



Deutscher Tropentag - Bonn, 9-11 October 2001
Conference on International Agricultural Research for
Development

Livelihood, Gender and Sustainability: Farmer's Strategies in East-Africa

Anja Blume

University of Oldenburg, Department of Geography, D-26111 Oldenburg, Germany;
e-mail: blumeanja@hotmail.com

Abstract

This study as part of an ongoing research project focuses on sustainable livelihood strategies of successful farmers as well as the potential and problems of project approaches and activities in two project areas in Tanzania and one in Kenya, paying special attention to gender aspects. A multimethod approach has been applied with main focus on participant observation. The data analysis not only reveals the stabilisation and improvement of ecological and economic conditions through the variety of measures implemented, but also the importance of indigenous knowledge within this context, e.g. with regard to traditional medicine. Furthermore, successful female and male farmers have a clear positive effect on their socio-cultural environment as knowledge carriers and multipliers. Since they function as important mediators between projects and people, especially marginal groups like poor farmers and female-headed households, an enhanced integration of these farmers in projects will directly support sustainability and thus success of project activities with positive effects going beyond the local level.

Introduction

Regarding the serious loss of natural resources world wide through rapidly increasing, man-induced processes of destruction and degradation, action is urgently needed. The assessment and analysis of farmer's livelihood strategies in the so-called 'developing countries' is a prerequisite for the enhancement and sustainable success of project interventions within the context of natural resource management. Only by knowing e.g. the indigenous potential and adoption rates of project inputs in a respective project area appropriate strategies and measures on a long-term basis can be developed, with far-reaching positive ecological, economic, socio-cultural and political effects.

Objectives, methods and materials

The research project aims to assess, analyse and illustrate the diverse farmer's strategies and activities within the context of natural resources management and related aspects by means of a comparative analysis of 18 successful, partly female-headed small-scale farms in two project areas in Tanzania (Arusha District; Shinyanga/Kahama Districts) and one in Kenya (Machakos District) through applying a multimethod approach. Interactions between the diverse activities and their effects on the families' socio-economic and social environment as well as on the ecological conditions are elucidated under special consideration of gender aspects. Different indicators regarded as playing a key role within the context of success (→ sustainability) have been identified and a matrix has been developed to which all farms have been assigned (see Blume 2000).

The research comprises a combined analysis across the local, regional and international level, carefully considering socio-cultural, economic, ecological and political aspects as well as interlinkages between these aspects (see **Fig. 1**; see also Blume 2000).

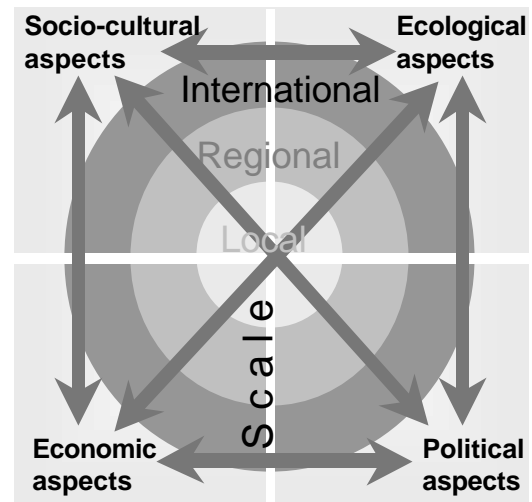


Fig. 1: Aspects and levels of analysis

Data have been collected during a stay of 4 - 7 days on each farm by means of participant observation. The farm stays have been supplemented by participation in women's/mixed group meetings, farm visits and informal discussions with farmers, participation in training, field days, etc. as well as interviews with experts and project staff from different organisations and institutions.

The approach of **participant observation** (see also **Fig. 2** and **3**) has been chosen since this method allows to create a communicative situation as natural as possible so that real processes of interaction can be assessed in its natural context (Friedrichs & Lüdtké 1973; Fischer 1981; Lamnek 1995). This approach implies further advantages like assessment of detailed, specific and reliable information and data, possibility of back-checking (clarification of unclear aspects and deepening of understanding), direct confrontation with daily constraints, potentials, etc. and *'learning by doing'*. Saving farmer's precious time and interaction between researcher and participants as equal partners, are important aspects as well (Rocheleau et al. 1988; Denzin & Lincoln 1994; Augustat 1994; Bortz & Döring 1995; Silverman 2000).



