The Community Resource Management Plan: A tool for integrating IKS into natural resource management

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Abstract

Resource management strategies are attempts to address the challenge of balancing resource conservation and utilisation. The state of resources and how they are used are inseparably linked to ecological processes. Thus sustainable resource use should be based on socially responsible economic development while promoting the resource base and the status of the ecosystem. The efforts to attain social responsibility make indigenous knowledge systems (IKS) a crucial component of any development and conservation intervention.

SAFIRE,(Southern Alliance for Indigenous Resources) an environmental local NGO mooted the idea of a community resource management plan (CRMP) during the implementation of the Managing our Indigenous Tree Inheritance (MITI) project. A CRMP consist of the assessment of livelihood systems and resources on which they are based as well as the development of strategies aimed at promoting and enhancing livelihoods and key natural resources. In addition, the plan has an adaptive management component based on a monitoring and control system to ensure sustainable use of resources. IKS integration was done through the participatory development of resource management strategies, by promoting best practices and mitigating negative impacts on resources and livelihoods.

The Tombo community of Nyanga, Zimbabwe have harvested thatch grass for both subsistence and commercial purposes for centuries. Their resource management strategies were based on the indigenous knowledge of grass productivity. This strategy was identified during the development of the CRMP. To date this community is harvesting and marketing grass to both local and international markets.

Introduction

Community resource management has evolved as a way of maximizing benefits derived from natural resource whilst enhancing their status. It has been argued that the status of the resources and how they are used are inseparably linked and as such there is a dynamic equilibrium between renewal and utilisation (IUCN 1996), As such, the development of community resource management plans (CRMPs) evolved as an attempt to establish, monitor and manage this equilibrium. The CRMPs are implemented through adaptive management to cope with the risk and cater for unpredictable and sometimes-unknown responses of resources and variation of other conditions.

CRMPs are records of all community's development, utilisation and conservation priorities for the implementation of resource management strategies and monitoring of impacts resulting thereof. The ultimate objective of developing CRMPs is the attainment of sustainable utilisation of natural resources. Sustainable use of natural resources is socially defined and therefore not an absolute determinant or a standard measure. Its determination therefore is

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a process that involves participation and public discourse where development agents are facilitators ensuring that social groups have equal representation (SASUG 1996).

SAFIRE, an environmental local NGO mooted the idea of a community resource management plan (CRMP) during the implementation of the MITI (Managing our Indigenous Tree Inheritance) project. The development of CRMP consists of the assessment of livelihood systems and resources on which they are based. As well as the development of strategies aimed at promoting and enhancing livelihoods and key natural resources. Indigenous knowledge systems are very important in the development and implementation as they form a base on which to build on. IKS integration was done through the participatory development of resource management strategies, by promoting best practices and mitigating negative impacts on resources and livelihoods.

During the development of the Tombo CRMP in Nyanga, Zimbabwe thatch grass was identified as one of the key livelihood resources. Grass cutting and marketing has been a source of income for this community for decades. The community saw it fit to have organized management of this valuable resource through collective marketing. This paper is a documentation of the process of developing the Tombo thatch grass resource management strategy.

The process of developing the grass resource management strategies

The process of developing grass management strategies was done in four stages. The first stage was the development of a CRMP framework (Table 1). The framework is a list of the community's development and conservation priorities based on the analysis of livelihood systems and the resources dependent thereof. Secondly, the community went further to define what would be the desired situation and what strategies could be used to get there. In this stage the IKS was used to bridge the desired state and the current state. After the management strategies had been identified the grass resources were selected as the most important for both management and conservation. Consequently a resource and utilisation assessment was conducted to incorporate scientific knowledge. The last stage of the process was the consolidation, adoption and implementation of the grass resources management strategies.

The Tombo CRMP

The Tombo CRMP framework was developed at a community meeting. At this meeting key livelihood activities were identified and prioritized for assessment and management. Since the assessment of all livelihood activities would have been difficult ten were selected. Ten groups were then formed and tasked with the assessment of an activity according to the CRMP framework. And the results are summarized in Table 2.

