number of years, is not seen by the farmers as having anything in common with the strategically planned fallow periods used in earlier times.

Although practically all farmers complain about a reduction in soil fertility and explain it in much the same way, thus admitting that their own form of land use is not sustainable, they still do not return to the tried and tested system of land use even when there is sufficient land available to allow the fallow periods necessary under the indigenous system. This conclusion is supplemented by the observation that, unlike their counterparts near towns, the farmers in the peripheral settlements undertake hardly any measures to counter-

act the decline in the fertility of their land. A comparison of yields per unit of area in the various locations provides evidence of the different action strategies. Maize yields vary between an average of 650 kg per acre close to towns, 629 kg per acre in market-integrated locations and only 449 kg per acre in peripheral settlements.

The influence of developing agricultural technology, represented by the ox-plough, is particularly striking if we look at the deep structure of the actions observed and thus the actors' perceptions of everyday life as they relate to action. Although the ox-plough was known as a method for cultivating land in the 1950s, it was only as a result of the national promotion of maize growing that its use spread to today's levels. In the 1990s, around two thirds of agricultural land was being ploughed using oxen. This method is expensive for households who do not themselves possess the animals and plough – it costs between 1,000 and 1,200 TSH<sup>4)</sup> to rent a team and plough for one day – but even poorer households try to have their plots cultivated by oxen. The main reasons given for using the ox-plough are the labour savings and – especially in the peripheral settlements – the possibility of cultivating extra plots. In other words, the arguments are related to the – in this case lower – "labour effort". The indigenous system of compost heaps seems "too demanding" in comparison, and the actors reject it, only to be then faced with the problem of soil exhaustion if the plots are used over longer periods.

Today's pattern of land use must, however, be seen in conjunction with other elements of change. The promotion of maize production also resulted in a value change in the concept of "labour", and this brought with it wide-ranging social consequences. These are illustrated in Figure 7 in comparison to the defining elements of the indigenous system of Figure 3. The policies for the promotion of maize production gave the crop a double function; that of staple foodstuff on the one hand and of main market product on the other. Although the farmers complain frequently about temporary difficulties on the market, maize has become a value that can be exchanged for money. In fact, a quantity of maize originally planned as a reserve store can achieve such an "exchange value" even "overnight". Many women complain about their husbands' lack of scruples in taking the stored grain and using it to obtain beer and other consumer goods when it is essential to safeguard the family's supply of food. As a result, the

<sup>3)</sup> Only 25% of households in villages close to urban developments possess cattle. In comparison, 54% of households in peripheral settlements keep at least a small herd of up to 6 animals.

<sup>4)</sup> At the time of the field work, 280 Tanzanian shillings (TSH) were worth about 1 DM.

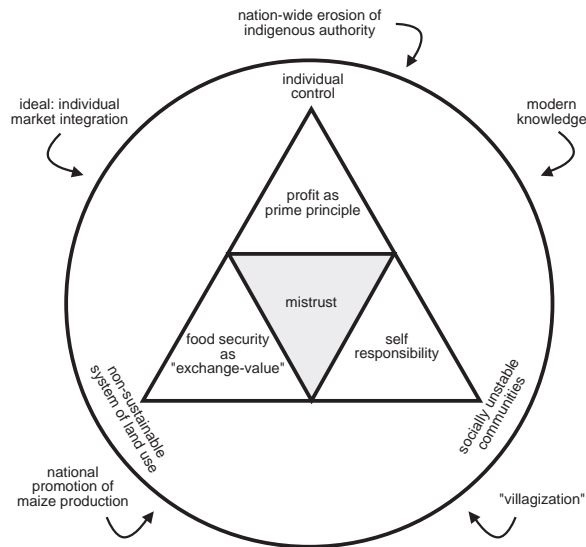


Fig. 7: The individual work ethic system  
Das System individueller Arbeitsethik

expectation has become that labour in the fields will be paid for in a cash value, and thus the work on and with the land loses its previously undisputed function as safeguarding the food supply by building up a stockpile of grain.