Fig. 2: Participant observation implies a close interaction between participants and researcher and intends to contribute to mutual understanding

The decision of working with rural households derives from the fact that we can only detect indigenous conservation techniques to understand mechanisms of adaptation, adoption and rejection of project measures if we go down to the level of implementation: the farm unit (see also Barrow 1996: 189-190). Within the study, the main focus has been directed to successful *female* farm-managers to find out their part within the above named context of the implementation of (farm) technologies, keeping in mind that women have to carry the main burden when it comes down to subsistence production and family duties (see e.g. Kinuthia 1993; Blume 1998; see also **Fig. 4**). The inclusion of female-managed farms allows to investigate potentials for as well as negative repercussions on the families through male migration in the face of the fact that the number of female-headed households is increasing rapidly in the so-called 'developing countries'; this fact often implies that the families are left behind without receiving any financial remittances or even being completely abandoned.

The aspect that all women are at least members of women's/mixed groups has been integrated to have a closer look at 'women solidarity networks' and the so-called 'trickle-down' effects of the women respectively the groups, also with regard to critics found in some literature, e.g. that "members of women's groups tend to belong to a higher resource echelon, meaning that the poorest farmers are not necessarily being reached" (WILLIAMS 1996: 8) or "[...] that group activities tend to suffer from inherent weaknesses such as moral hazard problems of free riding and the capture of benefits by an elite within the group" (MELICEK 1998: 86).

Research findings

Farmer's and group strategies, measures and activities are manifold: physical and biological measures, techniques of sustainable water and energy management, knowledge dissemination, off-farm activities, etc. In the following, a short overview of the main aspects will be given.

Farmer's and group strategies are location specific (see also Dharmawan & Manig 2000. 2): accordingly, individual and joint activities are reflecting the different socio-cultural, economic and ecological conditions and their interlinkages on the various scales (farm, community, area/region, country) as well as individual/communal prefer-



Fig. 3: Participant observation means living together with the people and participating in daily activities



Fig. 4: Women and children doing field work in Kahama district, Tanzania.

ences and interests like, for instance, special patterns of land-use systems amongst the Sukuma in Shinyanga District, Tanzania (see Blume 2001). On the other hand, patterns of differences and correspondences as well as interconnections can be identified along specific factors and indicators.

Different types of **physical soil and water conservation measures** have been observed on the farms (see **Tab. 1**). Types and extent of measures do not only vary due to e.g. relief (inclination), natural potential or project influence, but also due to labour/time intensity, financial aspects, etc. since all earthwork structures require maintenance.

*Contour tillage*¹ is carried out on all farms situated on sloping ground. Six types of *microcatchments* have been observed: *contour furrows and ridges*, *enclosure bunds* (partly for water harvesting on rice fields), *tied ridges* (especially in Shinyanga/Kahama Districts), *raised beds* - a traditional land-use practice of the Sukuma (see **Fig. 5**), *holes/micro basins*, and *circular bunds*.



Fig. 5: Raised bed cultivation on a farm in Kahama District, Western Tanzania

Furthermore, five types of large conservation structures can be distinguished: *infiltration ditches*, *contour bunds*, *fanya juu terraces* (see **Fig. 6**)², *cut-off drains* and *(level) bench terraces*. Some measures have been implemented only within one project area due to project approaches, local practices and colonial interventions like forced terracing (see e.g. Rocheleau et al. 1988: 124).



Fig. 6: Level bench terraces with contour furrows on a farm in Machakos District, Kenya

The most common physical soil and water conservation measures are *retention/infiltration ditches*, *contour tillage* and *contour furrows/ridges*, followed by *holes/micro basins*, *raised beds* and *tied ridges*. **Tab. 1** indicates that the highest variety of conservation measures is being found on the farms with an inclination above 4 % among which farms 1K-h and 2K-h show the highest variety of measures. On farm 1T-h the repertoire

¹ Studies show that minimum/no-tillage systems, combined with mulching, crop rotation, intercropping methods, green manuring and the use of special herbicides (controlling of weeds gets more problematic) are the most appropriate techniques for a sustainable management of soils (GEO 2000: 199-202).

