

Animal Research and Development

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**Animal Production in
Semi-arid Regions:
An Example from the Eastern Sahel
(Butana, Republic of Sudan)**

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THE RELEVANCE OF AGRICULTURAL POLICY FOR INCOME AND FOOD SECURITY

by

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Agricultural policy

The agricultural policy of the Sudan has exercised a decisive influence on animal keeping in the Butana. Here, it is not only regulative and procedural measures directly concerning animal keeping which are authoritative, but also laws and regulations referring, for example, to agriculture, trade and/or food guarantee, which affect animal keeping indirectly only.

Since the country's independence in 1956, the policy of the Sudan can be characterized, according to Wohlmuht (1992:12), as "constancy of policy failure" or "constancy of structural malformation". Therefore, in addition to the civil war and the natural catastrophes (Terzloff 1993:1), it is primarily the economic policy of the Sudan which is made responsible for the fact that the Sudan occupies the 36th place among the poorest countries of the world in the report on international development for 1990 (World Bank 1990b). In the World Bank's report on international development for 1992, no statements are made on the obscure economic development in the Sudan. Even after the coup d'état of June 30, 1989, there was little change in the policy, although a new economic philosophy was professed, in 1989, by the "National Conference for Economic Salvation" in the ten doctrines of the reform of economic policy (Wohlmuht 1992:23).

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In the following, four outstanding packages of measures of agricultural policy in the last decades will be presented together with their implications for animal production in the Butana:

- agricultural development,
- nationalization of pastures,
- market interventions (especially in trade and in the price policy), and
- government measures to promote animal production.

Agricultural development

Already before the Sudan became independent, the British condominium had developed agriculture in the Butana and in the bordering regions with the help of infrastructural measures (e. g., road construction, railway lines, machine rings, establishment of irrigation areas) and the further establishment of legal authority (Kirk 1994). It is only after independence that agriculture was practised on a significant scale in the region. The areal extension – and thus the reduction of pastures – was only made possible through deliberate measures of agricultural policy (horizontal expansion). The preference accorded to agriculture over animal keeping is obvious, for example, in the allotment of government disbursements within the framework of agricultural policy: animal keeping was rarely allotted more than 10 % of the funds (cf. Rahmann 1994). The development of agriculture was based on the "Bread Basket Strategy" of Numeiri's government which was founded on concepts dating back to the British colonial era (Wohlmut 1991: 438). The objective was to cause the Sudan to become independent of food imports and, above all, enable the production of surplus products which could be exported, considering the notorious negative trade balance (cf. Rahmann 1994; Wohlmut 1992: 13; Wohlmut 1991: 439). Thus, in the Butana for example, the New Halfa irrigated area was established as of 1964 and, since the fifties, the mechanized rained agriculture in the durra belt of Gedaref has been extended (Kirk 1994). Today, the latter has expanded and covers 6 million Feddan approximately in a wide belt which reaches up to 100 km from Khartoum to Kassala since the gratuitous appropriation of land (apart from the payment of an insignificant rent to the government) was tolerated by the public (in 1985/86, of the 200 million Feddan of cultivable land in Sudan, only 20.9 million were cultivated; 2.4 million Feddan of irrigated agriculture, 8.6 million Feddan of rained agriculture, and 9.9 million Feddan of traditional agriculture (ILO 1987: 49)). Credits were granted for investments, subsidies for agricultural inputs (e. g., fertilizers), while imports could be effected duty-free (Wohlmut 1991: 439).