Table 1. Contents of the Tombo CRMP framework.

Resource base	**Livelihood activity**	**Problems and constraints**	**Changes due to activity**	**Adaptive management**			**Responsible authority**
Key resources including those important for current livelihoods, threatened, endangered, locally extinct or desirable to reduce pressure on other resources	Utilisation patterns associated with each one of the key resources	Current problems resulting in unsustainable livelihood and resource management	Impacts of use on the resource base and livelihood strategies	**Desired state and**	**Mitigatory measures and best practice (agreed solutions)**	**Control systems**	Somebody responsible for ensuring that the control system is adhered to and producing the required results so as to feed into the review process based on the performance of both the resource base and the livelihoods of the people
				A description of the desired situation if the resource in question was used sustainably (the status of the resource, the nature and status of livelihood, the kind of management to be in place)	For the desired state to be achieved what changes should take place in order to mitigate negative impacts and promote best practice (what can be done to achieve the dream, what can be done to reverse the undesirable state or what can be do to maintain, support and promote the desirable status)	This is a system that should be put in place to ensure compliance and adherence to agreed principles so as to achieve the desired state	

Table 2. The Tombo CRMP Framework.

Livelihood activity	Resource base	Problems and constraints	Changes due to activity	Adaptive management			Support services	Responsible authority
				Desired state and opportunities	Mitigatory measures (agreed solutions)	Control systems		
Craft production	*Brachystegia bohemii*	Difficulties in getting enough fibre of the right quality	Reduced stocking and production levels	-Increase in sales and own use	Conservation of fibre tree to increase the stocking levels Market and product development	By-laws regarding extraction of trees should be enforced and adhered to. No indiscriminate tree felling leading to deforestation and soil erosion-Reduce craft production levels	Safire Agritex D.N.R	Sabhuku Natural Resources Committee (NRC)
Livestock production	Grass - grazing trees browse water	-Shortage of grazing areasSoil fertility and is being eroded in crop fields as fields are being used as grazing area	-poor soils in the crop fields	-Grazing areas with lots of quality grazing and browse as well as water	-development of by-laws-development and use of grazing scheme-Reduced tree felling-Gras burning in the grazing areas should be controlled-development of paddocks- burning to be done at the stipulated times	-All livestock should be tendered during the stipulated times and only roam free after wards	Agritex R.D.C N.R.B	Mambo Sabhuku Vedco
Grass cutting	*Hyperthelia*	-Over grazed and broken by livestock-Fire-Theft-Lack of markets-Poor marketing strategy-Low prices	-Increase in the number of cutters -reduced household income	- Organised marketing and product development-Lots of tall grass-development of satisfactory policies Prompt sales-Good prices	Construction of a ware house-Harvesting of mature grass-Exclusion of livestock-Fire management	-Burning the grass will be done only at the stipulated times-from November until the grass is cut livestock should be excluded-no stealing-those who fail to adhere to the regulations should be fined.	Safire Agritex Jengatavhu Sabhuku Natural Resources Committee (NRC)	

Table 2 cont. The Tombo CRMPFramework.