² *Fanya-juu* (Kisw. = 'make above'); terraces are constructed by throwing the soil excavated from a ditch uphill.

concerning physical activities is low related to inclination; however, the family keeps a high density of plant cover on the fields.

Concerning **biological measures** **Tab. 1** shows that on all farms where *contour cultivation* - an easy and cost/labour saving biological conservation technique - is carried out (all farms on sloping ground), three different types of *contour strips* have been implemented (*contour vegetation strips* - consisting of a big variety of different woody perennials, crops and grasses, *contour grass strips* - naturally growing, *trash lines* - mainly out of maize stalks). Another practice found is *planting along/in waterlines* (crops and/or grasses and/or trees along/in rivers, channels, ditches).

Raised bed cultivation is the traditional land use technique of the Sukuma in Shinyanga/Kahama Districts, Tanzania; here, wide areas are dominated by this cropping pattern with high variations of crop mixtures (Blume 2001).

Most common measures mainly for soil fertility improvement/maintenance are *crop rotation*, use of *farm yard manure*, *mulching* with crop residues and/or leaves and *composting*; other practices found are *green manuring* and the application of *liquid manure*. Furthermore, a big variety of *mixed/intercropping* patterns and species combinations (crops) has been observed (see **Tab. 1**).

All Kenyan farmers as well as farmer 1T-1 have established *natural forests/woodlots* on their farm lands. *Natural tree regeneration* is practised on ten farms with a higher portion on farms in the low potential areas (see also Blume 2001). 'Bush' *fallow* has been observed on three Kenyan farms, only one farmer has established a *rotational woodlot*. The highest variety of tree species and tree density has been found on farm 4T-h. With regard to the spatial arrangement of trees the analysis shows that trees/shrubs are planted along *farm/field boundaries*, *scattered on farmland* or *on soil conservation structures*. *Multistorey cropping* is a practice mainly found in the high potential areas; *alley/hedgerow intercropping* is less common.

Medicine (for humans and livestock) is one of the most important use aspects of *indigenous trees/shrubs* besides firewood (see **Fig. 8** and **Fig. 7**); the main use of *exotic trees and shrubs* is *fruits*. Further use aspects are shade, fodder, ornamental, fruits, timber, live-fence, mulch, nitrogen-fixing, prevention of soil erosion and handicraft. Almost all species are used for more than one service or production function.



Fig. 7: Woman in Kahama District, Tanzania pounding the bark of *Ficus sycomorus* to produce a decoction for the treatment of stomach problems of a sick cow