As agriculture began to be expanded, no or only insignificant changes took place in the extensive animal keeping which prevailed at the time (Rahmann 1994). Indeed, natural grazing areas were lost; however, there was no scarcity of fodder since, at that time, harvest residues could be utilized at no cost. The expansion of agriculture first caused serious difficulties to the extensive autochthonous animal keeping in the eighties. The formerly hardly relevant instrument of regulation policy, private property rights, became a decisive factor. It became evident that the one-sided development of "modern" agriculture had led to a dualistic agrarian structure: high incomes in irrigated and rained agriculture as well as in specialized animal keeping in the vicinity of urban areas, low incomes in traditional agriculture and in extensive animal keeping in the rural areas (Wohlmut 1991: 442). The crop areas cultivated by applying modern methods were, from the first, vested with extensive rights to act for the cultivators. These rights approximate those of the property status understood in terms of European law (Kirk 1994). These rights to act were especially exploited in areas where mechanized rained agriculture prevailed and was managed primarily as a private business. During the drought in 1984/1985, for the first time, the large farmers claimed money for the utilization of harvest residues in their fields; since then, this has been the rule (Rahmann 1992). To avoid these costs, animal keepers who do not have fodder resources from harvest residues from their own fields, that is, the majority, did without harvest residues for as long as the natural pastures permitted, and contributed thus to their overutilization. This decisive step – the sale of harvest residues – has become the rule ever since. In the extremely dry year of 1990/91, animal keepers who did not have their own harvest residues had to sell up to 20 % of their livestock to be able to pay the costs of supplying fodder and water to the remaining animals (Rahmann 1994).

As in the last decades, the owners of land under irrigated and mechanized rained agriculture are promoted and the cultivators owning small areas are neglected under the present government. That which is valid for small cultivators applies more strongly still to traditional animal keeping – not only in the Butana. In this, the political intention of weakening nomads, who are generally considered to be uncontrollable, played an important part. Decision-makers in politics and administration very often do not come from animal keeping societies whose ways of life are not familiar to them. They are more strongly attached to agriculture, to the interests of which they have given greater consideration in the agrarian policy than to extensive and well adopted animal keeping. The rudimentary approaches towards improving animal keeping (within the framework of the "balancing of agricultural development") have, for example, not gone beyond the establishment of the "Bank for Animal Production" or of the "Sudanese Animal Wealth Company" (Wohlmut

1992). This has not brought any advantages to the traditional animal keepers in the Butana, as the field surveys showed (Rahmann 1994).

Nationalization of pastures

Within the framework of the "Land Administration Act" of 1971, the natural pastures of the Butana have been nationalized (Kirk 1994). Whereas the natural pastures have, since then, been at the disposal of every animal keeper, the cultivated areas have the status of private right. Cultivators who own animal herds use this right to their advantage. As long as there is sufficient fodder and water in the natural pastures, the animal keepers from adjacent (irrigated) areas, the milk producers from the urban areas, and the large farmers from the mechanized rainfed agriculture send their animals to these natural pastures. There, they compete with the animal keepers, who live in the region and who depend on these fodder resources exclusively and reduce their withdrawals from the "common pool". When these natural pastures have been exhausted, the animals are sometimes fed harvest residues. Either the animal keepers have harvest residues from their own fields at their disposal (irrigated areas and especially in mechanized rainfed agriculture) or they must buy them.

Usually, the animal keepers in Central Butana are not in a position to incur these expenses and simultaneously achieve a sufficient income to maintain their families even if a positive marginal income can be earned in extremely dry years as well. This is due to the fact that surplus milk cannot be sold in the areas that are distant from the market and no or only insufficient of their own harvest residues are available from wadi cultivation (Rahmann 1994).

Interventions in the market policy

In the Sudan, there is a series of interventions in the market policy. The World Bank (1990:iii) even speaks of an overregulation of the Sudanese economy which it considers to be due to the fact that Sudan's government "... has mistrusted the private sector so that a web of regulations was built around the economy and all its sectors." Here, a difference should be made between interventions in the market structure, in the price policy, and in the international trade.

Within the framework of the agricultural development, the marketing prospects of animal keepers also improved (market in New Halfa, better transportation facilities). This has led to an intensified market integration. The world has shrunk for animal keepers; the Butana is no longer isolated. Thus, changes in animal keeping, determined by the market, have also been effected by animal keepers in the Butana (for example, intensification of sheep produc-

tion because of the demand in Saudi Arabia). Change in the marketing structures was restricted mostly to meat production only (Rahmann 1994).

