

**POLICY OPTIONS FOR COMMON PROPERTY RESOURCE MANAGEMENT: AN
EVALUATION OF THE POTENTIAL GRAZING MANAGEMENT STRATEGIES IN THE
ZIMBABWE'S COMMUNAL AREAS.**

by

Emmanuel Guveya

and

Kay Muir-Leresche

Working Paper AEE 4/95

Department of Agriculture Economics and Extension
Faculty of Agriculture
University of Zimbabwe
P O Box MP167
Mount Pleasant
Harare
ZIMBABWE

APRIL 1995

The authors are MSc final year student, and Senior Lecturer, Department of Agricultural Economics and Extension, University of Zimbabwe respectively.

This Working Paper is a result of a semester paper produced for the Applied Agricultural Policy Analysis course.

The views expressed in this paper are those of the authors and do not necessarily express those of the Department, University or any other institution.

Working Papers are published with minimum formal review by the Department of Agricultural Economics and Extension

**POLICY OPTIONS FOR COMMON PROPERTY RESOURCE MANAGEMENT: AN
EVALUATION OF THE POTENTIAL GRAZING MANAGEMENT STRATEGIES IN THE
ZIMBABWE'S COMMUNAL AREAS.**

by

Emmanuel Guveya

and

Kay Muir-Leresche

Working Paper AEE 4/95

Department of Agriculture Economics and Extension
Faculty of Agriculture
University of Zimbabwe
P O Box MP167
Mount Pleasant
Harare
ZIMBABWE

APRIL 1995

The authors are MSc final year student, and Senior Lecturer, Department of Agricultural Economics and Extension, University of Zimbabwe respectively.

This Working Paper is a result of a semester paper produced for the Applied Agricultural Policy Analysis course.

The views expressed in this paper are those of the authors and do not necessarily express those of the Department, University or any other institution.

Working Papers are published with minimum formal review by the Department of Agricultural Economics and Extension

CONTENTS

INTRODUCTION.....	1
1. THE CAUSES OF GRAZING LAND DEGRADATION IN THE COMMUNAL AREAS.....	1
1.1 A Historical Overview of the Grazing Land Degradation.....	1
1.2 Current Government Livestock Policy.....	3
1.3 Trends In Livestock and Human Population.....	4
2. THEORY OF GRAZING LAND MISMANAGEMENT.....	6
2.1 The Issue of Property Rights.....	6
2.2 Open Access as an explanation for Overgrazing.....	7
3. OBJECTIVES OF POLICY AND POLICY OPTIONS FOR MANAGEMENT OF COMMUNAL AREA GRAZING.....	8
3.1 Defining Policy Objectives.....	8
3.1.1 Efficiency.....	8
3.1.2 Equity	8
3.1.3 Sustainability.....	9
3.1.4 Food security.....	9
3.2 Policy Options for Grazing Management in Zimbabwe.....	9
3.2.1 The Allocation of Grazing Rights (Quota System).....	9
3.2.2 Taxing the Communal Farmer.....	11
3.2.3 Individualization of Title: Leasehold.....	12
3.2.4 Compensating coalitions.....	13
3.3 Experiences From Other Countries.....	15
SUMMARY AND CONCLUSIONS.....	16
REFERENCES.....	18

INTRODUCTION

The structure of agricultural production in Zimbabwe is characterized by the existence of three distinct types of land tenure and farming systems. Large scale commercial farming areas occupy 39 percent of the land and comprise extensive holdings under an individual freehold system, with an average holding size of 3 000 hectares. Small scale commercial farming areas account for 4 percent of total land area and consist of 110 000 smallholder farms of 80 to 200 hectares, also under a freehold system. Resettlement areas, introduced in 1980 to reallocate land formerly in the large scale commercial sector, also occupy 4 percent of the land. The government holds title to this land and extends annually renewable permits to settlers. The communal areas cover 42 percent of the land and cater for about 55 percent of the population on individual arable holdings of between on average 2 to 4 hectares. There are vast differences in land holding size. Key resources such as grazing, forests, and forest products and water are communally held (Murombedzi, 1990).

In this paper we are concerned only with the communal tenure system with particular reference to overgrazing in the communal areas. Evidence from many sources indicate that the communal area rangelands are overgrazed and hence degraded (Chigaru 1984; Ndlovu 1990; Clatworthy et. al. 1985; Rukuni 1985; Murombedzi 1990) and there is immediate need to formulate policies that will enable efficient and sustainable grazing use. Hence the purpose of this paper is to suggest policies that can be used for effective communal area grazing management and their implications on efficiency, sustainability, equity, and food security.

1. THE CAUSES OF GRAZING LAND DEGRADATION IN THE COMMUNAL AREAS

This section gives a historical overview of the problem of communal area grazing mismanagement, current government policies concerning the livestock sector and the current role of livestock in the communal areas and how each of these contribute to the continued degradation of the grazing areas.

1.1 A Historical Overview of the Grazing Land Degradation

The misinterpretation of the basic causes of resource degradation has led to the prescription of inappropriate solutions in the past. Persistent overgrazing, especially by domestic livestock, and in particular cattle, in combination with 'incorrect husbandry practices', have allegedly impoverished extensive areas of the communal areas. This situation has led to serious soil loss and to the siltation of rivers and dams. The same processes are said to be solely responsible for heavy stock and wildlife losses, particularly in drought years (Murombedzi 1990).

This phenomena of land degradation due to overgrazing and the expansion of arable agriculture into previously designated grazing land, dates back to the creation of the Reserves and the concentration of people on marginal land. Due to increases in taxes and falling grain prices, smallholder farmers were forced to increase land under cultivation during the early 1920s. By the end of the 1920s, this process had reached its peak and it was reported that the number of cattle in the Reserves was becoming too large and so much land was put under cultivation (Murobedzi, 1990).

In the 1930s the colonial government started paying attention to the conservation problems of the Reserves. The colonial government saw the crisis of land or grazing degradation in terms of bad African methods of land preparation - use of the plough, and opening up of new land by the well-off class of plough owning farmers. Peasants saw it as a crisis brought about by low prices, government intervention in marketing and the increasing diversion of labor into conservation works. According to the then government the policy solution was centralization¹ which was meant to oust this new entrepreneurial class and eventually to drive them out of the Reserve system altogether (Ranger 1985).