Livelihood activity	Resource base	Problems and constraints	Changes due to activity	Adaptive management			Support services	Responsible authority
				Desired state and opportunities	Mitigatory measures (agreed solutions)	Control systems		
Construction	*Terminalia sericea* **Mukuyu**	Indiscriminate tree felling	Shortage of construction poles	Availability of poles of desirable quality	Tree loping as opposed to felling Tree planting Strengthening of regulations	Those caught cutting trees indiscriminately should be fined Z$1000	Agritex R.D.C N.R.B	Sabhuku NRC Department of Natural Resources
Pottery	Soils	Shortage of wood for firing Product of poor quality	No market as people now prefer metal pots	Production of pottery-Increase in sales and own use	Clay extraction areas should be held sacred and only old women allowed to go	Controlled extraction Only the old women who have entered menopause should go to those areas	Safire Campfire	Sabhuku NRC
Water for household use, livestock watering and irrigation	Water	Wells are not protected	Long distances to water sources	Easily available and accessible clean water Development of a water provision strategy To have protected water sources close by	Provision of running water to households Increasing water sources (dams, boreholes) Conservation of trees on water ways Protection of water sources	No cultivation in and close to water ways	Safire Agritex D.N.R	Sabhuku Chief R.D.C Kraalhead N.R.C
Medicines for back ache diarrhea, constipation	*Cassine matabelica* *Pterocarpus angolensis* *Zingiber officinale*	Indiscriminate fire	Fewer clients more people going to churches	Healing people Practicing under a legal system even at modern clinics			Agritex R.D.C N.R.B ZINATHA	ZINATHA Department of Natural Resources N.R.C
Carpentry	*Combretum molle* *Cordyla africana* *Terminalia sericea* *Ozoroa reticulata* *Erythrina abyssinica* *Adina microcephala* *Pterocarpus angolensis*	Shortage of trees Lack of markets	Increase of stocking levels Conservation of trees by stopping indiscriminate tree felling	Increase in production and income levels Engagement of resource monitors	Tree planting and controlled cutting	By-laws regarding extraction of trees should be enforced and adhered to	Agritex R.D.C N.R.B	Chief R.D.C Kraalhead N.R.C

Grass cutting was viewed as one of the most important livelihood activities. Seven grass types were identified three of which were commercial thatch grass species. The major problems were grazing, breakage by livestock and lack of markets. Organized marketing was identified as the best option to ensure prompt sales, exclusion of livestock, grass management fire management and increased bargaining power. The main management strategies based on IKS were the use of fire and timing of harvests to maximise grass yield. These were then investigated further in the resource and utilisation assessments.

Resource status and utilisation assessment

Resource utilisation assessment

The first phase of the assessment used a participatory approach, which sought to assess the resource utilisation trends and patterns. This was carried out during a community workshop. Additional data on harvesting patterns and management practices were gathered through a questionnaire survey.

Thatch grass utilisation trends

The grass was cut mainly from the crop fields, which were managed individually by the owners. Resource management in the communal areas was faced with insecurity of tenure. Consequently the Tombo community invested in managing grass from their crop field than that which was communally owned. The people of Tombo started cutting grass in 1952 but commercialisation only came 23 years later (Table 3). Since then the industry has expanded rapidly with the number of entrepreneurs growing. The driving force behind the whole system was the quality and quantity of grass as well as rainfall (Figure 1). Low rainfall resulted in few, thin and short grass while excessive rains resulted in lots of thin grass. High fertility and soil moisture made the grass thicker and taller which was unsuitable for the industry.

The most preferred species were *Hyparrhenia hirta* (L.) Stapf. (common thatch grass), *Hyperthelia dissoluta* (Nees ex Steud.) Clayton (yellow thatch grass) and *Hyparrhenia cymbaria* (L.) Stapf. (boat grass) in that order. *Hyparrhenia hirta* was preferred because was said to be self-pruning while *H. dissoluta* was liked for its commercial value. *H. cymbaria* sometimes tended to be too tall, too thick and was alleged to rot and break easily (Table 4). Grass cut for domestic use was not processed unlike that for commercial use, which was brushed and graded. The Tombo community realised that there was preferential distribution of the three species. Their combination varied with soil moisture. *H. hirta* was said to have tree varieties which differed in colour and thickness. This was attributed to variations in soil water and fertility.

Ecological resource status

The second phase of the assessment was an ecological survey, which sought to quantify the resources and identify potential impacts and impact indicators. Transect cutting was the main tool used in the exercise. Five transects were laid out starting from the main road. Transects were

Table 3. Grass utilisation historical profile.