In the face of the increased range of goods on offer, new desires have arisen and the actors are increasingly finding themselves subject to conflicting interests and needs. Whereas building up a food reserve was previously the primary, unquestioned value of labour, the same food security has today become just one of several value components. Now the farmers are faced with the question of whether the profit from labour is worth the effort they must put in, and many men, especially young ones, often decide against the kind of labour in the fields that was previously not open to question. Instead, they rely on alternatives – whether realistic or not is open to debate – such as trading, charcoal production or a job in road construction which they see as offering them the same exchange value for less effort.

In summary, we can say that profit orientation has taken the place of ultimate security orientation in the actors' minds. The value of labour in the fields is no longer measured by the sole yardstick of food security but now is seen rather in relation to the perceived market value of the product of the labour, and it is this that decides the labour input into the environmentally demanding plots. In view of this depending on their market integration, farmers choose one of two forms of land use.

As a result of increasing land shortage, the inhabitants of settlements that have a high degree of market integration and are close to towns feel that they have to invest in the land they possess and make efforts to improve the soil. The intensification measures proposed by national programs involving expensive methods of production have proved to be not worth the expense in most cases, and so the actors look for the kind of means and measures to intensify the use of their land that can be obtained without considerable investment on their part. Aside from mulch and compost, the use of cattle dung is a possibility, and indeed older children can be seen in villages near urban developments and in market-integrated settlements carrying the dung in shallow baskets on their heads to the fields. Cattle dung is already such a valuable commodity in these locations that it is offered for sale. Despite all their efforts to improve the productivity of their land, however, the actors themselves ultimately do not consider their system of land use to be sustainable. Their plots are too small and the productivity cannot be sufficiently improved using the little means available. Even those prepared to put much work into their land find that there is very little safety margin in their food security, with the result that land shortage alone means that households now tend to have less food security than in the 1960s.

As a result of the changed perceptions of everyday life, other factors that further endanger the households' situation begin to play a role. Firstly, villagization severely shook the previously firmly established belief in the fixed and yet socially-differentiated structure of the community. Whereas the people had previously been suspicious of strangers who were not part of the community, villagization meant that they suddenly had strangers as neighbours, and fear and mistrust were the results. This, combined with the national strategy of breaking down traditional power structures, served to legitimise the rejection of solidarity. In addition, the "demystification of the natural world", in other words scientific explanations for what was previously seen as supernatural and thus beyond the individual's control, leads to the threat of sanctions – especially bewitching – losing their capacity to induce fear. As a result of this, traditional duties and rights can in turn no longer be enforced.

In addition to this general decline in previously internalised morals came the realisation that the village community was no longer in possession of what had previously been the ultimate measure for judging whether a member was prepared to make every effort to secure his or her own survival. Nowadays, a reliable and transparent yardstick for deciding on an individual's right to social solidarity help can no longer be

based on the customary indicator of work done, namely the amount of grain in the store, and nor can the sources of income mentioned above be accurately assessed by the other members of the community. In this way, the old control instruments and mechanisms governing social support have lost their significance and so the decision regarding how much labour is expended is increasingly left to the individual. Consequently, those in need can only hope that their neighbours take pity on them, rather than, as previously, being able to invoke neighbourly responsibility to receive help. The final result is that households tend to be increasingly vulnerable to food deficits.

On the periphery, the lack of labour combined with a sufficient availability of land means that any attempt at intensification of land use does not seem profitable and is consequently rejected as an alternative course of action. The labour that is available can be more profitably employed in conjunction with the use of the ox-plough on additional plots of land, whereby the actors are for the most part well aware that their actions work towards an overexploitation of the soil. Complaints about the decreasing productivity of the plots as a result of overuse can be heard in peripheral settlements as often as they can in villages near urban developments. Thus we can see that the argument about ignorance made by the agricultural advisor quoted at the beginning of this paper is not justified even if the farmers are not prepared to take remedial action. Instead, it can be seen that the majority of the actors are indeed well aware of the various possibilities for improving soil productivity open to them.

