

SIGNIFICANCE OF WEEDS IN SEMI-PERMANENT AND PERMANENT FARMING SYSTEMS IN THE COASTAL AREA OF TOGO

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SUMMARY

Within the framework of investigations on the composition, ecology and significance of the weed flora in Togo, a case study was carried out in the coastal area to determine the impact of weeds in the prevalent small scale farming systems. The transition from semi-permanent cultivation in the north-west to permanent cultivation in the south-east of the area is accompanied by an increasing weed infestation of the fields and an increasing need for early and more frequent weeding. On an average weeding of major crops is carried out one time more often under permanent cultivation. Compared to semi-permanent cultivation, costs for weeding are 67 % higher and account for more than half (55 %) of overall production costs.

1. INTRODUCTION

The results presented in this paper were part of a two years investigation on the composition, ecology and significance of the weed flora in Togo carried out from 1982 to 1984. Within this framework, a survey was carried out in the coastal province with the objective to determine the impact of weeds in the prevalent small scale farming systems.

2 MATERIALS AND METHODS

The survey was done in co-operation with the extension network of PRODERMA (Projet de Développement de la Région Maritime). 52 farms, 2-3 farms per subdistrict, were selected for the survey. Together with the extension personnel all farms were visited and respective farming systems analysed with the help of a questionnaire and field visits.

3 RESULTS

3.1 Impact of the sociological environment on the farming systems

The population density in the province increases from 50 persons per km² in the northwestern districts of "Tsévie" and "Tabligbo" to a maximum of 240 persons per km² in the southeastern districts of "Anécho" and "Vogan". As a consequence the intensity of land use increases along the same line. The average fallow period for fields decreases from 7 years in the northwest (semi-permanent systems) to zero in the southeast (permanent systems), and the average size of the surveyed farms is reduced from 16 to 9 ha due to high population pressure.

3.2 Impact of weeds in the different farming systems

The varying intensity of the two groups of farming systems (semi-permanent and permanent) has a clear impact on the composition of the weed flora as well as on the type, frequency and cost of weed control measures in respective farms (Tble. 1).

Tble. 1: Weeds and weed control in semi-permanent and permanent farming systems in the Coastal Province of Togo

| | Semi-permanent systems | Permanent systems |
|---|---|--|
| Major weeds (ordered acc. importance) | Imperata cyl. Lactuca tar. Cyperus sp. Commelina sp. Euphorbia het. Rottboellia coc. Panicum max. Ageratum con. Brachiaria def. | Lactuca tar. Commelina sp. Euphorbia het. Imperata cyl. Striga asi. Boerhavia sp. Rottboellia coc. Cassytha fil. Potulaca qua. |
| Average weeding frequency: | | |
| - of maize | 1.8 | 2.7 |
| - of cassava | 3.3 | 5.0 |
| - of groundnuts | 1.5 | 2.4 |
| - of beans | 1.3 | 2.3 |
| Expenditure for weeding (DM/ha): | 84.- | 140.- |
| Portion of: | | |
| - costs for all hired labour | 50 % | 70 % |
| - overall production costs | 41 % | 55 % |

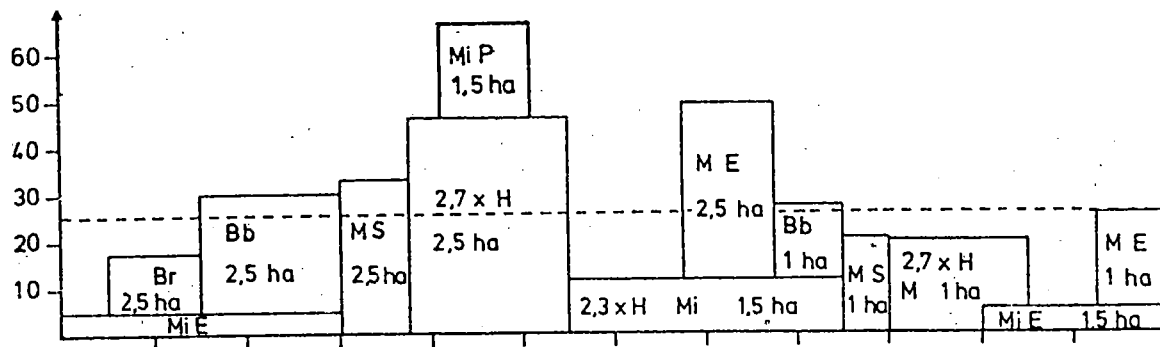
Farmers in the more intensive permanent systems have to invest more labour in weed control. On average, weeding of the major crops is carried out one more time compared to the semi-permanent systems. For maize, cassava and beans, a significant positive correlation exists between the frequency of weeding and the number of years the fields have been under permanent cultivation, the correlation coefficients (at $p = 5\%$) being +0.46, +0.31, and +0.35, respectively.

The higher input for weeding is furthermore reflected in the farmer's expenditures for casual labour, increasing from DM 84.- in semi-permanent to DM 140.- in permanent farming (Tble. 1).