Year	Growth patterns	Users / cutters	Quality and quantity
1952	Lots of tall grass of preferred girth	Very few users and no commercial use	Lots of grass in the fields
1954	The grass regenerated well but was later eaten by worms (**nhunduru**)	Nobody as there was no grass	No grass everywhere
1968	Lots of grass everywhere	Very few cutters	Lots of grass but was breaking due to an exceptional cold season
1975	Lots of very tall grass	People started going commercial with bundles selling at 25 cents (Rhodesian)	Lots of very tall good quality grass due to good rain season
1982	Lots of grass everywhere of the right girth	More people joined in the grass cutting industry	the quality and quantity of grass was more than that of 1975
1992	No grass	No cutters	No grass due to drought
1993	Lots of grass	Many cutters	Good quality
1995-98	Not as much as the previous years	Even more cutters	Tall thick grass
1999	Lots of grass due to excessive rains	More cutters even man	Short, thin grass due to excessive rains

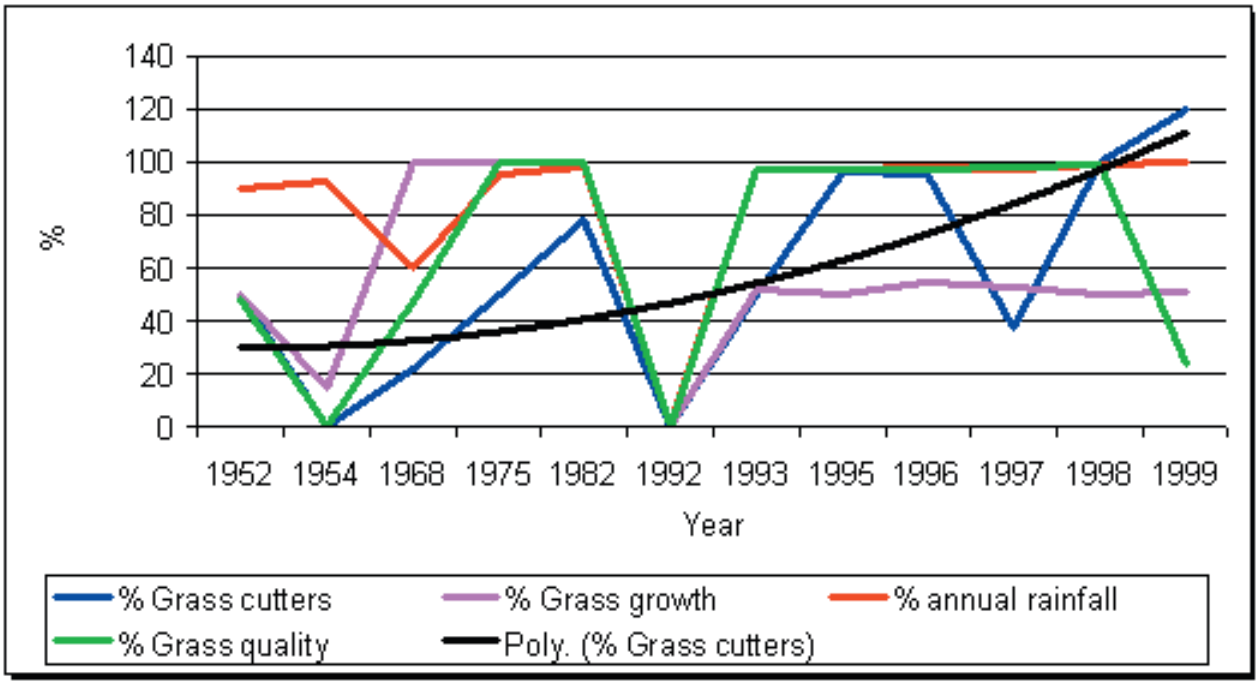

Figure 1. Factors influencing thatch grass cutting in Tombo

Table 4. Tombo grass resources profile.