After the end of World War II, colonial agriculture in Zimbabwe became a profitable venture. This necessitated the implementation of Land Tenure Act (LTA) and led to mass eviction of African 'squatters' from European land unless they entered into labor agreements with the white farmers. The result was a dramatic increase in the human and livestock population of the Reserves and a concomitant and inevitable rise in the rate and extent of resource degradation in the Reserves. The NHLA with its provisions for intensive conservation works: drain strips, gully dams, contour ridges, rotational grazing etc, was introduced against this background.

Government attempts to undermine large rural entrepreneurs continued with the promulgation of the Native Land Husbandry Act (NLHA) in 1951. This act is often regarded as having introduced the potential for capital accumulation in the Reserves by providing individual tenure. However, its implementation had the effect of equalization of land holdings. The conservation measures of the NLHA were resisted by the smallholder farmers because it meant taking out of production land that was already not enough to guarantee even subsistence needs and farmers would spend most of their time attending to conservation works. The most important reason farmers resisted the NLHA act was

¹ Originally conceded as a measure by which a division was made between exclusively arable and exclusively grazing land, centralization became a means of redistribution of land in the reserves.

that it required them to limit livestock numbers so as to curb overgrazing (Cliffe 1986).

In the early 1970s a policy of community development was conceived in which the state gave recognition to some of the institutional realities, particularly the role of chiefs, while still attempting to achieve the technical and economic objectives of the NLHA. These ideas were incorporated in the LTA of 1970 which gave legal recognition to what became known as the Tribal Land Authorities in communal areas or the Tribal Trust Land. The grazing schemes of the early 1970s were a direct result of this policy (Tawonezvi and Zindi 1994). The perceived benefits from the setting up of grazing schemes included improved livestock production leading to better calving rates, improved animal offtake arising from increased numbers as well as better veld management and reduced degradation, improved access to draught power, decreased labor requirements for herding and increase availability of labor for other farming operations (Cousins 1988). The grazing schemes were also expected to reduce the risk of irreversible environmental degradation as a result of perceived overgrazing and poor management.

Grazing land degradation in the communal areas was due to arable expansion brought about by inappropriate pricing policies and the colonial administration perception of the problem as being essentially a tenure problem, and their failure to prescribe solutions, i.e. land redistribution. Arable expansion into grazing areas has continued almost unabated in post-colonial Zimbabwe. The resettlement programme, having managed to settle only 40 000 households out of the targeted 162 000 by 1984 has obviously not significantly relieved land pressure in the communal areas especially when one considers that employment in the non-agricultural sector has not increased at all while the population has grown at an annual rate of around 2.9 percent (Tawonezvi and Zindi 1994).

Proposing an economic cost and benefit analysis for arable expansion into grazing, Scoones and Wilson (1989) observe that such expansion has tended to be more rapid in the overpopulated high potential areas in NRs II and III, and in areas of spontaneous resettlement in the north (the Zambezi Valley). In these areas, returns on opening up of arable land will probably remain higher than the costs of reduced grazing.

1.2 Current Government Livestock Policy

The current livestock development policy is largely a continuation of policies initiated since the 1920s. The assumptions underlying these policies as well as the prescriptions proposed to the perceived problems, have shown similar continuity. First, the livestock production in communal areas is seen in terms of milk and meat production. To this end the encouragement of small ruminant goes hand in hand with farmers objectives for increased meat production as well as milk from cattle. The Policy Statement (MLAW,

1993) argues that improvement in the efficiency of livestock production will lead to improved offtake rates and levels of income. Among other things, this is expected to be achieved by conservation of rangeland, control of livestock numbers and stocking rates, promotion of grazing schemes, and increased offtake rates encouraging cattle sales. How the conservation of the rangeland and control of livestock numbers and stocking rates are to be achieved is not spelled out.

The government objectives of increasing cattle off-take from the communal areas is in direct conflict with farmers' objectives. Steinfeld (1988) makes it clear that communal area farmers are not interested in reducing their cattle numbers by selling because they regard cattle as an investment. When their external value (market value) rises farmers regard this as an additional security as well as a form of increased wealth. It is therefore surprising that while the policy document acknowledges the functions of cattle based on recent research, and recognizes the low levels of output from the communal sector, it proposes to consider increased offtake from cattle as an important thrust.

Secondly, another view which has been increasingly advocated is the one which sees the communal tenure system as the major constraint to sustainable livestock production. The rangeland is a common property resource with the right to its exploitation held by all members of a loosely defined community. It is argued that lack of accountability on the grazing resource in traditional communal rangeland has resulted in lack of commitment to improve grazing areas and its water resources. This in turn have led to mismanagement, land degradation and, consequently, poor livestock productivity (LDP 1992). While the policy paper recognizes this problem of common property management, it only highlights the formation of grazing schemes and efficient use of the available livestock feed - mainly crop residues as the possible solutions to curbing the degradation of grazing areas. The policy document does not indicate how the problem of open access with a community can be resolved to ensure efficient and sustainable use of the range. In this paper we suggest possible policies that can be implemented or adopted to ease range degradation whilst at the same time satisfying the farmers objectives of keeping livestock for crop production, store of wealth, milk and offtake for sales or subsistence.

1.3 Trends In Livestock and Human Population

The livestock (this includes cattle, goats, sheep and pigs) numbers in the communal areas dramatically increased from 1.8 million in 1965 to 3.4 million in 1977, an increase of approximately 80 percent (Chigaru 1984). After stagnating in the late 1970s, the communal cattle herd has increased from approximately 2.9 million head at independence to approximately 4.4 million head in 1991, indicating an average annual growth rate of 3 percent (MLAWD 1993). During the period 1980 to 1990, the goat flock

increased from 0.982 million to 2.6 million and that of sheep from 0.387 million to 0.6 million (MLAWD 1993).

This increase in livestock numbers went hand in hand with an increase in the human population, without concomitant changes in the size of available land. The trend has been one of increasing cattle numbers and decreasing grazing resources as a result of increased cropping to satisfy the food needs of a rapidly expanding "peasant" population.

However fluctuations were experienced primarily due to droughts. It is estimated that the size of the communal herd fell by 31 percent due to the 1991/92 drought (Tawonezvi and Zindi 1994). In many areas of the country, human and livestock numbers are greatly in excess of carrying capacity of these areas (Table 1).