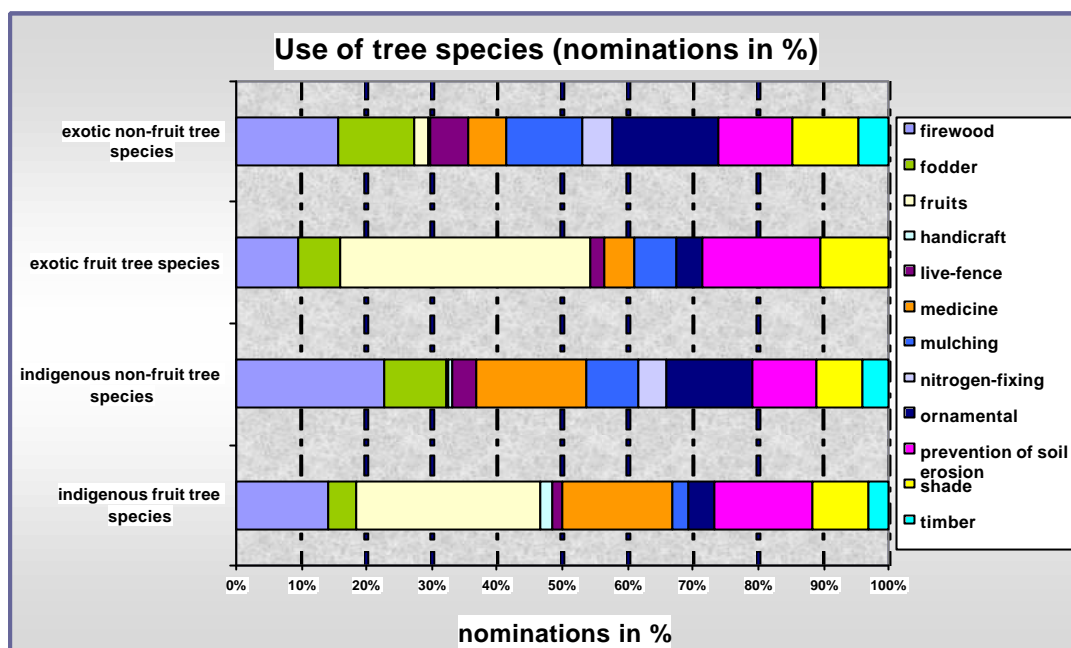


Fig. 8: Use of tree species (nominations in %)

Within the context of sustainable **animal husbandry** *zero-grazing* has been introduced as an environmental sound practice, although implying additional work (caring for fodder, water, cleaning stable). Out of the farmers who keep livestock six farmers practise *zero-grazing* exclusively, five farmers partly, and four farmers only practise *free-grazing*. All of these farmers except three farmers in Shinyanga/Kahama district have implemented *grass/herb fodder banks*, nine farmers have implemented *tree fodder banks* (see **Tab. 1**).

Especially in the low potential areas water is one of the most restricting factors for a sustainable land use. **Tab. 1** shows that all Kenyan farmers except one Kenyan farmer and two Tanzanian farmers have constructed a **water tank**. Nine families suffer from water shortages, especially during the dry season (although five farmers have established a water tank).

Sustainable energy management through improved cooking stoves forms an important element within a sustainable use of natural resources. Furthermore, *energy-saving stoves* help to reduce smoke, a source for serious respiratory diseases especially amongst women and children (see **Fig. 9**). Eight farmers dispose of an improved cooking stove for firewood, two farmers will have an improved cooking stove soon; two farmers only use an improved cooking stove for charcoal. There exists a correlation between the degree of independence from external wood resources (governmental forest, market) and the use of improved cooking stoves: the eight Tanzanian farmers who (additionally) collect/buy firewood (3T-1, 1-3T-h, all farmers in Kahama/Shinyanga Districts except farmer 4T-1) use a traditional stove (three stones) (see **Tab. 1**).

The number of farmers engaged in **off-farm activities** and the amount of off-farm income is clearly higher in Kenya (see **Fig. 10**). Here, off-farm employment is an important source of family income shown by the fact that only one family depends on farm income exclusively (1K-1, retired) compared to six families in Tanzania. These farms, are female-headed and form the bottom income group (2T-1, 3T-1, 2T-h, 4T-1, 5T-h, 6T-

h) which supports the general statement in the literature that female-headed farms in the so-called 'developing countries' have a weak status regarding financial resources.

Income/year	Farmers and project areas																	
	Machakos (Kenya)						Arusha (Tanzania)						Shinyanga/Kahama (Tanzania)					
	1K-l	2K-l	3K-l	1K-h	2K-h*	3K-h*	1T-l*	2T-l	3T-l*	1T-h	2T-h*	3T-h	4T-l*	5T-l	6T-l	4T-h	5T-h*	6T-h*
Off-farm activities - she (except group) in Ksh**			96		60	60	36								8			
Off-farm activities - husband in Ksh**		180	120	180						42		60		24	30	80		
Farm activities in Ksh**	45	10	50	180	2	50	0.25	45	14	77	25	250	30	25	15	30	42	13
Total in Ksh**	45	190	266	360	62	110	38.5	45	14	119	25	310	30	49	48	110	42	13
Ranking	10	4	3	1	7	6	12	10	15	5	14	2	13	8	9	6	11	16

Legend:

K = Kenya; **T** = Tanzania; **l** = low potential area; **h** = high/mid potential area; * = female-headed household; ** Add three zeros. 80 Ksh = ~ 1 \$ (January 2000); = not on the resp. farm; = not in the resp. zone/country

Fig. 10: Income

Various **trickle-down effects** of the female farmers (as well as of males → family members, friends, neighbours, etc.) have been found: besides material, physical and financial aspects, they are important with regard to ideological aspects like knowledge dissemination (through generally talking to and teaching neighbours, friends, relatives, etc. and through engagement as trainers and teachers) as well as organisational, diplomatic and leadership qualities.