Looking at the labour demand in the course of a year, the peak period in both groups occurs at the beginning of the long rainy season during weeding time, from late April to early June (Fig. 1). A second labour intensive period is in August at the

Mandays/
Month

Permanent Systems



LEGEND:

R: Land clearing

Br: Burning

Bb: Soil tillage

M: Maize

Mi: Cassava

S: Drilling

P: Planting

H: Weeding

E: Harvest

--- labour capacity
of the farm

Semi-permanent Systems

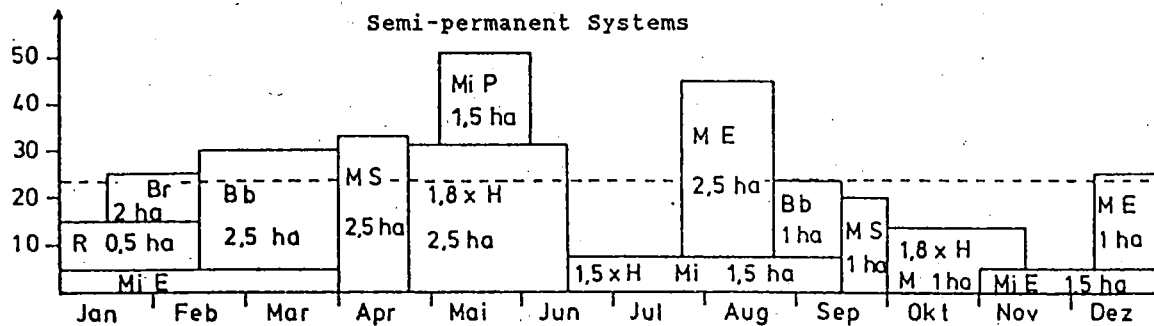


Fig.1: Labour requirement for the cultivation of maize/cassava intercrop (1.5 ha) and maize (1 ha/rainy season) in semi-permanent and permanent farming systems in the Coastal Province of Togo.

time of maize harvest. However, this second period seems to be less crucial since, traditionally, the whole family help in harvesting and the school children are on vacation as well. The less demanding period of late June and July is used by some farmers to plant early maturing crops such as beans or tomatoes in between the maturing maize (relay cropping). In the short rainy season the cassava from the first season still remains in the fields and only a small additional area of maize is planted. Hence the labour requirement is much less.

The more marked labour peak in permanent farming explains the increased expenses for labour in these systems (Fig. 1 and Tble. 1). On the one hand, less labour is required during land preparation because clearing of fallow vegetation is not necessary. On the other hand, this is more than compensated for by the increased labour demand during the time of weeding, bearing in mind that the labour input shifts from a period of low demand to the peak labour period.

4 DISCUSSION

The significance of the weed flora in the surveyed farming systems is clearly expressed in the relatively high input of capital and labour. Ruthenberg (1980), analysing various tropical farming systems, states that once the stage of shifting cultivation has been passed and the land is cultivated more intensively, the labour requirement for weeding will increase continuously and, together with harvesting, will be one of the most time consuming endeavours of small scale farmers. Quite often, labour peaks arise as a result, since these tasks have to be carried out within a certain timeframe (Fig. 1).

Whereas the surveyed farmers under the conditions of Southern Togo are coping with the maize harvest by using family labour, their own labour force is usually insufficient to carry out the different field operations at the beginning of the rains, especially weed control. With no alternative and labour saving weed control method being available, farmers are forced to either employ casual labour or to weed late and get off with yield reductions. This explains the high proportion of expenses for weed control on the overall production costs, 41 % and 55 % in semi-permanent and permanent farming, respectively.

GÖRGEN (1984) in a detailed economic analysis of a farm in the Northwest of the province, also found the labour expenses for soil tillage and weeding to be the most expensive operations. He further states that the labour productivity in the farm is about equal to the cost of casual labour. Hence, the hiring of labour is not only restricted by the liquidity of the farmer but is also hardly cost-effective. GÖRGEN concludes that the labour force available during these peak periods is the most constraining factor for the hectare cultivated by the farmer. Similar conditions are reported from the Central Province of Togo (MIDHOE 1982 and ZHRER 1978) as well as from other West African countries (HERNANDEZ 1987; MERLIER & DEAT 1978; OLUNUGA & AKOBUNDU 1978).

Under the conditions of Southern Togo, the transition from semi-permanent to permanent cultivation - as it is happening in a lot of developing countries with a high population growth rate - aggravates considerably the described situation. The longer the period of permanent cultivation the higher the weed infestation in the fields, necessitating more frequent weeding (Tble. 1). Furthermore, each weeding operation becomes more difficult and time consuming because weeds tend to be more adapted to the system under permanent cultivation. These changes are reflected quantitatively in the increased labour demand and the increasing monetary input for weed control in respective farms (Fig. 1, Tble. 1). The farmers in the less densely populated Northwest have more land at their disposal, and therefore are able to cope with increased weed pressure by leaving them fallow for some years. Because of the land shortage in the Southeast of the province, farmers cannot afford to leave their fields fallow. Thus expenditure for weeding increases in permanent as compared to semi-permanent farming by 67 % and reach DM 140.-per hectare. Weed control therefore becomes the highest cost factor in arable production being 55 % of the overall costs.

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