

A REGIONAL TSETSE AND TRYPANOSOMIASIS CONTROL  
STUDY : MALAWI, MOZAMBIQUE, ZAMBIA AND ZIMBABWE

- SUMMARY -

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Although both forms of ground spraying are efficient methods of control, considerable concern is currently being expressed about the environmental hazard created by the continued use of persistent insecticides. There are no suitable alternatives to dieldrin and DDT. It would seem though that aerial spraying presents less of a threat to the environment.

Progressive eradication of the vector leading to the total eradication of the infested area is regarded as the only permanent solution to the problem. It has therefore been recommended in the report that the four countries should work towards the elimination of the common fly-belt within a mutual regional programme.

It is likely there will be opposition to the concept of total reclamation because of some apprehension about its impact upon the wildlife areas scattered throughout the general area of the common fly-belt. In particular, the Luangwa national parks and the Parque Nacional da Gorongoza could be sensitive issues. It must be emphasised, however, that it will not be possible to leave any wildlife area untreated if such a project is to succeed. From past trials and control operations, there appears to be little to fear from an environmental point of view to eradication effected by ULV application of endosulfan from aircraft. The technique seems to present little threat to non-target species and would cause minimal disturbance to the areas treated. The belief that tsetse infestations are protectors of wildlife is also not altogether true. Wildlife decimation has proceeded and is still continuing in areas of the densest infestation. Wildlife resources can only be protected through the will of the people and the law of the land.

The report emphasises that it has been the development of night aerial spraying which has made the reclamation of an area the size of the common fly-belt a feasible proposition. It would be impossible to sustain ground spraying methods on such an undertaking because of the high level of planning and field supervision required. Nor are knapsack or Unimog spraying techniques suitable for broken terrain. It is also probable that both would be unacceptable to some governments for environmental reasons, particularly if it were intended to use them in areas of prime value for wildlife conservation.

The current capability of aerial spraying can probably be best gauged by Zimbabwe's 1982 operation. Three aircraft satisfactorily covered 2 400km<sup>2</sup> in five to eight nights (plus suitable daylight hours where necessary). It seems reasonable, therefore, to expect the same unit to complete 5 000km<sup>2</sup> within 16 to 19 days and possibly more as efficiency improves. On the basis of this performance, it would take eight units of similar composition and effectiveness eight

pallidipes Aust., Glossina austeni Newst. and Glossina brevivalpis Newst. G.pallidipes probably ranks equal in importance with G.morsitans over large areas of the fly-belt. G.austeni occurs only in Mozambique and G.brevivalpis in Malawi, Mozambique and Zambia. These last two mentioned species are very restricted in distribution and usually occur in isolated pockets.

The importance of the common fly-belt infestation relates to the greater extent to the occurrence of the disease bovine trypanosomiasis. This constitutes a major limiting factor to the full utilisation of this extensive area. Consequently, it has considerable bearing on the economies of these countries and the well-being of their people, particularly those living in or near the infested area.

Human trypanosomiasis is of less concern and is only of any real significance in Mozambique's Tete Province and Zambia's Luangwa drainage, particularly the Isoka area.

Due to a lack of funds and experienced staff, it has become increasingly difficult to sustain anti-tsetse control measures in recent years, other than in Zimbabwe. As a result Malawi, Mozambique and Zambia have had to resort to chemoprophylaxis to the greater extent to protect existing cattle herds. It is noteworthy that Mozambique is also attempting to extend its cattle distribution by this method. It sees little hope in the immediate future of reclaiming country from tsetse on a permanent basis!

The report emphasises that the chemoprophylaxis practiced by these countries cannot be regarded as the solution to the problem. Although it is possible to maintain cattle in the presence of tsetse flies with drugs, they do not thrive and the possibility of drug resistance developing is a real danger.

The benefits which are likely to result from reclaiming this common fly-belt would be considerable to all the countries concerned. In the case of Malawi, Mozambique and Zambia, where cattle populations are low in relation to the natural carrying available, numbers could be increased substantially. This would assist a situation where there is inadequate meat and dairy products to meet the internal demands of the individual countries, and an insufficiency of draught animals.

The four main tsetse control methods currently being used to combat G.morsitans and G.pallidipes within the Zambian and Zimbabwe elements of the region are the two ground spraying techniques, knapsack and Unimog spraying and day and night aerial spraying. Zimbabwe's selective game elimination technique, within fenced corridors and Zambia's holding lines are unlikely to persist. No control operations are being conducted at present in either Malawi or Mozambique.

As has been demonstrated a number of times in Zimbabwe, it is futile trying to prevent international border encroachment of tsetse flies without being able to deal with the source of the fly. Similarly, having eradicated tsetse flies in an area up to an artificial border line or for that matter an internal line, to hold the position gained along such lines, when dense tsetse populations exist immediately beyond, is an impossible task.