Nearly 75 percent of the communal lands lie in the NRs IV and V which are ill-suited to dry land cropping. At low population pressures, even land of low potential can be managed productively, using existing farming practices. However, as Table 1 shows, all but a third of the communal lands have human and population pressure in excess of their current carrying capacity. This population pressure is excessive in some 40 percent of the communal areas. The existing farming systems currently followed in large areas of Zimbabwe are simply not sustainable at today's human and livestock population levels (Blackie 1982).

Table 1: Population pressure in relation to carrying capacity

<u>Pressure class</u>	<u>Proportion of communal lands(%)</u>
Balanced or none	32.7
2 times - some	29.8
3 times - great	12.9
4 times - extreme	11.7
5 times - desperate	12.9

Source: Whitlow J.R 1980, "Environmental Constraints and Population Pressures in the Tribal Areas of Zimbabwe", Zimbabwe Agric. J., 77. 4: 173-181; in Blackie (1982)

The increase in livestock numbers is due to the multiple roles livestock play in the communal areas - draught power, manure, milk and social functions. Due to the multiple roles of cattle, low off-take rates resulted. In turn the low offtake rates results in increased overgrazing during the dry and drought seasons.

2. THEORY OF GRAZING LAND MISMANAGEMENT

This section of the paper briefly discusses the theory of grazing land mismanagement.

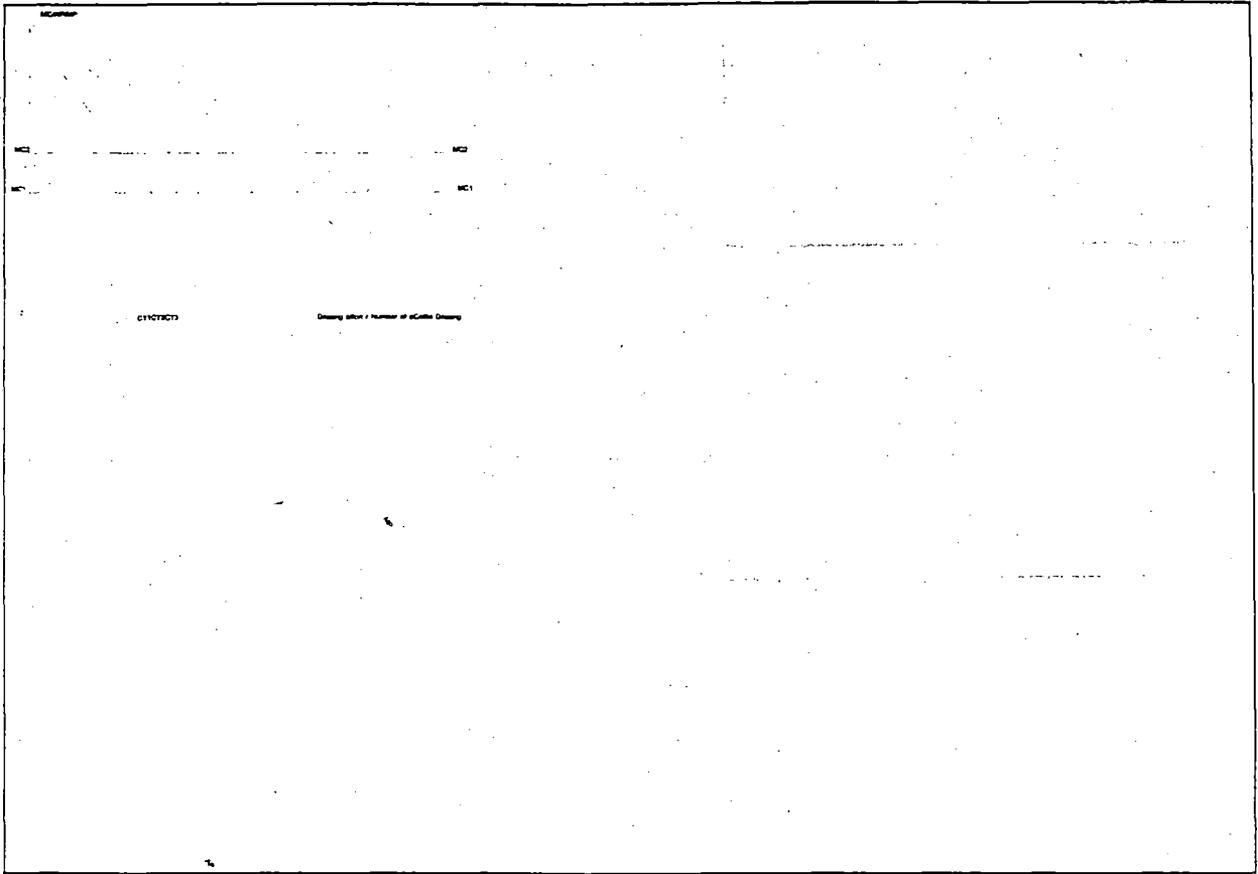
2.1 The Issue of Property Rights

Property rights are the set of entitlements which define the privileges, obligations and limitations governing the use of resources by individuals and groups of individuals. To secure an optimal allocation of resources in a market economy, there is need for efficient property rights. Four conditions define an efficient structure of property rights (Tietenberg, 1988):

1. **Universality:** All resources are privately owned and all entitlements completely specified. This is to avoid situations in which competing claims and conflicts may cause uncertainty of ownership and discourage investment in the sustainable use of natural resources.
2. **Exclusivity:** All benefits and costs (including positive and negative externalities) from owning and using the resource should accrue, either directly or indirectly, solely to the owner. Multiple ownership may undermine incentives to invest in a resource, particularly when the number of owners is high.
3. **Transferability:** property rights should be transferable from one owner to another. If rights over resources are not transferable, long term investments may be discouraged because owners cannot profit from such investment in case of a change in ownership.
4. **Enforceability:** Property rights should be secure from involuntary seizure or encroachment by others. Where challenge to ownership, risk of expropriation or high political and economic instability occur, private initiatives to manage resources may be undermined.

Given these characteristics of well defined property rights, tenure systems in relation to grazing lands can be grouped into four: freehold, leasehold, communal and open access.

In classical economics private ownership with well defined property rights, has as a goal profit maximization. Ignoring discounting, and not taking into account the environmental damage done by grazing cattle as well as grazing costs, the individual owners would keep CT1 cattle (Figure 1). If property rights are well defined and externalities are internalized, i.e. the private owners pay for environmental damage, they will only graze CT2 cattle.



