

POLICIES AND INCENTIVES TO PROMOTE THE TRANSITION FROM DEGRADED PASTURELANDS TO SUSTAINABLE LIVESTOCK PRODUCTION SYSTEMS AND LIVELIHOODS IN THE GUTAH HILLS

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INTRODUCTION

Crop-livestock systems are the most prevalent agricultural land use systems in the Gutah Hills and the main livelihood strategy for the families living in the area. Livestock production constitutes one of the main pathways used by poor households in the North West Region of Cameroon, as well as in many other areas of Sub-Saharan Africa, to accumulate capital and assets, which can be crucial in maintaining household survival in times of crisis and changing social status of the poor rural families. However, the combined threat of food insecurity, under nutrition, poor health conditions and climate change act as additional stressors on these rural communities, further limiting their coping ability to those stressors, and adversely affecting poverty eradication efforts.

Pastures are the main land use system in the North West Region (NWR) of Cameroon, and in those areas livestock is managed using traditional technologies in an extensive agro-pastoral system which results in soil fertility decline, poor crop-tree-livestock integration, increased encroachment

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on fragile and protected areas, with the consequent reduction in the already scarce forest relicts existing in the area. Moreover, poor pasture management has resulted in frequent conflicts between grazers and farmers, because animals invade the croplands trying to get the feed they cannot find in the overgrazed pastures. As cattle, horses, sheep and goats are raised in a sort of free-ranging system in pastures located in the vicinity of croplands not properly protected by fencing; there is no means to deter animals of damaging crops.

HOW PASTURE DEGRADATION AFFECTS THE ENVIRONMENT AND THE SOCIAL AND ECONOMIC CONDITIONS OF CROP-LIVESTOCK FARMERS?

Poor pasture management in the Gutah Hills, which involves overgrazing –particularly during the dry season-, the use of fire to control weeds and external parasites in cattle, as well as to eliminate the over-matured grasses and residues left after grazing, has resulted along the years in severe pasture degradation, but the problem is becoming more serious every year because of the continuous increase in stocking rate in the grazing lands, amidst climate change and variability. All these results in:

- Poor soil cover, which in turn makes it more prone to erosion; and greater fertility losses
- Greater emission of greenhouse gases and poor capture of emitted carbon;
- Expansion of grazing areas to the forest relicts;
- Biodiversity losses; and
- Reduction in water amount and quality, and the latter is worsened because animals are watered directly from the streams, damaging the existing vegetation and the soils in the riparian forest as well.

From the socioeconomic point of view, degraded pastures result in reducing animal productivity, with stocking rates between 0.5 - 0.7 animal units⁶/ha, slow growth that makes cattle to reach market weight at 6-7 years, and heifers to get their first calf at 4-5 years; consequently, the income generated by such activity is very limited, and the capital turnover is quite slow. It also results in seasonal transhumance forcing some of the young family members to separate temporarily from the rest of the family. Also, producers managing degraded pastures are less able to manage risk, and are more prone to suffer the impacts of severe droughts or flooding.

WHAT OTHER FACTORS LIMIT LIVESTOCK DEVELOPMENT IN THE GUTAH HILLS?

Access to markets is an additional limiting factor in the Gutah Hills. Although there is a local Cattle Market in Acha-Tugi, but the lack of a weighing device forces to price negotiation processes based on animals appearance, instead of bodyweight. Also, each farmer negotiates his/her animals individually, and this is critical because most animals are bought by middlemen who take those to larger markets such as the one in Bamenda, getting the best part of the profit. In the case of small ruminants, those are usually sold in a regional market, but poor road conditions and transportation costs affect the profit of smallholder livestock producers.

Cattle rustling also limit farmers' interest on investing in the improvement of cattle production systems, because his/her best animals –and even the whole herd- could be stolen in only one night.

⁶ Animal Unit (AU) = A bovine weighing 400 kg

Access to technology information and services is another limiting factor, and this is even more affected because of the lack of farmers' organizations, and the limited presence of government officials at village level. There is only one Veterinary Technical Assistant based in Tugi, but his almost only responsibility is on the prevention of transmittable diseases via vaccination, therefore farmers do not receive any recommendations on pasture and natural resources management, feeding, breeding, etc.

STRATEGIES FOR THE REHABILITATION OF DEGRADED PASTURES

Pasture degradation is characterized by the loss of edible forage species and its replacement by poorly palatable grasses and weeds, and in more extreme conditions not even those take over the space left by valuable species, therefore patches of bare soil are observed in the pastures, and those could be eventually eroded by the rains. Under those conditions, livestock is managed extensively and animals show poor performance.



