Alley Farming in the Humid and Subhumid Tropics

Proceedings of an international workshop held at Ibadan, Nigeria, 10–14 March 1986
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Alley Farming in the Humid and Subhumid Tropics

Proceedings of an international workshop held at Ibadan, Nigeria, 10–14 March 1986

Editors: B.T. Kang and L. Reynolds

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Abstract / Résumé / Resumen

Abstract — An urgent challenge facing scientists working on upland food-crop production in many parts of the humid and subhumid tropics is the need to find viable, sustainable, and environmentally sound alternatives to the ancient shifting cultivation and bush-fallow, slash-and-burn cultivation systems. As a food-cropping and livestock-production technology, alley farming requires a low level of inputs and helps conserve soil resources while sustaining long-term farm productivity. This publication presents the results of an international workshop on alley farming in the humid and subhumid tropics. Held in Ibadan, Nigeria, 10–14 March 1986, the workshop was attended by 100 participants from 21 countries. The theme of this workshop was the development of more productive, sustainable farming methods with low inputs in the humid and subhumid tropics using alley farming techniques. This book reviews the present state of alley farming research and its application, discusses the use of woody species in tropical farming systems, highlights training and research needs, and proposes the establishment of channels for collaborative research.

Résumé — Les scientifiques s'intéressant aux cultures vivrières en zones d'altitude dans de nombreuses régions des tropiques humides et sub-humides doivent répondre à un besoin urgent : trouver des solutions de rechange viables, soutenables et environnementalement saines aux anciennes méthodes de rotation des cultures et mise en jachère et de culture sur brûlis. A titre de technique de culture et d'élevage, l'agriculture en couloirs ne nécessite que peu d'intrants et contribue à conserver les sols, tout en favorisant la productivité agricole à long terme. Cette publication présente les résultats d'un atelier international sur l'agriculture en couloirs dans les tropiques humides et sub-humides qui s’est tenu à Ibadan, au Nigéria, du 10 au 14 mars 1986 et qui a réuni 100 participants de 21 pays. L'atelier portait sur la mise au point de méthodes culturales plus productives et plus durables ne nécessitant que peu d'intrants pour les régions des tropiques humides et sub-humides, grâce aux techniques de l'agriculture en couloirs. Le livre fait le point sur la recherche actuelle en matière d'agriculture en couloirs et ses applications, discute de l'utilisation des arbres dans les systèmes agricoles en milieu tropical, met en lumière les besoins en matière de formation et de recherche et propose l'établissement de canaux aux fins de la recherche en collaboration.

Resumen — Un reto urgente al que se enfrentan los científicos que realizan investigaciones sobre la explotación de cultivos de montaña en muchas zonas húmedas y subhúmedas de los trópicos, es la necesidad de encontrar alternativas viables, sustentables y correctas desde el punto de vista del medio ambiente, al antiguo método de cultivos migratorios y a los sistemas de cultivo en barbecho y de corte y quema. Como tecnología utilizada para cultivos alimentarios y la producción ganadera, la agricultura de pasillo o entresurcos necesita pocos medios y ayuda a conservar los recursos del suelo en tanto mantiene la productividad agrícola a largo plazo. Esta publicación presenta los resultados de un grupo de trabajo internacional sobre agricultura de pasillo o entresurco en las zonas húmedas y subhúmedas de los trópicos, celebrado en Ibadán, Nigeria, del 10 al 14 de marzo de 1986, y al que asistieron 100 participantes de 21 países. El tema de este grupo de trabajo fue el desarrollo de métodos de cultivo más productivos y sostenidos con pocos recursos en las zonas húmedas y subhúmedas de los trópicos, utilizando técnicas de agricultura de pasillo o entresurco. Este libro revisa la situación actual de la investigación sobre la agricultura de pasillo o de entresurco y su aplicación, discute el uso de especies maderables en sistemas de cultivo tropicales, subraya la necesidad de realizar investigaciones y dar cursos de capacitación y propone la creación de canales para la investigación conjunta.
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Adoption of alley cropping in the Province of Atlantique, Benin