GrassType	Harvesting/Processing	Areas of Distribution	Quantity (Score)	Preference (Score)
Hyparrhenia cymbaria	Cut in July after the water drained away	Water ways Fertile soils In crop fields in water chains	(3) Not much in the area	(3) Tallest grass but rot and breaks easily quickly
Hyparrhenia hirta	Cut and then shaken to remove dirt (dead leaves) on burnt contours the grass has very little dirt (dead leaves)	Found everywhere except in the mountains and wetlands	(1) Most abundant type	(1) Most preferred and is of medium height
Hyparrhenia dissoluta	Has three grades cut and pruned to remove all the dead leaves	Found everywhere except in wetlands	(2) Lots of it but not more than H. hirta prefers medium rains	(2) Most important for commercialisation
Mabava	Not cut	On the mountains	(7) Very little in the area	(7) Important for grazing though some areas used for thatching
Sporobulus pyramidalis	Pulled off by hand	Found everywhere	(4) Lots of it in the area	(5) Important for craft, brooms, hats, baskets and grazing
Ruhukwa	Pulled off by hand	Found on rocky places	(6) Very little in the area 6	(6) Important for craft, brooms, hats, baskets and grazing
Cynodon dactylon	Pulled off by hand or dug out	In water ways	(5) Very little	(4) Used in arresting soil erosion