The cause of the pattern of actions seen today is to be sought in the changed perceptions of everyday life, which have an effect in two ways. On the one hand, the decision regarding labour input is today left to the individual. Traditional control mechanisms are no longer effective, indigenous authorities have largely lost their power and sanctions such as the bewitching curse either are not respected or cannot be applied in today's less clear-cut social context. The result is that constitutional "sloth" now comes to the fore. In addition to this general individualisation of the work ethic, the "effort clause" has an effect, making labour in the fields and especially labour to improve the soil seem much too strenuous in comparison with other labour alternatives. Particularly on the periphery, where there are still sufficient tree stocks and where businessmen from *Sumbawanga* buy charcoal by the truckload, charcoal production is seen as more "rewarding" than work in the fields. In view of this, many, particularly the younger men, accept the lack of sustainability in their pattern of land use.

### 5 Sustainability over the course of time

This last section of the paper returns to the theoretical deliberations made at the beginning with the objective of considering the degree of freedom the actors in the research area enjoy with regard to their actions. In other words, it will be a discussion of the opportunities contained within the actors' actions for them to deal with the threats they themselves perceive to the sustainability of their natural and social environments, and their ability to deal with them in ways that are acceptable to them.

Returning to the example of the actors close to urban developments, we must conclude that the circumstances surrounding them so tightly constrain land use that sustainability is hardly possible. The actors feel forced to exploit their land and in the long term will not be able to counteract decisively the effects of soil exhaustion with the means that are available to them. However, if we recall that the indigenous land use system presented itself as an interplay between natural and social circumstances, conceding such a determining influence to structural components must be seen as too simplistic a basis for evaluating the system in its entirety. As far as the social components are concerned, the actors certainly do have the power to create new structures that can either strengthen or weaken the existing tendency to vulnerability. Here it should be stressed that the actions in fact seem to increase the vulnerability in a number of cases. The actors base their actions on a combination of old and new structural elements in a way that tends to reject social solidarity. As they still refer to the traditional measure of solidarity, they see themselves justified in denying help to those in need and can legitimise it to others by appealing to practical awareness. In other words, the transition from an indigenous to a new system, implied in the contrast between Figure 3 and Figure 7, is not complete. The reality lies somewhere in between as many of the actors orient their actions according to a mixture of old and new systems.

A reflective approach to the new circumstances can already be discerned among some villagers, however. Typically, notably fewer people in villages close to towns are labelled "lazy" and thus "automatically" denied aid. In these settlements, new social practices and responsibilities can be observed as the inhabitants form new religious communities and other non-religious solidarity groups. The common feature of these new social forms is a strict regulation, adapted to contemporary life and enforced by sanctions, of a mutual responsibility to help in emergencies (these are described and analysed in more detail in TRÖGER 2002.)

This discursive approach to social change makes some steps in the direction of a socially fair adaptation to the new.

In contrast, the action of the inhabitants of peripheral settlements in the context of their natural and social circumstances proves to be dissimilar. Although land use here is not oriented towards sustainability either, the actors do not feel pressured by the problem in the same way as their counterparts near towns. The social control safeguarding a sustainable land use has largely been removed and a profit-oriented perception of everyday life dominates. This brings with it a new structure that insufficiently cares for the land and an individualistic approach to problem-solving. As there is still enough land available for cultivation, the clear majority of households do not suffer from existence-threatening food shortages – at least in good years – and so the processes of reflection seen in settlements close to towns are prompted less frequently. For the most part, the actors find themselves in a situation in which their actions are oriented according to their individual interests and they can relatively freely combine structural elements from different models according to what will bring them the largest short-term profit. The consequences of these structuration processes

have not yet proven themselves unambiguously negative, and it will be a while yet before the actors in the peripheral settlements have to engage in the kind of reflection already seen in villages near urban developments. Looking at the results of our survey as a whole, however, we can predict that this will certainly become necessary eventually.

The question was raised at the beginning of this paper of whether a sustainable land use could be seen as the embodiment of a successful adaptation to a natural environment. Considering the survey results presented here, it can be stated that the specific approach taken by the people to their natural environment certainly defines the long-term productivity of their agricultural land. However, the actions taken in this context are much less dictated by external influence or ignorance than is often assumed. Rather, the decisive factor in many cases is the incorporation of environment-related activity into the respective social system, and it is this that forms the basis of the perceptions of everyday life that ultimately influence the structuration processes and, with them, the actors' actions. It is only against this background that a judgement can be made about what in the concrete circumstances of the people can be seen as 'sustainable'.

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