Another tenure type is common property regime. Common property regimes are not a free-for-all but are structured ownership arrangements within which management rules are developed, group size is known and enforced and incentives exist for co-owners to follow the accepted institutional arrangements (Bromley and Cernea, 1989). Thus with common property regimes, resources can be managed efficiently, to almost the same extent as grazing under the free hold tenure system.

Grazing resource degradation in the communal area has been incorrectly attributed to "common property systems", when it actually originates from lack of well defined property rights and lack of local-level institutional arrangements. This situation is an open access tenurial system, which is discussed below.

2.2 Open Access as an explanation for Overgrazing

In Zimbabwe, when the livestock and human populations were low, there were no problems of overgrazing and environmental degradation. As both the livestock and human populations increased to more than the carrying capacity of the environment in the communal areas, grazing land has become a scarce resource. The non-development of property rights led to the open access.

With open access, - no one exercises control over the grazing resources. In the communal areas communities can exclude other communities from using their grazing resources. Since the property rights to grazing lands are not conveyed to any single

farmer within a community, no single farmer can exclude others from exploiting the grazing lands.

The effect of lack of property rights and hence open access are illustrated in Figure 1. Hardin (1968) has succinctly summarized the decisions facing an individual cattle owner using a communal pasture. The rational herdsman seeks to maximize his own utility. Each additional animal he grazes adds, say, one unit of utility since he gains additional revenue from the use of that animal. This same animal, by increasing grazing pressure, also detracts from his utility. But since the extra effect of the overgrazing caused by a single beast is small and overgrazing is shared amongst all grazers, the disutility effect is small. The net effect, under existing arrangements, is that the only way a herdsman can improve his utility is by increasing his cattle holdings. Combine this fact with the very real gains in capital value associated with owning cattle and it is no wonder that most of Zimbabwe's communal lands are critically overgrazed. In this case without well defined property rights the number of cattle kept and grazed is at the level CT3. This means the individual farmer has an incentive to expend further effort until profit is zero². If farmers are made to pay for the cost of grazing and environmental damage caused by keeping cattle (through taxes for example), say the difference between MC1 and MC2 in Figure 1, they would graze only CT2 cattle in each time period.

3. OBJECTIVES OF POLICY AND POLICY OPTIONS FOR MANAGEMENT OF COMMUNAL AREA GRAZING

This section presents the possible policy options that can be used to enable efficient and/or sustainable use grazing lands in communal areas. Where possible the limitations of each policy option are discussed.

3.1 Defining Policy Objectives

Before presenting the possible policy options for grazing land management, the objectives of policy that are considered relevant for this paper are presented. These are efficiency, sustainability, equity, and food security. A brief outline of the meaning attached to each policy objective is given below.

3.1.1 Efficiency

Efficiency means the allocation of scarce resources to those competing uses that yield the maximum net benefits according to societal preferences. These preferences are usually revealed by prices through the market in the form of demand for goods and services. In the case of grazing, the greater the demand, the higher the market price for grazing. A perfectly functioning free market for grazing would provide an economically efficient use of grazing lands. This is static efficiency and would be Pareto Optimal at the given income distribution.

² Let $f(x)$ be the value of cattle output produced if there were x cattle grazed under open access. Current output per cattle is therefore $f(x)/x$. When an individual contemplates adding, say, an ox, total output becomes $f(x+1)$ and number of cattle $(x+1)$. Revenue generated by one ox for the individual is $f(x+1)/(x+1) = AP$. The individual farmer then compares this revenue with MC1. If $f(x+1)/(x+1) > MC1$ it is profitable to add an ox to one's herd since the value of output exceeds the cost. Hence the individual will choose to graze cattle until the AP of one ox is driven to MC1 and CT3 cattle are grazed.

Whilst static efficiency is the allocation which maximizes the net benefits in every period, dynamic efficiency involves maximizing the net present value (NPV) of use of scarce resources among the alternative resource uses over time. Dynamic efficiency also includes the multiplier effects over time and is usually broadly defined throughout the economy. For example, with well defined property rights, degradation of the veld will be reduced, as well as soil erosion and river siltation. The reduced siltation has implications on availability of water for irrigation and household uses, fish catch if there is any fishing in the area etc.

3.1.2 Equity

Equity is concerned with fairness of resource distribution. Hence it inevitably involves political and value judgements. There is a potential trade-off between equity and efficiency. To achieve greater equity, some amount of efficiency may have to be sacrificed. However, depending on the type of environmental problem to be solved, efficiency and equity can be complementary. For example, in terms of grazing in the communal areas, by allocating property rights to the presently open access situation may serve efficiency and equity objectives simultaneously. This is achieved by making the best use of the grazing lands and, with careful implementation, some of the gains can be channelled to non-cattle owners.

3.1.3 Sustainability

Maintaining long term grazing land productivity by preventing overgrazing implies a sustainable use of grazing land. Sustainability implies the use of the grazing resources without compromising future generations. The sustainability principle does not apply only to non-renewable resources but also to renewable resources. If the rate of harvesting of the renewable resource is faster than the rate of regeneration, then that resource can not be sustainably utilized.

Since the renewable resources are used over time, there is need to discount the net benefits realized from the use of those resources. But by discounting, more value is placed on the grazing resources today and less value on the resources in the future. The higher the discount rate used in calculating the NPV implies more of the resources that are available are used today than in the future as this maximizes the NPV. Hence sustainability is not achieved since there will be less of the grazing resources for the future generation than there are for the present generation.

3.1.4 Food security

Food security means the availability and access to food by a household to lead an active normal life. Food is available by producing or importing and one has access to food through own production or by purchasing. In this paper food security refers to rural household food security rather than to urban household food security.

3.2 Policy Options for Grazing Management in Zimbabwe

3.2.1 The Allocation of Grazing Rights (Quota System)

Reynolds (1981) has advocated the use of the share concept to enable communities to manage communal resources such as grazing land. It serves to separate communal interest in the improvement of grazing from the interest of the individual in using that grazing. Each member of the community would be allocated a grazing 'share' which

would be the right to graze some number of livestock units. The total number of livestock units permitted would equal the locally determined carrying capacity. The individual shareholder has a limited but guaranteed right of access to the grazing. Should he possess insufficient livestock, this right can be sold/leased on an annual basis to other community members whose cattle exceed their quotas. A price for grazing, which does not exist under traditional arrangements is established and it is the difference between the MC1 and the MC2 curve in Figure 1. With encroachment on to the grazing lands, this means the grazing rights per household would be reduced and the difference between MC1 and MC2 is increased.