All the female farmers researched are engaged in **women solidarity networks** → women's groups which empowers them to participate in and become part of activities far beyond their own individual resources and capabilities; thereby, they acquire a certain degree of security. The groups are correlated with a communal spirit, giving strength concerning the expression of needs and increasing their position within the village, which again positively effects decision-making processes. Furthermore, the groups are a chance for the extension of personal knowledge for an easier management of everyday life (see also Fortmann & Rocheleau 1984: 269; Cernea 1991; Kinuthia 1993; Martin 1994; Wacker 1994; Augustat 1994; Barrow 1996). The groups are engaged in different activities amongst which *harambee* (Swahili for 'self-help'), tending tree nurseries, handicraft and horticulture are carried out most. The positive effects of the individual farmers can be transferred also to the groups: they are important multipliers, leading the way for innovations and empowerment movements.

Tab. 1: Measures related to a sustainable natural resources management implemented on the farms

<i>Districts/Project areas</i>	Machakos (K)						Arusha (T)						Shinyanga/Kahama (T)						
	Farmers	1K-1*	2K-1*	3K-1*	1K-h*	2K-h*	3K-h*	1T-1*	2T-1*	3T-1*	1T-h*	2T-h*	3T-h*	4T-1	5T-1	6T-1	4T-h	5T-h	6T-h
Physical measures																			
contour tillage (plough/hoe)	X	X	X	X	X	X	X	X		X	X	X							
contour furrows & ridges	X	X	X	X	X	X	X	X		X	X	X							
tied ridges				X		X					X		X		X	X	X	X	X
raised beds				X								X	X	X	X	X	X	X	X
holes / micro basins		X	X	X	X	X	X		X						X		X	X	X
circular bunds		X	X		X		X				X	X						X	
enclosure bunds					X		X	X									X	X	X
contour bunds							X	X		X	X	X							
(level) bench-terraces				X	X	X													
fanya-juu terraces	X	X	X	X	X														
infiltration / retention ditches	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X
cut-off drains	X	X	X	X	X														
Biological measures																			
contour cultivation	X	X	X	X	X	X	X	X		X	X	X							
contour grass strips			X		X		X												
contour vegetation strips	X	X	X	X	X	X	X	X		X	X	X							
cultivation along / in waterlines	X	X	X	X	X	X	X				X	X							
cultivation on raised beds				X								X	X	X	X	X	X	X	X
trash lines												X							
mulching	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
green manuring							X			X	X								
composting	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X
farm yard manuring	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
liquid manuring							X	X		X									
crop rotation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
mixed- / intercropping (crops)		X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X
trees scattered on farmland	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
trees on soil conserv. structures	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
trees on farm / field boundaries	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
hedgerow / alley cropping				X		X	X			X		X	X	X	X				
multistorey cropping	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
fallow	X				X	X													X
natural forest/woodlot	X	X	X	X	X	X	X												X
natural tree regeneration	X	X			X		X	X					X	X	X	X			X
Other measures																			
zero grazing / own grazing area			X	X	/	X	X	X		X	X	X	X	X	X	/	/	/	/
fodder bank – grasses & herbs	X	X	X	X	/	X	X	X	X	X	X	X			X	/	/	/	/
fodder bank – trees**				/			X	X		X	X	X	X	X	X	/	/	/	X
energy saving stoves (wood)		X	X	X	X	X	X	X					X		♦	♦			
energy saving stoves (charcoal)				X									X						
water harvesting (water tank)	X	X	X	X		X	X					X							

Legend:

K = Kenya; **T** = Tanzania; **l** = low potential area; **h** = high/mid potential area;
X = carried out on the farm; **X** = carried out partly/little on the farm; / = no livestock;
 * = inclination > 4 %; ** = *Leucaena ssp.*, *Gliricidia s.*, *Flemingia m.*, etc.; ♦ = ordered;
 □ = not on the resp. farm; □ = not in the resp. zone/country

Recommendations

Some of the main aspects which have to be taken into consideration and integrated into the projects' programs (or incorporated through working closely together with other projects) for a sustainable success of project activities are listed below:

- ◆ focus on indigenous trees and natural tree regeneration: exotic species should not displace and substitute indigenous species, but function as a valuable additional source and supplement to the existing indigenous potential of perennials.
- ◆ group and on-farm tree management/nurseries
- ◆ energy saving stoves for firewood and charcoal, especially in the Tanzanian projects
- ◆ water harvesting methods (especially water tanks), especially in the research area in Shinyanga/Kahama districts, Tanzania
- ◆ zero-grazing and fodder banks
- ◆ organic farming methods
- ◆ traditional food crops and vegetables
- ◆ gender issues in general
- ◆ education of especially girls/women
- ◆ credit situation
- ◆ marketing situation
- ◆ regular visits of farmers by project staff → follow-ups
- ◆ youth → young farmers
- ◆ women's/youth/mixed group performances on environmental issues
- ◆ environmental education and information centers
- ◆ open-minded/successful female farmers and groups
- ◆ close co-operation with other projects, organisations, institutions, etc.

Summary and conclusions

Concerning the methodical aspect the study reveals that qualitative field research based on participant observation is a positive approach for the collection of additional, complementary and specific data and information; moreover, this research method contributes to mutual understanding between researcher and participants as well as to intercultural exchange. On the project level the analysis shows that some aspects on the program as well as on the implementation level have to be revised or newly integrated. Furthermore, it has been elucidated that successful female farmers - besides the engagement in different ecologically sound measures with a positive implication on ecological aspects - have a decisive influence on their social environment and take over the position of knowledge carriers and multipliers. Consequently, successful farmers function as important mediators between projects and people, especially marginal groups like poor farmers and female-headed households.

These central factors have been identified also for the groups: they fulfil several benefits like contributing to ecological as well as economic and socio-cultural stability and enhancement, being stakeholders within the process of knowledge dissemination. The findings of this study support the quotation of Kinuthia (1993: 39) that „[...] [w]omen have the potential to change the nature and tempo of development, not only for their own welfare but also for the welfare of the community and society as a whole.”

Accordingly, it can be concluded that “[r]ural peasants’ and women’s organisations [are] the most effective means of securing poor rural people’s participation in both the planning and the benefits of rural development“ (Cecelski 1985: 67).

One of the most interesting and promising result of this study is the revelation of positive implications of ,open-minded‘ male farmers: through various activities like physical, financial and ideological support of their families, groups and their social environment in a whole, they improve and stabilise ecological, economic and socio-cultural conditions; moreover, they directly contribute to the empowerment of rural female farmers and thus to gender equality.

Addressing and involving both sexes in projects through appropriate concepts and their translation into action as well as strengthening the position of open-minded and engaged female and male farmers within projects through their integration into gender workshops, training on resource management, study tours, etc. will enhance the success of project strategies for a sustainable management of natural resources due to multiplier effects of contact and feedback. Simultaneously, this will result in a better quality of life of the target group as well as in the improvement and stabilisation of natural conditions, with far-reaching positive effects and implications even on the regional and global level: “Given equal access to opportunities and resources, women like men have proven to be efficient, dynamic and indispensable partners in development. Together, on the farm, and at all levels of society, women and men constitute a formidable partnership to achieve food security in the 21st century” (FAO 1996).

Acknowledgements

Special thanks are dedicated to the *Friedrich-Ebert-Foundation*, who provides the financial basis for this project.