The markets also brought about better possibilities of supplying consumer goods. In that respect, however, it must be stated that the market structures lack the government's regulating influence - with a view to stabilizing prices and income (Williams 1993: 142). As to their market position, the animal keepers are at a disadvantage in comparison with animal buyers and sellers of consumer goods. This is apparent above all in the terms of trade (Oesterdiekhoff 1991; Rahmann 1994). Especially in times of crisis as during years of extreme drought, when there is a great need for consumer goods (basic foodstuffs primarily), these are very expensive, whereas animals are very cheap. (Compared to favourable years such as 1988/89 (price relation between a sheep and a sack of sorghum = 1:1), in years of extreme drought, such as 1990/91, the price relation is 7:1.) Here, the relative marketing power of animal buyers and of sellers of consumer goods play a decisive role. Especially in times of crisis, government intervention is lacking or is not realized (for example regarding the highest price for sorghum) (Rahmann 1994).

Prices also exercise an important influence on international animal trade. Especially the government monetary policy has had effects on the international trade of the Sudan, and on the exportation of animals as well. The Sudanese pound is overvalued and is not accepted abroad at a fixed rate of exchange. Shadow markets have developed. (Since April 1992, the Sudanese pound has been called Dinar (conversion = 10:1.) This is why foreign currencies are of great significance for the import of commodities. Among other things, animals are exported in order to obtain foreign currency. The weakness of the Sudanese pound abroad caused the Sudanese government, at the beginning of the eighties, to transact "barter business", for example with Egypt (1981) and Libya (1990), in the course of which animals are exchanged for commodities (Rahmann 1994). A serious problem for international trade arose during the Gulf conflict, in 1990/91, when the Sudanese government supported Iraq. Saudi Arabia strictly impeded, among other things, the importation of Sudanese animals. Even the present conflicts with Egypt handicap the exportation of camels, for example. In the last case, however, the handicap is more strongly determined by the Sudanese who, in 1991, introduced strict regulations regarding the exportation of camels to Egypt. Only 15 % of the exported camels should be female animals although precisely these bring about profits when exported (as a reason, it was stated that the production potential of these popular animals should not be exported, so that the production potential would not be lost in the long term). All of this had led to an expansion of animal smuggling (especially sheep to Saudi Arabia and camels to Egypt) which, nowadays, make up far more than the number of animals officially exported (Rahmann 1994).

Direct promotions of animal production by the government

The government promotes animal production with the objective of increasing not only the number of animals kept but also their productivity. It thus assumes a social task which cannot be fulfilled by the individual animal keepers (Doppler 1990: 267). Within the framework of the direct promotion of animal production by the government, the following measures are applied:

- improvement of animal health by the governmental veterinary service
- subsidization of concentrated feed
- cultivation of fodder in national fields under irrigated agriculture
- cross-breeding with European breeds of cattle.

The majority of the veterinarians who work in the research region are employed by the government. Annual mass vaccinations, in the course of which mostly cattle are vaccinated against enzootic diseases, constitute a crucial aspect of the activities of the veterinary service in the Butana. The production and distribution of the vaccines and drugs are the government's monopoly. Since the beginning of the eighties, the production of vaccines has been being modernized with the substantial support of international projects within the framework of development cooperation (Böhnel/Weiser 1994), so that the number of distributed doses was increased by the factor 7.5 approximately (to about 17.5 mio. doses) between 1982/83 and 1991/92 (Whabi 1992: PARC 1990; Statistical Yearbooks of the Sudanese Veterinary Administration 1982/83 - 1987/88), thanks to the scientific assistance provided to the Sudanese Veterinary Research Administration by the Institute for Tropical Animal Health, Göttingen University. As a result of the prophylactic measures as well as the treatment of sick animals and emergency operations at the outbreak of enzootics, the health of animals is promoted within the framework of the available possibilities. However, the measures of the government veterinary service are far from being sufficient to meet the demand for veterinary care that prevails in the survey region (Weiser 1994).