3.2.1.1 Efficiency implications

The carrying capacity of community grazing lands is determined annually by the group with the help of extension personnel. Probably this would take place in the interval after the rains, and before the flush of new births. In bad years, the carrying capacity would be revised downwards and thus the price of grazing would rise³. Should the community under- or overestimate the carrying capacity in one year, this can simply be adjusted in future periods. The system guides the community into the efficient use of grazing.

In terms of dynamic efficiency, veld degradation will be reduced resulting in reduced siltation which has a positive impact on irrigation, availability of water for domestic and livestock use and on fisheries, if there is any fishing in the area.

3.2.1.2 Equity implications

The procedure of giving grazing rights to households or individuals, allows those who own few or no livestock to receive compensation for not grazing the common land from those "wealthier" individuals who hold stock in excess of their share. The fact that the lease of grazing rights to the "wealthy" households is done on an annual basis means the poor households would have a flow of income from year to year.

3.2.1.3 Sustainability implications

As long as the society sticks to the recommended stocking rates for each individual year, the policy of grazing rights is sustainable since the problem of overgrazing will be no more. Even if the community continues to encroach onto grazing land, the difference between MC1 and MC2 may increase to a level that may hinder farmers from increasing their herd sizes. The consequence is the biomass yield of the veld will not go beyond *minimum viable* total veld biomass below which the veld would not be able to regenerate.

In this way there will veld for future generations as is available to the present generation of farmers.

3.2.1.4 Food security implications

A priori, the effects of allocating grazing rights on food security cannot be stated. On one hand, due to improvements in veld management, milk production and draught output will increase and hence the food security at the rural community level will increase. The major beneficiaries will be the cattle owners and the secondary beneficiaries will be the non-cattle owners. The non-livestock owners may benefit indirectly from resulting low milk prices and early ploughing of their fields. On the other hand, due to de-stocking

³ In the form of de-stocking or high grazing prices.

there will be less draught power and manure availability and this would have a negative impact on food security.

Poor households would have money from their share sales/rental and this will increase food security.

For this policy, the impact on food security depends on whether the increased draught power calving and milk production due to the improved veld, outweighs the effect of more animals without veld improvement.

3.2.1.5 Problems in implementing the grazing quota policy

First, the question that is posed is who should be considered when distributing grazing shares? Is it the household or individuals within the household? This is an important question that must be addressed first because livestock ownership is not at the household level but it is by individuals in the household.

Secondly, which authority enforces grazing rights and duties is a critical variable. The options are: the state, the community, or the community backed by the state. The type of authority will determine the by-laws that has to be adopted to ensure that the recommended stocking rates are observed.

Third, owners with large cattle herds will protest against paying. During a survey of grazing schemes Cousins (1987) got the following responses from livestock owners concerning share grazing:

- a. Finding money to pay will not be easy
- b. Accumulating debt to non-owners
- c. farmers still helping each other with ploughing, hence the idea to make owners pay may be difficult to implement
- d. individuals with excess grazing may demand more than the agreed price
- e. non-owners by not owning cattle are lazy, so why should they benefit from non-owners
- f. outsiders would come in and buy shares

These responses shows that on implementing the policy, the community will have to decide on how payments for grazing would be done. For example, the community could agree that payment could be done in-kind in the form of "ploughing rights". Thus per grazing right sold, the cattle owner would plough y acres of the non-cattle owner as payment. With this sort of arrangement, problems (a) to (d) above would have been solved. For problem (f) the community will have to agree that no outsider would be allowed to buy grazing shares from the community.

3.2.2 Taxing the Communal Farmer

Another option that can be used to manage communal grazing is to tax the cattle owners. This can be done by making the cattle owners pay \$X per animal per year for grazing. When this policy is implemented it will be important to inform the farmers on exactly why they have to pay the tax. Also of importance is that the tax be collected by local authorities and not by the state so that it can either be redistributed to non-cattle owners or be used in the development projects of the community or in managing and improving grazing.

3.2.2.1 Efficiency implications

In theory, the tax system is supposed to result in efficient use of resources. With a perfectly functioning market, high demand for grazing will result in high taxes and low demand in low taxes. However, the tax system functions well as long as the tax levied on the livestock owners is enough to cover for grazing costs and externalities, otherwise a lower than optimal tax would result in inefficient use of grazing lands.

3.2.2.2 Equity implications

If the tax revenue collected is redistributed to non-cattle owners who do not directly benefit from the utilization of the grazing resources, it is equitable. If the tax revenue is used on other development projects, then the non-owners may benefit indirectly or may not benefit at all depending on who benefits from the projects. In this case the tax policy may not be equitable.

3.2.2.3 Sustainability implications

The tax system will result in less animals being grazed. This means stocking rates may be close to the carrying capacity of the veld. Thus the tax system would result in a more sustainable use of the veld. There would be need for authorities to see that there is no encroachment on the grazing lands for cultivation. Perhaps farmers will have to pay even higher taxes.

3.2.2.4 Food security implications

A priori the implications of the tax system on food security can not be spelled out. As outlined under the grazing rights policy, the impact of the tax system on food security depends on whether increased the draught power and milk production due to the improved veld, outweighs the effects of more animals without veld improvement.

Unlike the grazing rights policy, farmers may not be obliged to plough for non-livestock owners. Given that there will be few animals available for draught, it is mainly the livestock owners who may benefit from increased crop production due to the improved draught condition resulting from better veld management. In this case the inequality gap between cattle owners and non-owners may increase.

3.2.2.5 Problems in implementing the tax policy

As has been shown in the introduction to this paper, farmers resisted the cattle head tax. Trying to implement this policy may be politically sensitive, though it is clear this is one policy option that can result in efficient and sustainable use of grazing.

The other problem is that the system is open to corruption. The responsible authorities may misuse the tax revenue or some influential individuals may bribe the authorities so as not to pay. If this happens, the tax system ceases to be efficient and sustainable.

3.2.3 Individualization of Title: Leasehold

The National Farmer's Association of Zimbabwe (NFAZ) has argued for leasehold permits granting "the rights to occupy land on an individual basis, both on arable and grazing land, on the ground that these will allow proper resource management through accountability in terms of observing the stipulated conditions of the permit (Cousins, 1990). The argument put forward by the NFAZ is the individual title is essential for

security and investment.