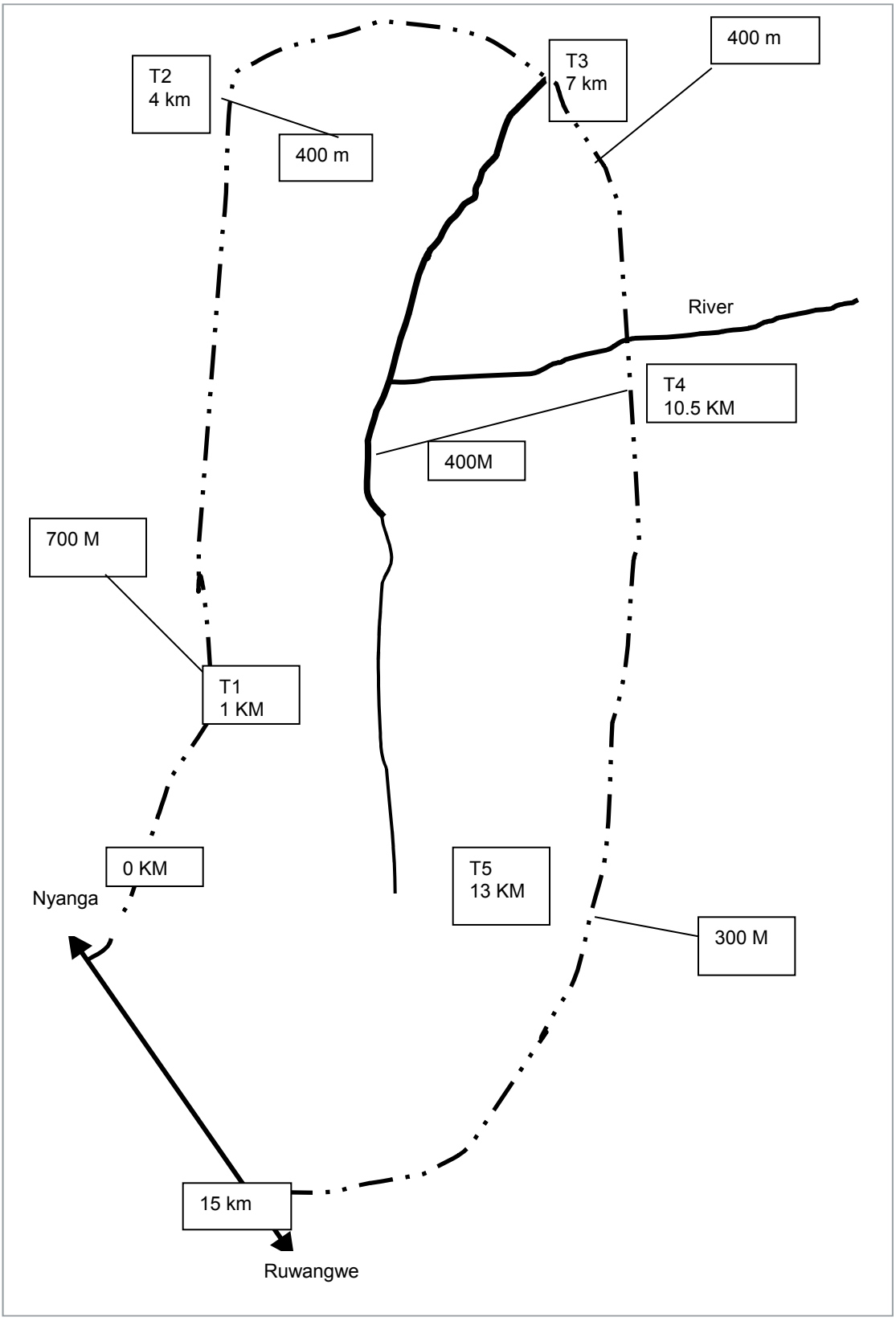

Figure 2. The position of the line transects used in the ecological survey, Tombo II (25/09/99).

laid eastwards and westwards alternately across the catena and set about 3 km apart for the entire 15 km loop road (Figure 2). For each transect, sample plots of 5.64 m radius (100 m^2) were used to assess the ecological status of the grass (Figure 2). These plots were approximately 100 m apart, based on 110 paces of 88 cm. At each plot grass types, coverage and harvestable proportions were recorded (Figure 3).

Thatch grass distribution

From the ecological survey it was established that thatch grass was distributed everywhere within the Tombo area though with varying species composition. Settlements, crop fields and shrublands interspaced the grass resource areas. In settlements there was less thatch grass and more short grasses than other areas. Tall grass or good quality thatch grass was confined mostly to the crop fields on contour ridges and water ways while in the wild the grass tended to be short, thin and at times overgrown with shrubs.

The amount of harvestable grass was between 50 % and 70% of the standing stock whilst grass cover ranged from 90% to 95%. The grass was distributed differently in the five transects where T1 and T2 had more *H. hirta* and *H. disoluta* than T3, T4 and T5 which had lots of localised *H. cymbaria*. This could have been due to differential soil water content since the latter were closer to streams. Where there was evidence of high water levels there was less thatch grass and lots of *Panicum*, *Digitaria* and *Sporobulus* spp. especially in T4. *H. cymbaria* was the tallest grass, more than 2 m, followed by *H. dissoluta* and *H. hirta* was always less than 2 m. In the wild there was lots of dead grass (fuel) as compared to the crop fields. The most abundant grass from the community's perspective was *H. hirta*. The ecological survey rated this as the second most abundant after *H. dissoluta* with *H. cymbaria* being the third. The ecological survey and the PRASS were therefore in agreement which implies that the most preferred species were the most abundant.

The thatch grass enterprise

Intensive grass commercialisation was adopted as one of the management strategies. The grass was mainly harvested between June and October. The grass cut with a sickle and then combed with a brush. On average the length of the grass cut was 1.6 m . Grass cutting differed between men and women. As compared to men women cut shorter grass, spent more time on travelling and cutting and produced more bundles of the finished product (six times as much). Of the 9 067 bundles harvested in 1999, 72.8% were *H. dissoluta*, 10..9% *H. cymbaria* and 16.3% *H. hirta*. The average size of a bundle was 165 +/- 24.1 grass stocks. On the other had men claimed to get more money than women from their sales. The household income from grass sales ranged from nothing to US$60.00 in the 1999 season. To date there are about 300 individuals involved in commercial harvesting of grass (Figure 4).

Figure 3. Plot sampling for grass assessment during the Tombo thatch grass ecological survey.