The government subsidizes concentrated feed in order to increase the milk production. This relatively cheap concentrated feed is allotted according to the statements which the beneficiaries make regarding the number of lactating cows they keep. However, concentrated feed is not regularly available. Its distribution is organized by the veterinary stations so that it is obtained almost exclusively by animal keepers in the vicinity of urban centres. Animal keepers in Central Butana have practically no possibility of availing themselves of this offer. None of the animal owners who had moved from Um Sartha to New Hushetb and who had lactating cows during the survey period laid claim to the opportunity of obtaining this concentrate feed in New Halfa. No statements

are available regarding the quantity distributed. However, it can be assumed that the effects on animal keeping are very poor in the whole survey region (Weiser 1994).

Fodder cultivation, usually lucerne (*Medicago sp.*) or Egyptian clover (*Trifolium alexandrinum*), is practised by tenants in national fields in the irrigated area of Gezira. Altogether, this also contributes towards developing the production of animal products in the vicinity of centres where there is a demand for those. The effects of fodder cultivation in national fields cannot be quantified. However, they are not relevant at the moment for the majority of animal keepers in the survey region since these usually do not rent fields in the irrigated area of Gezira and therefore cannot take the advantage of this opportunity.

Since the cultivators organized themselves in a Farmers' Association, in 1992, and thus acquired the majority in the project administration in the New Halfa irrigation area, fodder cultivation has been discussed more intensively (Khalil 1993). However, already before the privatization by the semigovernmental administration, there had been initial approaches: in 1991, the "Animal Production Department" was established in the administration of the New Halfa Scheme (interview by Mr. Husein, Director of the Animal Production Department of the New Halfa Scheme administration). These approaches towards fodder cultivation have not been realized hitherto.

Milk production was to be increased by crossbreeding, under government organization, high-yielding European breeds with the autochthonous cattle population. To that end, bulls of the Holstein-Friesian breed were imported. Moreover, in New Halfa for example, approaches towards establishing a station for artificial insemination of local cattle with sperm from Holstein-Friesian bulls are again being made. However, the planned station will not be ready for use in the medium term. Moreover, it is extremely doubtful whether cross-breeds that are not adapted to the local conditions can lead to an improvement of animal production in the survey region. It is rather to be apprehended that the negative effects of crossbreeding will be far more considerable than the expected advantages (Seifert 1992: 19 f.).

The measures described are variously effective at the regional level for the animal keepers in the survey region. When the effects of the listed government measures are compared, the activities of the veterinary service show the most evident promoting influence on animal production in the Butana since, in comparison, a greater number of animal keepers benefit from them.

All these examples of government measures towards promoting animal production should not delude us as to the fact that they have relatively low influence on the animal production in the Butana. On the whole, there has been no change in the disadvantage of animal production, especially of the

extensive production systems, in the past three decades: its promotion continues to be relatively insignificant in comparison with the government efforts in agriculture.

Food and income security

A crucial problem for many animal keepers in Central Butana is the permanent food and income insecurity. Specific difficulties arise for traditional animal keepers during the years when the amount of rainfall is below average and during which there can be serious problems regarding the quantitative and qualitative supply of food, as could be ascertained by Maxwell (1989) during the drought of 1984/85 and by the surveys of this research project during the extremely dry year of 1990/91 (Rahmann 1994). The droughts or extremely dry years cause low harvest yields in agriculture (especially in the traditional wadi cultivation) and low production performance in animal keeping. Moreover, the terms of trade develop to the disadvantage of animal keeping (cf. Rahmann 1994). Many animals must be sold to be able to secure the high costs of feeding people and animals since other sources of income are available to a very limited extent only.