3.2.3.1 Efficiency implications

Due to lack of security of tenure this policy is inefficient. Farmers are likely to over-use the grazing under their control as much as they can before the lease comes to an end, and they will not pay for the damage done to the environment due to over-exploitation.

Efficiency also implies implementing a policy at least costs. If the lease policy have to ensure that the grazing lands are not over-exploited, responsible authorities will have to ensure that enforceable standards for grazing are set. It is costly to enforce these standards and hence the individualization lease hold policy is likely to be inefficient.

3.2.3.2 Equity implications

Given the land use pattern in communal areas, i.e. opportunistic herding in spatially and temporally variable environments, at high stocking rates, it may be impossible to demarcate individual plots of sufficient size to accommodate the feed resources to sustain a draught-oriented herd of cattle, without drastically reducing the number of households in the area. It is unlikely that all households in a community could be provided with grazing land of high enough quality. That is an equity problem would arise in the allocation of individually held grazing land.

On allocating land for grazing to individuals, if non-cattle owners are taken into consideration, the individualization leasehold policy would be equitable. Then the non-cattle owners would lease their grazing to owners on an annual basis and generate a flow of income either in cash or in the form of "ploughing rights". If the non-cattle owners are not considered the policy would be inequitable.

3.2.3.3 Sustainability implications

Due to lack of security of tenure, farmers will over-exploit the grazing areas under their control. The result is an unsustainable use of grazing resources.

3.2.3.4 Food security implications

With the lease hold policy food security may initially improve in the community due to the initial overuse of the veld. With time, as the veld condition deteriorates there would be a decrease in draught and milk output. Hence in the long run the food security of the communal farmers is threatened.

If some farmers decide to sell or lease their land holdings, they eventually become landless and this may exacerbate the food security situation in the communal areas.

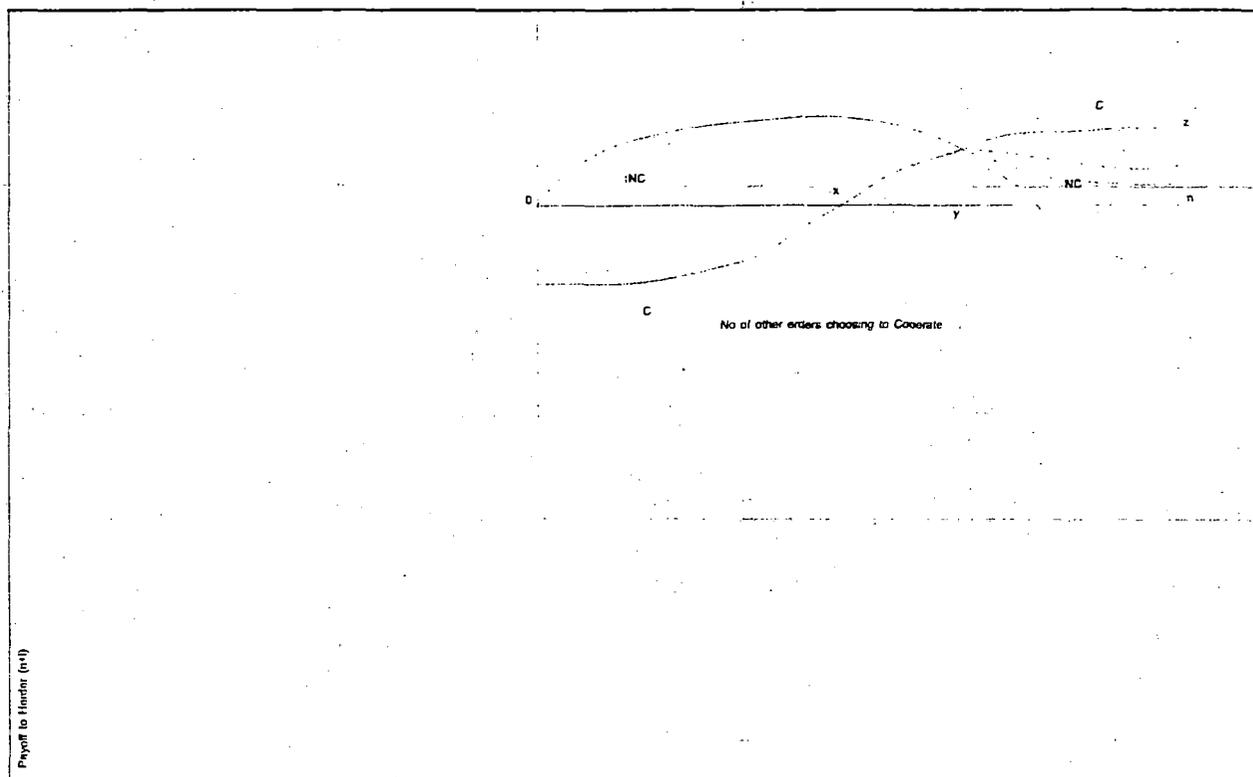
3.2.3.5 Problems in implementing the individual title policy

As pointed out by Bruce (1986), individual title does not guarantee that the grazing land will not be subject to exploitation and degradation. One possible reason for overstocking is where an individual holding is too small to support enough cattle for breeding and draught. Thus this proposal may not be technically feasible under conditions of high population pressure. With the anticipated land reform, this policy may be feasible.

3.2.4 Compensating coalitions

Compensating coalitions basically refers to a situation whereby the farmers form organized groups or cooperatives so that they can manage the grazing lands as a

community (Wilson and Thompson, 1991). A brief theory for the compensation coalitions is given below and it is illustrated in Figure 2.



C represents the cooperative payoff to herder $n+1$ as more herders cooperate with the grazing plan. With few ($<x$) herders cooperating, the sacrifices made by herder $n+1$, such as herd size reduction and time managed grazing, are reflected in negative payoffs. Positive payoffs occur with increased cooperation. If all herders cooperate we reach an equilibrium at z . However, herders have an incentive to defect, that is they choose not to cooperate (NC). As more people choose to cooperate the payoffs to defect increase because the defecting herder does not have to reduce herd size or follow grazing guidelines, yet benefits from improved forage levels due to the actions of others. These increasing positive externalities for the defecting herder are reflected in the positively-sloped NC curve. NC is said to dominate C because NC payoffs exceed those of cooperators (the dominated strategy) at low levels of cooperation.