For severely degraded pastures -with less than 40% edible species– as the majority of the grazing land in Tugi and the rest of the Gutah Hill is usually recommended to replace the whole standing vegetation for new pastures. It means to use chemical herbicides, followed by full soil preparation (ploughing and harrowing) before planting new seeds. However, considering the predominant sloping topography of the grazing areas in the Gutah Hills, as well as the lack of machinery for land preparation such strategy is not recommended. By the contrary, it would be preferable to apply pasture rehabilitation strategies based on restoration ecology principles such as minimum soil disturbance, to prevent soil losses due to the impact of the intensive and heavy rains that occur at the beginning of the rainy season, when the pasture rehabilitation work is initiated. In those empty spaces left after removing weeds or already in bare soil, some seeds or vegetative materials could be planted with slight soil disturbance. All these will contribute to reduce costs of pasture rehabilitation, even though more hand weeding efforts using a cutlass will be needed to reduce the competition exerted by weeds. .

The key point to assure successful pasture rehabilitation is to exclude animals from the intervened pastures, in order to prevent defoliation of edible grasses, either the regrowth of existing plants or the new ones planted. Even though a herdsman could control animals to graze the pastures subject to rehabilitation, it is impossible to assure that others will not come when the herdsman is not around. Therefore, it is better to build a fence in the perimeter of the area under rehabilitation, and this could be used later as the basis for the implementation of a rotational grazing system. However, the cost of fencing is high. TUSIP experience showed that the cost of a durable fence is FCFA 107,000 (aprox. US\$ 215) per 100 m. Many livestock farmers may not have the financial capacity to do such investment, even though the increase in production will pay for the investment in the midterm, but pastures could not be effectively grazed for about one year, therefore no income from rehabilitated pastures will be generated in such period.

When a given area is excluded of grazing, the carrying capacity of the farm is reduced, therefore to prevent that overgrazing problems are exacerbated, there are two options: to sell some animals which in turn could provide some income to cover the costs of rehabilitation, or to precede rehabilitation with the establishment of a fodder bank to complement grazing.

HOW PASTURE REHABILITATION COULD BENEFIT LIVESTOCK PRODUCTION?

The rehabilitation of degraded pastures results in an increase in pasture availability and quality, which in turn allows maintaining a higher carrying capacity and obtaining better live weight gains. Changes will be even higher when semi-zero grazing accompanies pasture rehabilitation. Those changes will also benefit the environment, because lifespan methane emission and nitrogen excretion are also reduced when animals graze rehabilitated pastures, compared to degraded pastures. Some values illustrating expected effects of pasture rehabilitation, with and without the use of fodder banks to complement grazing in Tugi farms are presented in Table 1.

Table 1. Potential effects of pasture rehabilitation, with and without the use of fodder banks, on livestock productivity, methane emission and nitrogen excretion in Tugi Village

Parameter	Pasture/Feeding Strategy		
	Degraded	Rehabilitated	Rehabilitated + Cut & Carry
Stocking rate, animals/ha	0.50	1.75	2.00
Time required to reach 400 kg BW, years	6.3	4.3	3.6
Average LWG from 200 to 400 kg, kg/day	0.185	0.287	0.495
Beef production per hectare from 200 to 400 kg, kg/ha/year	33.7	183.1	361.1
Animals between 200-400 kg BW			
Methane emission, kg/animal/period	118.1	105.3	90.4
Manure excretion, kg/animal/period	2201	1839	1368
Total N excreted , kg/animal/period	67.5	60.4	48.0

Among the additional potential benefits of pasture rehabilitation are: (a) greater carbon sequestration in the farms, because part of the former grazing areas could be devoted to tree plantations or secondary forests, which are good carbon sinks; (b) a reduction of grazers/farmers

conflicts, because the increase on pasture availability in rehabilitated pastures, along with fencing, will prevent animals to invade crop farms, because they could obtain sufficient feed in their paddocks.

IS PASTURE REHABILITATION ECONOMICALLY-SOCIALLY FEASIBLE?

The rehabilitation of degraded pastures applying restoration ecology principles do not involve much investments, but if those are linked to the use of fencing to assure exclusion of animals from the intervened pastures, then the economic feasibility of such intervention is compromised. The investment required for fencing in North West Cameroon was estimated in US\$ 215/100 m and US\$ 890 per hectare, and the increased value of additional beef production obtained after rehabilitation did not cover the total costs of pasture rehabilitation + fencing, at least in the 12 years period used as a basis for financial analysis. With a greater level of intensification, such as including the use of fodder banks, makes the activity economically feasible in the long run, although more investment is needed.