References

- Augustat K 1994 Frauen und Bodenerosion. Eine entwicklungsethnologische Fallstudie in den West-Usambara-Bergen, Tanzania. Breitenbach, Saarbrücken.
- Barrow E G C 1996 The drylands of Africa. Local participation in tree management. Initiatives Publishers, Nairobi.
- Blume A 1998 Frauen und Agroforstwirtschaft. Untersuchungen verschiedener Projekte in Tanzania. Der Tropenlandwirt. Beiheft 64. Selbstverlag der Tropenlandwirte Witzenhausen, Witzenhausen.
- Blume A 2000 Practices, problems and potentials of a sustainable management of natural resources in Kenya and Tanzania: A gender approach. Comparative analysis of twelve smallholder farms. Oldenburger Geoökologisches Kolloquium 8. Hochschulmanuskript, University of Oldenburg.
- Blume A 2001 (in print) Successful farmer’s strategies and success indicators. A case study in Shinyanga and Kahama districts, Tanzania. Oldenburger Geoökologisches Kolloquium 10. Hochschulmanuskript, University of Oldenburg.
- Bortz J, Döring N 1995 Forschungsmethoden und Evaluation. 2. vollst. überarb. und aktual. Aufl. Springer Verlag, Berlin, Heidelberg, New York.

- Cecelski E 1985 The rural energy crisis, women's work and basic needs: Perspectives and approaches to action. Technical Cooperation Report. ILO, Genf.
- Cernea M M 1991 The social actors of participatory afforestation strategies. *In* People first. Sociological variables in rural development. M M Cernea. pp 340-393. World Bank, Washington.
- Denzin N K & Y S Lincoln 1994 Part III. Strategies of inquiry. *In* Handbook of qualitative research. Eds. N K Denzin, Y S Lincoln. pp 199-219. Sage, London, New Delhi.
- Dharmawan A H, Manig W 2000 Livelihood strategies and rural changes in Indonesia: studies on small farm communities. *In* Deutscher Tropentag 2000. International Agricultural Research: A contribution to Crisis Prevention. Ed. Universität Hohenheim. pp. 1-10. University of Hohenheim, Stuttgart.
- FAO 1996 Gender and food security. Food and Agriculture Organization of the United Nations. Internet (<http://www.fao.org/Gender/gender.htm>).
- Fischer H 1981 Zur Theorie der Feldforschung. *In* Grundfragen der Ethnologie. Schmied W, Kowarzik A, Stagl J. pp. 63-78. Reimer, Berlin.
- Fortmann L, Rocheleau D 1984 Why agroforestry needs women: Four myths and a case study. *Unasylva* 36, 2-11.
- Friedrichs J, Lüdtkke H 1973 Teilnehmende Beobachtung. Einführung in die sozialwissenschaftliche Feldforschung. 2. überarbeitete und erweiterte Auflage. Beltz, Weinheim, Basel.
- GEO 2000 Der Kampf um die kostbare Krume. *In* GEO 10, 199-202.
- Kinuthia C 1993 Women groups in Kenya with special reference to housing and community development. *In* The women's movement in Kenya. Eds. S A Khasiani, E I Njiro. pp 39-58. Association of African Women for Research and Development (AAWORD). High-Tech Computer Applics Agencies, Nairobi.
- Lamnek S 1995 Qualitative Sozialforschung. Band 1. Methodologie. 3., korrigierte Auflage. Beltz, PsychologieVerlagsUnion, Weinheim.
- Melicek H 1999 Decentralization and sustainable rural development. *In* Göttinger Beiträge zur Land- und Forstwirtschaft in den Tropen und Subtropen, 133, 84-89. Erich Goltze, Göttingen.
- Martin G 1994 Women, environment and sustainable development. Discussion booklet: Five ILO case studies. ILO, Rom.
- Rocheleau D E, Weber F, Field-Juma A 1988 Agroforestry in dyland Africa. ICRAF, Nairobi.
- Silverman D 2000 Doing qualitative research. A practical handbook. Sage, London.
- Wacker C 1994 Sustainable development through women's groups: A cultural approach to sustainable development. *In* Feminist perspectives on sustainable development Ed. W Hartcourt. pp. 128-142. Zed Books, London.
- Williams E D 1996 Gender and soil fertility decisions. Initial report. ICRAF, Maseno.