The payoff curve for cooperation reflects the degree of range improvement, and hence productivity, as more herders follow a coalition or a grazing plan. Marginal payoffs to each additional herder are low at first but then increase at an increasing rate until a critical mass of herders join the cooperative group. Payoffs continue to increase with each additional cooperator but at a decreasing rate.

NC continues to dominate at low levels of cooperation but NC and C eventually converge as more people choose to cooperate in the hope of reaching a Pareto equilibrium (z). At y the two payoff curves intersect with C becoming the dominant strategy. If the compensating coalition can reach a size y they can convince others to join because of the

superior economic payoffs.⁴

3.2.4.1 Efficiency implications

This policy option is likely to work when the environment in most areas is very degraded. If successfully implemented, this policy option is, in theory, efficient as long as the number of people composing the community is small. This is basically because the costs of organizing group meetings and agreeing on the number of livestock to keep would be low. However, as the group size increases, the transaction costs increase and the policy may become inefficient. If this policy, is encouraged in the communal areas at village level, it may be easily implemented.

3.2.4.2 Equity implications

The effect of the policy on equity cannot be stated a priori. Veld improvement due to formation of a coalition results in improved animal weights which, *ceteris paribus*, results in improved draught and milk output. As long as there is a competitive market for these products, non-cattle owners would indirectly benefit from the resulting lower prices of milk and draught. However, if milk and draught are traded in an imperfect market, non-cattle owners may not benefit from the coalition. Hence the coalition may not be equitable.

3.2.4.3 Sustainability implications

Once the community have agreed to form a coalition, and at least y individuals in the community agrees to abide by the by-laws, it will enable the veld to regenerate and to be used sustainably.

3.2.4.4 Food security implications

The impact on food security are the same as for the grazing rights and tax policies. The impact will depend on whether increased draught power and milk production due to the improved veld, outweighs the effects of more animals without veld improvement. Whether the non-cattle owners would be food secure will depend on the existing market conditions.

3.3 Experiences From Other Countries

This section provides experiences from other countries concerning common property resource management with special reference to grazing. Some of the experiences can be used to define, complement and modify some of the policy options outlined above for the communal areas of Zimbabwe.

To reduce grassland degradation in the Yellow River delta in China, it was recommended that grazing be separated from cutting areas, controlling dates and intensity of grazing and reducing stocking rates (Li, 1989 -abstract). This policy may be a specificity that has to be followed for example under any of the policy options in section 3.2.

To overcome environmental degradation due to overgrazing in India one of the policy

⁴ The dotted lines for NC beyond y illustrate the hypothetical level of enforcement by cooperators on herders tempted to ignore the grazing plan. But of course there is no economic incentive for herders to choose the NC option at or beyond this point.

options was to control population growth (Pal, 1989 - abstract). Metz (1987) indicates that in West Nepal, with increasing human population, to overcome overgrazing, better conservation strategies and planting of fodder were encouraged. What may be appropriate for Zimbabwe, is the need to ensure that in the long run there is a relative decline in the majority of the rural population depending on land for a living through the development of rural industries.

Country experiences that show that individualization of holdings may not work are drawn from Kenya and Botswana. Experience in Kenya has shown that individualization can be a costly and time consuming process, and that the expected results of increased investment in agricultural production and rising incomes is by no means guaranteed. Fragmentation of households has not been effectively halted, and confusion have arisen because people continue to convey rights in land according to rules of customary law. Landlessness and increased insecurity for some have also resulted (Barrows and Roth, 1989).

Botswana has attempted to overcome problems of grazing management by granting of individual leaseholds to commercial ranching areas on some parts of what was previously communal grazing. Again the results have not been the improvements in investment and productivity hoped for, and loss of rights of some groups and inequitable effects have been recognized as serious negative consequences (Lawry, 1983).

In the Aravalli Hills, Jawaja Block, Rajasthan in India, informal education centers were established where villagers could come together to discuss potential solutions to the problems they faced. Through these village discussions a consensus was reached to establish a large scale afforestation programme. The programme included a variety of safeguards to ensure equitable distribution of benefits (Dixon, James and Sherman (eds) 1990 - abstract). This is an example where by establishing appropriate institutions, the community can actually come together and discuss solutions to its problems - a form of compensating coalitions.

Another area where compensating coalitions seem to work is in the Sami areas of Northern Norway. In this area management of common grazing has been successful through flexible social groupings which mediate the relation between the size of the herd and the capacity of the pasture. The fact there is no historical evidence of overgrazing in the Sami area shows that this management system is successful (Bjorklund, 1990 - abstract).

A case from Mexico shows the difficulties that may be encountered in the formation of compensating coalitions. Wilson and Thompson (1991) indicated that high transaction costs explain the difficulty for coalitions not reaching either y or z in Figure 2. These are the opportunity costs of achieving and maintaining assurance within a compensating coalition. Time to form coalitions may be a scarce resource. Institution building takes valuable hours and days away from activities which have a higher probability of producing income. Lack of political sophistication, technical knowledge and entrepreneurial ability on the part of herders are also critical components of these transaction costs. In addition, most herders are suspicious of cooperative programs. The authors also noted that cultural inertia is another transaction cost that may prevent the formation of coalitions.

SUMMARY AND CONCLUSIONS

The paper shows that the problem of overgrazing in the communal areas is due to historical developments, current government livestock development goals which are in conflict with farmers livestock production objectives and the multiple role of cattle in the communal areas which results in low off-take rates. Also of importance is the problems of tenure - property rights for communal area grazing are not defined.

Under the present grazing management in communal areas, externalities are not internalized by the decision making units thereby creating a situation of open access. Hardin's (1968) 'tragedy of the commons' concludes that individuals enjoy the benefits of the common property regime but the group pays the full cost of the individual's behavior. Since costs are not internalized by the individual herder, overgrazing is a rational decision in the short run, leading to the degradation of the range lands.

Under an open access regime, herd size, grazing routes and livestock mix are subject to individual objectives and constraints. Yet common property is defined as the co-equal ownership of the rights to a bounded resource where community-established rules govern its use. Therefore an institutional structure is essential to the definition of common property. Without it, common property cannot be differentiated from open access and resource degradation is inevitable. But with an institutional structure providing rules to regulate individual and group behavior, communal groups can cooperate successfully for the benefit of the community and the Natural Resource.

The policy options that can be used to manage the communal area grazing resources and their implications on efficiency, equity, sustainability and food security are given. These policy options are the allocation of grazing rights, taxing the cattle owners, leasehold ownership of both arable and grazing and compensating coalitions.