Definitely the availability of funds for investing in the pasture rehabilitation process will always be the bottle neck for livestock farmers in the Gutah Hills to adopt such technology, therefore there is a need to find potential options to solve the problem. Given that fencing is the item that has the heaviest weight on the innovation costs; it is suggested to consider subsidizing at least 50% of the costs of fence installation, as suggested by the data presented in Table 2.

Different options could be used to provide the subsidy. Although to give it in cash to pay for the purchase of materials needed for fencing is one possibility, would be better to give it in kind, probably providing the barbed wire, and in that way we assure that good quality wire is used. Another possibility is to tie such subsidy to the planting of trees protecting water sources. Another possibility could be to provide credits with a subsidized rate of no more than 7%, but it will work

only if pasture rehabilitation is accompanied with the planting of fodder banks. In such case, there should be a loan's period of grace of two years.

The justification for those policies involving incentives would be the potential benefits pasture rehabilitation will have on the environment, not only in terms of soils, water, methane and nitrous oxide emissions, but on preventing the expansion of pastures into forest relicts as well.

Table 16. Present net value (PNV) and internal rate of return (IRR) for the rehabilitation of degraded pastures and the use of fodder banks with native cattle in Tugi village.

Scenarios	No subsidies		50% Fencing costs subsidized		100% Fencing costs subsidized	
	PNV, US\$	IRR, %	PNV, US\$	IRR, %	PNV, US\$	IRR, %
<u>Animals between 200 - 400 kg</u>						
Degraded vs. Rehabilitated Pastures	(- 488.99)	(- 2.95)	(- 77.46)	5.50	334.06	30.68
Degraded vs. Rehabilitated Pastures + Fodder bank	92.77	9.09	524.87	15.71	936.39	26.65

OTHER MEASURES FOR ENHANCING THE ADOPTION OF PASTURE REHABILITATION STRATEGIES

Strengthening knowledge sharing mechanisms. The extension service has limited presence in the Gutah Hills, and in the areas where those services are available, extension workers do not have information on the impacts of pasture degradation on animal productivity and the environment, as well as on how to rehabilitate degraded pastures. In that sense, the dissemination of the results obtained by the Tugi Silvopastoral Project (TUSIP) is needed. Also, the conduction of participatory learning and experimentation sessions within the Farmers Field Schools (FFS) approach will help farmers to be effectively trained on pasture rehabilitation strategies and other related topics. Even though existing farmers groups could be the basis for organizing FFS, there is a need that extension staff provided either by the central or local governments, or by NGOs, lead those initiatives, but those will need training in participatory methodologies and silvopastoral techniques as the ones promoted by TUSIP.

Preventing cattle rustling. Animals are valuable assets for the rural population in the Gutah Hills, therefore the theft of animals discourages farmers to invest in improving livestock production and rehabilitating degraded pastures. Surveillance provided by the police or any other armed force with presence in the rural area, supported by community organizations, will help to deter cattle rustling. Also, animal identification by branding or tattooing will help to identify stolen animals. In the case of Cameroon is common that the animal head is exhibit in the place where beef is sold, hence this aspect should be taken into account for identifying animals.

Improving marketing options. Animals are usually directly negotiated in the cattle market, but most of the time farmers do not get the right price because animals are sold based on body appearance, instead of controlled weight. The municipalities own the cattle markets and charge a small fee to farmers who bring animals, and they could increase a little the fee to cover the cost of

a scale to be used to check each animal weight for the owners to get a fair payment for their animals.



Promoting livestock farmers' organizations. Livestock farmers in the Gutah Hills operate individually and have small herds, therefore could not take advantage of the opportunities associated to the scale of production, either buying inputs, processing and/or selling products. Also as individuals have limited access to decision makers, to government services, to technology and market information, and so on. In the case of the Gutah Hills there are several groups organized for cultural purposes, which could serve as the basis for farmers' organizations. The role of local authorities on promoting the basic units at village level could be relevant.

However, those groups should be organized not only around primary production, either for the purchase of inputs or commercialization of the primary products, but also by promoting agri-business efforts to add value to their primary production. One immediate option in the case of cattle farms could be the processing of good quality dry meat and its commercialization in larger markets.