In the final report of the research project, a model was worked out on the basis of the empirical data (Pflumbaum/Rahmann 1994). It arrives at the conclusion that – under the environmental conditions prevailing today – the human population living in Central Butana cannot be fed by the traditional animal keeping which is practised if the capacity of natural pastures should not be exceeded (this situation will be aggravated in the wake of the demographic development). In order to achieve permanently the contribution of animal keeping – based on an average of 77 % in the model – to cover the consumption requirements livestock of 7.6 TLU/person is required (the amount of 77 % is a weighted average. In favourable production years, the contribution is higher (up to 100 %) but it can decrease to less than 30 % in extremely dry years). This would lead to a number of animals which is not justifiable from the ecological aspect (more than 140,000 TLU). With the ecologically justifiable number of livestock of 4.9 TLU/person, in contrast, only 50 % of the consumption requirements can be met by animal keeping in the medium term. Since, besides animal keeping, there is no alternative possibility of earning an income which can satisfy these consumption requirements, the following dilemma can be foreseen: degradation till desertification of large parts of the natural pastures in Central Butana or the pauperization of large numbers of the population resulting in an exodus from the rural areas to the settlements of destitutes in the urban centres and in the irrigation projects.

However, according to the model calculations, various development possibilities are conceivable to avoid or mitigate the expected dilemma. If these model calculations can only outline reality, it is possible to make some statements that are based on these calculations.

The central elements of development prospects based on the model are:

- the direct development of animal keeping, and
 - the creation of additional income-earning possibilities for traditional animal keepers
- especially in times of crisis such as during droughts and extremely dry years, but also as regional development of the infrastructure in the medium and long term.

Alternative possibilities of earning an income must be created so that either a share of the population can abandon animal keeping or the active animal keepers must meet a lower share of their consumption requirements than is required today with the help of animal keeping. It is only if they are offered alternative possibilities of earning an income that the animal keepers will be in a position to limit their livestock at a level which is ecologically tolerable without having to bear risks for their family's existence. (During the survey, it became evident that the animal keepers adjust their livestock to their income situation. The more the available family labour was bound by other economic activities outside animal keeping, the smaller was the number of livestock. The largest number of livestock could be found among animal keepers who had no other sources of income.)

The creation of new possibilities of earning an income should represent an alternative to animal keeping. However, it should not require the permanent absence of all male household members (as is necessary in the case of migration to the Arab Peninsula), since the existing social structures and networks are thus ruined or completely destroyed. Furthermore, new income-earning possibilities should be relatively independent of the fluctuating amounts of rainfall since, in extremely dry years and precisely during droughts, a high income outside animal keeping is necessary.

Among the available possibilities, irrigated areas achieve the greatest potential for creating possibilities of earning an income (especially wage-labour, since there are no free leased areas) for animal keeping. These possibilities should be regionally embedded in the Butana and be relatively independent of rainfall and, also, be accepted by animal keepers in principle and be based on their educational level. (About 300,000 people live in the New Halfa irrigated area alone (Salem-Murdock 1989: 19 f.). According to the model calculations in Pflumbaum and Rahmann (1994), alternative possibilities of earning an income should be created for about 5,000 people only.)

Farming on leased land (Hawachas) is relatively extensive in the irrigated areas. The yields per unit are below their potential. Thus, an intensification of production with a view to creating new possibilities of earning an income is realizable. At the same time, however, attention should be paid to the fact that these possibilities of earning an income can be seized by those who need them. A concentration of the areas should be prevented. Furthermore, it is to be expected that, in the absence of government influence regarding especially crop rotation, cropping systems and marketing, the tenants' personal initiative would be promoted (Khalil 1993). Self-administration seems appropriate to guarantee the necessary structures for the management of an irrigated area. (The efforts made by the present Sudanese government towards achieving privatization are also undertaken in the irrigated areas. The buyers are generally relatively rich businessmen and/or supporters or representatives of the governmental structures in the Sudan. The future will show whether privatization will really be achieved. The same applies to the new organization of the "Board of Directors" on which, by virtue of law, the tenants should have the majority. The present tenants' representatives belong to the "Farmer Association", a para-governmental organization in which mostly wealthy tenants are grouped.)