Most of the area currently infested with tsetse flies in Mashonaland East Province had previously been reclaimed during the period late 1950s through to the late 1970s. Regrettably, the greater part was lost again during the latter years of the liberation war in Zimbabwe, when control measures along the Mozambique border were suspended. Tsetse have now spread deeper into Zimbabwe than was the case in the mid-1950s.

The infested areas of Mashonaland East and adjoining areas, both within Zimbabwe and Mozambique, are relatively small elements of an extensive fly-belt common to Malawi, Mozambique, Zambia and Zimbabwe totalling 322 000km<sup>2</sup> in extent, which has been termed the common fly-belt in the report. Other than a narrow connecting link with the northern Mozambique fly-belt across the lower Rio Zambezi, the common fly-belt is isolated from the other existing belts by either ground rising above the ecological limit of tsetse flies, major water bodies or where the natural woody cover has been extensively removed as in Malawi. None of these States individually could rid themselves of the problem which this fly-belt presents to them. A regional approach is therefore necessary.

The architects of the Mashonaland East agricultural and rural development study, the Agricultural and Rural Development Authority of Zimbabwe appreciated this requirement and consequently commissioned the preparation of the report "A regional tsetse and trypanosomiasis study: Malawi, Mozambique, Zambia and Zimbabwe."

The extent to which each of the four countries in the study is prejudiced by the common fly-belt is related to the area of land infested. Mozambique has by far the greatest area, followed by Zambia, then Zimbabwe and finally Malawi. Malawi is, however, in the unfortunate position of being tightly sandwiched between two extensive infested areas, the one comprising elements of the common fly-belt in Zambia and Mozambique on the west and the other, the northern Mozambique fly-belt, lying to the east.

The chief tsetse fly species of the common fly-belt is Glossina morsitans morsitans Westw. This is found throughout. Three others occur, namely Glossina

years to cover the area of the common fly-belt at 40 000km<sup>2</sup> per year. A project of ten years would therefore possibly be required, allowing 25 per cent for progressive overlap and contingencies.

On the basis of Zimbabwe's 1982 aerial spraying operation cost of Z\$223/km<sup>2</sup>, plus the anticipated increases in cost for the 1983 operation for flying, insecticide and incidentals of 15 per cent, 5 per cent and 15 per cent, respectively, giving a revised cost of Z\$250/km<sup>2</sup>, the cost for the first year of such an undertaking would be Z\$10 million, excluding the cost of salaries, travelling and subsistence for senior staff or the cost of monitoring the results of the operation. Assuming an annual inflation of 12 per cent, total expenditure over a ten year period would be approximately Z\$196 million.

In proposing aerial spraying as the most suitable method for eradicating tsetse flies within the common fly-belt, it has been emphasised in the report that this still requires a great deal more development work, particularly relating to electronic guidance systems for aircraft and the treatment of broken country. Both problems are considered as being relatively easily surmountable.

It is proposed that the regional programme be undertaken in two phases of operation, the first to last three years called the Preparatory phase and the second ten years called the Eradication of the common fly-belt phase. It is visualised that the first phase will be devoted to determining the true extent of the problem, to training, to research, particularly that relating to the development of the aerial spraying technique and baited targets and traps, which are seen as an important adjunct to existing control methods, to limited eradication operations which would be regarded to some extent as large-scale field trials and to an environmental impact study. The second phase would be purely eradication supported by close monitoring of results.

An estimate of costs has been provided. Details have been set out in a comprehensive table together with accompanying notes. All costings are in constant Zimbabwean dollars. The preparation was not straight forward because some countries were unable to provide the consultant with all the costings required. As a result it was necessary to extrapolate from Zimbabwean prices in a number of cases. In preparing the estimate, it was assumed that the four countries involved would make reasonable inputs to the programme from their existing resources, particularly that of staff.

The total cost of the Preparatory phase is estimated to amount to Z\$24,74 million. That for the subsequent ten year eradication phase is projected to amount to a further Z\$155,8 million.

The report was subjected to a financial appraisal which indicated an Internal Rate of Return (IRR) over twenty years of 14,3 per cent. In establishing this return it was noted that with the exception of Malawi, even by year 20, the liberated areas would still not have reached their full livestock carrying capacity. If projected over a more protracted period the resulting increase in benefits would have given rise therefore to an even higher IRR.

The projected return was not particularly sensitive to changes in its factors.

Of particular importance amongst the recommendations of the report was a proposal that the management of the regional programme as a whole should be effected by a committee comprising representatives from the four countries to be called the Standing Committee, assisted by an experienced glossinologist referred to as the Regional Co-ordinator. It is considered that the ultimate success of the programme will depend to a very great degree on the enthusiasm, energy, dedication and most important of all, the leadership of these two working together.

It is noted in the report that there was consensus on the desirability of the regional programme amongst the respective technical authorities of the four countries subject to ratification by their governments.