T.P. Akonde, B. Lame, and E. Kummerer

Centre of Regional Action for Rural Development, Cotonou, Benin

Abstract — Alley cropping has been tested and adopted by the Centre of Regional Action for Rural Development (CARDER-Atlantique) in Benin. Results of experiments carried out over 2 years have shown that a farmer using this technique can increase maize yield by 35–52% in the main season and by more than 50% in the minor season. The prospect is good for extending this technique to farmers in the Atlantique Province of Benin.

Introduction

The Centre of Regional Action for Rural Development (CARDER-Atlantique) is a national and regional development institution whose research objective is to examine the adoption possibilities of potential cropping patterns developed by international and national research institutes. Its main aim is to promote agricultural development through innovations that will overcome the obstacles to agricultural improvement in the Province of Atlantique in the southeastern region of Benin.

Rainfall in Atlantique varies between 800 and 1200 mm/year. The population density is about 350 people/km². The subsequent intensive land use has caused a rapid deterioration of the soil structure, a decrease in fertility, and a reduction in the fallow period. Because Atlantique Province is located on the coast, it has been subjected to rapid urbanization, gradually reducing the amount of arable land.

The CARDER-Atlantique project is trying to achieve food self-sufficiency through research and utilization of alley cropping systems, systems that will allow intensive land use with minimal inputs as a substitute to natural fallow. The project has adopted the alley cropping system developed at the International Institute of Tropical Agriculture. The following woody species were used in the trials: Leucaena leucocephala, Gliricidia sepium, and Cajanus cajan.

Results

Adaptation tests of various species and varieties are being carried out in the Support Research Farm at Abomey-Calavi (20 km from Cotonou) and in some farmer-managed fields. The maize cultivar EV 74835R was used for the trials,
Table 1. Mean maize yields (kg/ha) from alley cropping trials, main crop.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Maize grain yield</th>
<th>Relative yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2685</td>
<td>100</td>
</tr>
<tr>
<td><em>Leucaena</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One mulching</td>
<td>3840</td>
<td>143</td>
</tr>
<tr>
<td>Two mulchings</td>
<td>4076</td>
<td>152</td>
</tr>
<tr>
<td><em>Gliricidia</em>, two</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mulchings</td>
<td>3840</td>
<td>143</td>
</tr>
<tr>
<td><em>Cajanus</em>, two</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mulchings</td>
<td>3625</td>
<td>135</td>
</tr>
</tbody>
</table>

Table 2. Mean maize yields (kg/ha) from alley cropping trials, minor season.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Maize cob yield</th>
<th>Relative yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1018</td>
<td>100</td>
</tr>
<tr>
<td><em>Leucaena</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One mulching</td>
<td>1812</td>
<td>177</td>
</tr>
<tr>
<td>Two mulchings</td>
<td>1747</td>
<td>172</td>
</tr>
<tr>
<td><em>Gliricidia–Cajanus</em>, one</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mulching</td>
<td>1542</td>
<td>151</td>
</tr>
</tbody>
</table>

which were conducted in the main cropping season, from April to July. Results of trials over a 2-year period show an increase of 35–52% in comparison with the check (Table 1). Results from the 2nd season (September–December) using NH (a composite maize strain) show an increase in yield of about 50% (Table 2).

Results of observation trials on the growth of various woody leguminous species and varieties also showed large differences in early growth. In 1 year, *Leucaena leucocephala* mean plant heights ranged from 2.3 to 3.8 m. *Acacia auriculiformia* reached a mean plant height of 2.32 m. *Gliricidia sepium* established from cuttings reached a mean height of 1.96 m; from direct seeding, the mean height was only 0.76 m.

Conclusion

The extension of the alley cropping system as an alternative to natural fallow can be carried out in the Province of Atlantique, Benin.