Table 5. The current grass resource management strategies

Strategy	Desired state	Recommendations	Remarks
Burning	Less dirt in the grass-Grass grows very well with no dirt	Burn at the right intervals, in the right season i.e end of October, every three years	Repeated and or indiscriminate burning leads to short grass and sometimes less grass Frequent burning destroys the seeds and increases weeds so should not burn frequently
Cutting grass from the contours	Grass grow more than on burnt fields due to that the debris adds fertility to the soil	Even though labour intensive, people can work in groups	This would reduce fuel load and improve quality
Cutting only mature grass	Long lasting durable product	Grass cutting should commence after the cold i.e. after June	Such grass does not rot easily Seeds would have matured and been dispersed
No grazing before grass cutting	Tall unbroken grass	Livestock should move into areas with thatch grass after November.-Need for by-laws which will guarantee security of tenure	The grass grows without being grazed or trampled by livestock-Grazing after cutting has had no impact on standing stock
Grass cutting and or burning should be done every five years	Lots of clean grass which is easy to process	Cut every three years	The grass does not grow well as it gets overgrown with shrubs
Intensive commercialisation	Increase in household incomes	-Organised marketing to increase bargaining power and access to markets-Resource management institution working under traditional leadership to oversee grass utilisation	Currently all resources belong to the state but for the people to manage and commercialise the resources there is need for security of tenure

The business was operating under the guidance of six management strategies. These were the grass burning regimes, grass cutting practices, grazing and commercialisation (Table 5).

Lessons Learned

Indigenous scientific knowledge systems

- Rural communities have the appropriate ecological knowledge based on their IKS to manage their resources sustainably. The Tombo community was using knowledge for managing grass resources that they had built up over 40 years. This knowledge included among others the preferential distribution of various grass species according to environmental gradients (soil fertility and moisture).

- The quality of the grass was determined by its thickness, which varied with the soil water content. Thick grass was said to be unsuitable as it rotted and broke more easily compared to thin grass. Consequently, the most preferred were those growing on drier soils i.e. *Hyperthelia dissoluta* and *Hyparrhenia hirta*. Incidentally these are the grass species most preferred by the markets.

- It was essential for the grass to be hardened by the cold. As a result one of the management strategy to ensure a good durable products was to harvesting after June which is the coldest month in that area. By that time the seeds would have matured and been dispersed as well.

- Fire can be used as a management tool but can also be disastrous. Repeated burning was said to have resulted in reduced stocking levels of thatch grass and increase other species. This could have been a shift in the competitive advantage between species. To avoid this the community consensus was that burning should not be done within three consecutive years. At the same time they needed to burn, as the grass on unburned areas was relatively thinner and shorter than that from other areas.

Figure 4. Thatch grass processing for marketing in Tombo.

Prerequisites for community based natural resources management

This process of developing resource management strategies based on IKS only works if there is security of tenure and a common socio-cultural context as well as strong leadership.

- For rural communities to be able to invest in the management of the communal resources there should be some written or otherwise known arrangement detailing the security of resource tenure. Otherwise all that investment would go to waste if the land use systems were to change.

- An enabling policy environment with less interference from local government would be most ideal. However, contemporary knowledge systems are crucial for sustainability so as to ensure that local systems can adapt and cope with the dynamic demographic, biophysical, political and economic environment. Therefore the participation of development and research agents co-ordinated by local government and rural district councils will remain essential.

CRMP tool application

- The management plan should be specifically for a self-defined community, with known legal/traditional boundaries that could be determined by ethnicity, livelihood systems and or legal settlement patterns (temporal, spatial, historical). This makes the plan a binding document that can be used for both development and conservation programmes.

- A certain degree of socio-cultural homogeneity is very crucial. For instance people in resettlement areas find it difficult to develop community resource management systems based on IKS as they have different cultural backgrounds, values and beliefs.

- The CRMP concept proved to be a very useful tool for the incorporation of IKS and general local knowledge into resource management. This reduces the dependency syndrome instigated by introduction of systems that communities are not familiar with. The CRMP assisted the community to move from problems to solutions using their own knowledge and resources.

- Unfortunately the process requires investment from the community in terms of time and resources. Most of the time the communities are not prepared to make those investment especially for resources that are communally owned. On the other hand economic incentives are very important. As such the MITI projects uses the CRMP to develop enterprises e.g. marketing of thatch grass. This business made people aware that resource management could actually bring quick returns and had started embarking on long-term ventures.

Literature Cited

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