According to the surveys conducted within the framework of the project, the tenants are greatly interested in cultivating durra (until 1981, durra was not planned in crop rotation. Cotton, groundnuts and wheat predominated. Since 1981, the cultivation of durra has been allowed on one third of the area. A problem arises when financing the irrigated cultivation of durra. A similar skimming off over prices as for the cash crops which are now produced (and partly exported) is possible to a limited extent only). On the one hand, durra is a crop adapted to the locality, can be cultivated in monoculture, and produces relatively good yields. The crop is the population's basic foodstuff and also the most important fodder plant after the natural pasture. The biomass production of durra is not equalled by any other plant. Thus, durra is the most important double-purpose plant in the Butana and has successfully been cultivated there over centuries.

In addition to creating opportunities of earning an income, the development of animal keeping is a possibility of guaranteeing income and food. The great significance of harvest residues as a cost factor for animal keeping, especially during the extremely dry years, becomes evident in the model calculations. There is a — hardly realistic — possibility that harvest residues will be left to animal keepers free of charge. This should be realized at the statutory level and controlled conscientiously. If harvest residues are again placed free of charge at the animal keepers' disposal, resources would be released for consumption expenditures. Thus, it would be possible for the present population of the

Butana to meet, with an ecologically justifiable livestock (initial livestock of 4.9 TLU/person), their usual share of consumption expenditures (77 % on the average) with the help of animal keeping and to maintain the number of herds in the medium term.

The important aspect for animal keepers in Central Butana is the maintenance of animals in natural pastures. Since these resources are at everyone's free disposal, they are in constant competition not only with each other but especially with animal keepers who are "foreign to the Butana" for water and natural pasture resources. This encourages a behaviour which is appropriately described by the term "burned earth". The legislation which was valid until 1971 conceded a "dar" to every ethnic group. The resources in their "dar" was at the free disposal of the members of an ethnic group. But foreign animal keepers had to pay compensation or, in retaliation, tolerate the utilization of the resources in their "dars". A web of contracts and agreements regulated the utilization of the most important resources between the various ethnic groups. There is no doubt that the abrogation of these regulations concerning natural pastures cannot be annulled. However, exclusive rights of use of natural pastures for the sedentary population, there, are absolutely realizable if they can be enforced and, above all, controlled. If they had exclusive rights of use of natural pastures and water resources, the animal keepers would be in a position to claim compensation from those who are foreign to the Butana (Kirk 1994). This would help them either to achieve a certain income or to find fodder resources in other regions. For example, since many tenants in the irrigated areas and large farmers from the durra belt of Gedaref utilize the natural pastures during and after the rainy period, they should, if exclusive rights of use are granted, offer a return service which could take the form of gratuitous harvest residues.

In addition to the cost-reducing measure of again making harvest residues in agricultural areas available free of charge to animal keepers, there is also the possibility of increasing yields for animal keeping. This is only realizable if animal keeping is subsidized or if it is reduced in favour of modern agriculture. Here, the objective is to put once more the comparative cost benefits of the two subsectors in a balance adjusted to the locality. This can only be realized with a direct intervention on the part of the government. In this case, it has at its disposal all the political instruments which, at the same time, extend, for example, from the development of greater productivity of the individual animal species, over price protection, and the subsidization of inputs to marketing facilities locally and abroad. Furthermore, it is imperative to intensify research in animal keeping in order to develop and disseminate adjusted forms and techniques of production. All this requires a series of legal measures which are very cost-intensive. Moreover, they preserve structures.

Here, there is a multiplicity of measures which could produce positive effects on animal keeping. They only require a consistent plan and strategy with a long-term orientation. As extensive animal keeping is still widely rejected in the government and in the administration (urban centres), it cannot be expected that important changes will occur in this case.

Altogether, it has become evident that income security is elementary for food guarantee. Without a secure income, there is no food guarantee. There is a series of possibilities of developing animal keeping or of removing barriers. Here, an appeal is made to the government primarily since the individual animal keepers and animal keepers as a whole have no freedom of organization which would secure them permanent survival.