

The Importance and Impact of Biogas Production in Organic Farming Systems in China: The Case of the “China Man Village / District of Beijing”

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Biomass Energy Farming and Sustainable Farming are two strings of future agriculture which take increasing attention all over the world. Multi-functional and social, ecological and economical sustainable farming is the reason for this attention. In Germany enormous efforts are made to increase Organic Farming and Renewable Energy. In China the ecological impact of the intensive agriculture (high input — high output) is enormous and endangers the natural resources and last but not least the national food safety and security in the future. On the other hand the fast growing economy and particularly the industry has increasing demand for energy. Energy Farming is considered as an option to take part of the economic growth. The Government of China has launched political programmes to develop more environmentally sound agriculture and to utilise biomass farm resources for the industrial development.

That these demands and expectations for future farming are not a contradiction, the scientific challenge is to develop sustainable farming systems which can fulfill national food security, food safety and considerable renewable energy production without harming the environment, is economic and socially accepted. Biogas production in ecological farming systems is considered as an option to merge environmentally sound food and energy production.

The present paper deals with energy input-output analyses of China Man Agroecosystem and estimate of impact on the village agroecosystem by inducing biogas production. In 2004, output-input energy ratios of planting subsystem and animal husbandry subsystem were 2.0 and 0.5 respectively. Input biological energy subsidies of planting subsystem are very low, only 34.4GJ/hectare, which affect amount of total output energy. 4581GJ straws and 3377GJ dung are directly fertilized into planting subsystem without compost or anaerobic fermentation, which are not utilized available by crops. The estimate result showed, firstly, energy value of straws and dung will be utilized by biogas fermentation to fulfil part living energy consumption of villagers. Secondly, biogas slurry with higher mineral nitrogen (ammonia) content used to fertilize crops can gain a higher yield. The ecological farming production system will be optimized environmentally and friendly by inducing biogas production.

Keywords: Biogas, China, energy flow, organic farming

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Tropentag 2005

International Research on Food Security, Natural
Resource Management and Rural Development

**The Global Food & Product Chain –
Dynamics, Innovations, Conflicts,
Strategies**

Book of Abstracts

Editors:

Eric Tielkes, Christian Hülsebusch, Inga Häuser,
Andreas Deininger, Klaus Becker

University of Hohenheim, Stuttgart
October 11-13, 2005

Impressum

Die Deutsche Bibliothek — Cataloguing in Publication-Data (CIP)

The Global Food & Product Chain — Dynamics, Innovations, Conflicts, Strategies:
international research on food security, natural resource management and rural
development; book of abstracts / Tropentag 2005 Stuttgart-Hohenheim.

Hrsg.: Eric Tielkes, Christian Hülsebusch, Inga Häuser, Andreas Deininger, Klaus
Becker

ISBN: 3-00-017063-4

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Subtropics, Stuttgart, Germany

Editors:

Eric Tielkes, Christian Hülsebusch, Inga Häuser, Andreas Deininger, Klaus Becker

Online-Versions:

Print-Version, pdf: <http://www.proceedings2005.tropentag.de>

Web-Version, HTML: <http://www.abstracts2005.tropentag.de>

Layout:

Eric Tielkes, Inga Häuser, Andreas Deininger

Typesetting:

L^AT_EX 2_ε

Printed by:

MDD Media Digitaldruck Copy Shop Büromaschinen GmbH

Wollgrasweg 27

70599 Stuttgart

September 2005

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Preface

The Tropentag is the International Conference on Research for Development in Agriculture and Forestry, Food and Natural Resource Management - an annual event alternately organised by the Universities of Berlin (Humboldt), Bonn, Göttingen, Kassel (Witzenhausen) and Hohenheim in co-operation with the Council for Tropical and Subtropical Agricultural Research (ATSAF), the GTZ Advisory Service on Agricultural Research for Development (BEAF) and the German Forum on Research for Development (DFOR).

The Tropentag 2005 is the seventh annual meeting providing a forum for scientists, experts and students involved in research for development. The Tropentag 2005 conference theme is The Global Food & Product Chain - Dynamics, Innovations, Conflicts, Strategies.

Sustainable use and conservation of natural resources are priorities of the international community. Land, freshwater, energy, and biodiversity in natural and agricultural ecosystems are resources increasingly at stake. With view to the growing world population, the supply with agricultural commodities and food, food security, -quality and -safety must be achieved through an ever more efficient use of resources rather than through extending resource use. Achieving the United Nations Millennium Goals requires a considerable rise in overall food production, in which many international stakeholders take an interest. This leads to a global use of local resources, with global actors increasingly dominating the competition for access to these resources. The globalisation of food markets and the regulation of production through certification as means of consumer and market protection favours food industries rather than smallholder agriculture. With increasing globalisation, local food chains are articulated into a global food web, in which large scale agriculture serves the world market whereas smallholder agriculture rather serves domestic demands. In this context, not only industrialised agricultural production but also post harvest and food processing industries gain importance. A multitude of new issues arise in the field of resource definition, allocation, and use.

The Tropentag 2005 addresses the dynamics of the above processes, conflicts arising there from, strategies to overcome these conflicts and contribute to attaining food security and food safety and innovations that could form part of these strategies.