The analysis shows that the grazing rights and coalition policies if well implemented, with the appropriate institutions in place, are efficient, and sustainable.

As the evidence from other countries show, it may be necessary or desirable to complement these policies by putting up informal education centers in the communal areas and producing fodder to supplement the veld. Also of importance is that as the population continues to grow, there is need to enhance rural industrialization to ease the pressure on land, so that the fragile environment of the communal areas are not further degraded.

In conclusion, the allocation of grazing rights policy or/and the compensating coalition policies are the potentially feasible policies that can be adopted to efficiently manage the grazing lands in the communal areas of Zimbabwe.

REFERENCES

- Barrett Scott (1989). *On the Problem of Overgrazing*. LEEC Paper 89-07.IIED/UCL London Environmental Economics Centre.
- Barrow Richard and Rota Michael (1989). *Land Tenure and Investment in African Agriculture: Theory and Evidence*. LTC Paper no. 130, Madison: Land Tenure Centre.
- Bjorklund, I. *Sami reindeer pastoralism as an indigenous resource management system in Northern Norway: a contribution to the common property debate*. *Development and Change*. 1990, 21: 1, 75-86.
- Blackie Malcolm J. 1982 *Improved Productivity From Livestock Production in the Communal Areas of Zimbabwe*. Working Paper 2/1982. Department of Land Management, U.Z., Harare
- Bradley P. and P. Dewees 1993. Indigenous woodlands, agricultural production and household economy in the communal areas. In Bradely P.N. and K. McNamara (eds.). *Living with Trees: Policies for Forestry Management in Zimbabwe*. World Bank Technical Paper No. 210. Washington, D.C.
- Bromely D.W. and Cernea MM (1989). *The Management of Common Property Resources. Some conceptual and operational fallacies*.
- Cliffe L. 1986 *Policy Options for Agrarian Reform: A technical Appraisal*. FAO Harare.
- Cousins, Ben (1990). *Livestock Production and Grazing Rights in Communal Lands and Resettlement Schemes in Zimbabwe*. Background paper: Zimbabwe Agriculture Sector Memorandum.
- Cousins B. 1987 *Evaluation of Pilot grazing Schemes. Microprojects Programmes*. CASS, U.Z., Harare.
- GFA. 1987. *Study on the Economic and Social Determinants of Livestock Production in the Communal Areas*. Gesellschaft fun Agraprojecte Ubersee. Final Report to the Ministry of Lands, Agriculture and Rural Resettlement. Government of Zimbabwe.
- Hardin, G. 1968 *The Tragedy of the Commons* Science 162: 1243-1248
- Lawry S.W. (1983). *Land tenure, land Policy and Smallholder Livestock Development in Botswana*, LTC Paper no. 73, Madison: Land Tenure Centre.
- Lawry S.W. 1988 *Communal Grazing and Land Management: The case of Lesotho*. International Livestock Centre for Africa, Addis Ababa.
- Lawry S.W. 1989 *Tenure Policy and Natural Resource Management in Sahelian West*

Africa. Land Tenure Centre, University of Wisconsin, Madison.

Murombezi James. 1991. *Wetlands Conservation Under Common Property Management Regimes in Zimbabwe*. CASS, UZ, HARARE.

Li, X.D. *Grassland degradation in the Yellow River delta*. *Journal of Ecology*. 1989, 8: 5, 47-49; 4 ref.

Dryland management options in wastelands development: Jawaja Block, Rajasthan. In Dixon, J.A.; James, D.E.; and Sherman, P.B.J. (eds), (1990), *Dryland management: economic case studies*. London, UK; Earthscan Publications.

Metz, J.J., (1987). *An outline of the forest use practices of an upper elevation village of West Nepal*. *Banko-Janakari*. 1987, 1: 21-28; 10 ref.

Murombezi James. 1990. *Communal Land Tenure and Common Property Resource Management: An evaluation of the potential for sustainable common property resource management in Zimbabwe's communal areas*. CASS, UZ, HARARE.

Pal, B.P. *Environmental conservation and agricultural production*. *Indian Farming*. 1989, 39: 7, 3-7.

Parsons N. and Palmer R. 1977 Introduction Historical Background in Palmer R. and Parsons N. (eds), *The Roots of Rural Poverty*, London: Heinmann.

Ranger T.O. 1985 *Peasant Consciousness and Guerilla war in Zimbabwe*. Zimbabwe Publishing House, Harare.

Reynolds N., 1981 *The design of Rural Development Proposals for the Evolution of a Social Contract Suited to Conditions in Southern Africa*. Cape town: SALDRU.

Scoones I. and Wilson K. 1989 "Household, Lineage groups and Ecological Dynamics: Issues for livestock Development in Zimbabwe's Communal Land". In Cousins B. (ed) *People Land and Livestock*. Proceedings of a Workshop on The Socio-economic Dimensions of Livestock production in the Communal Lands of Zimbabwe. GTZ and Centre for Applied Social Sciences, University of Zimbabwe, Harare.

Scoones I. 1988. Patch Use by Cattle in a Dryland Environment: Farmer Knowledge and Ecological Theory. Paper Presented at *Workshop on Socioeconomic Dimensions of Livestock Production in Zimbabwe's Communal Lands*, 12-14 September, University of Zimbabwe, Centre for Applied and Social Sciences, Harare.

Steinfeld H. 1988. *Livestock Development in Mixed Farming Systems. A study of smallholder livestock production systems in Zimbabwe*. Farming Systems and Resource Economics in the Tropics, W. Doppler. Kiel, Wissenschaftsverlag Vauk.

Tawonezvi H.P.R. and C. Zindi (1994). *A Study of Common Property with Respect to*

Livestock Management.

Theisen R.J. and Marasha P. 1974. *Livestock in the Que Que Tribal Trust Land: an Ecological Study of the Importance of Livestock to Development*, mimeo.

Whitlow J.R. 1980, *Environmental Constraints and Population Pressures in the Tribal Areas of Zimbabwe*, *Zimbabwe Agric. J.*, 77: 4: 173-181



This work is licensed under a
Creative Commons
Attribution – NonCommercial - NoDerivs 3.0 License.

To view a copy of the license please see:
<http://creativecommons.org/licenses/by-nc-nd/3.0/>

This is a download from the BLDS Digital Library on OpenDocs
<http://opendocs.ids.ac.uk/opendocs/>