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Enset (*Ensete ventricosum* (Welw.) Cheesm.) in subsistence farming systems in Ethiopia

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Abstract

Enset is cultivated as a food crop only in southern and southwestern Ethiopia though growing wild widely distributed in Africa. It is a multipurpose crop and provides also forage, construction material, fuel and traditional medicine amongst others. Moreover, enset cultivation improves soil by permanent soil tillage due to its high demands to soil fertility and soil structure. Enset is not a monoculture, but rather includes cereals, pulses, vegetables, fruit trees and animal husbandry. Climate and cultivation system both have a strong impact on enset cultivation in each particular region. However, regarding traditions connected to enset, enset has a strong impact on the cultivation system and the everyday life of the people. Therefore, often it is referred to as "enset culture".

Background and justification

Enset (Ensete ventricosum, family. Musaceae) is widely distributed in eastern and southern Africa but cultivated only in southern and southwestern Ethiopia as staple food for about 15 million people in mixed subsistence farming systems. Cultivation is practised by different ethnic groups (Tab. 1-3). The main product is starch extracted from the underneath corm and the leaf sheaths. Moreover, all parts of the plant are used in household, agriculture and traditional medicine. Numerous landraces are grown for different uses and site requirements. Propagation is done vegetatively. It is cultivated in areas extending from 1700 to 3300 meter altitude with annual average temperatures between 8°C and 22°C and annual precipitation between 900 and 1500 mm. Dry periods lasts from 3 to 8 months (AMBORN 1991, BRANDT *et al.* 1997, SCHULTE-KEMNA 1983, WESTPHAL 1975, KEFALE *et* SANDFORD 1991).

Objective

The aim of this study is to elucidate interactions within a single farm and within farming systems, and to compare different systems.

Material and methods

Farming systems in 10 Regions in southwestern Ethiopia are compared with regard to enset cultivation, arable crops, horticultural crops, animal husbandry and climate. These regions are located in the enset growing region in southern and southwestern Ethiopia, east and west of the

Rift Valley, namely Alaba, Gardula, Gedeo, Gurage, Hadiya, Kambatta, Sidamo, Sura, Tambaro, Welaita and Wenchi. At least 10 farms were visited in each region and farmer were interviewed about their enset cultivation. In Wenchi farmer were interviewed during a demonstration of enset farming at three farms. Farmers were questioned for the crops they were growing and the importance of enset within their plantation with special reference to the landraces of enset. A short description of each farm was made including the sex of the interviewed person, family size (if possible), size of total farm and enset plantation, diversity of cultivated crops, soil type and current weather conditions (ZIPPEL *et* KEFALE 1995).

Fig. 1: enset pulp prepared for fermentation

Fig. 2: boiled corm ready for consumption

Fig. 3: enset used as animal fodder

Fig. 5: enset leaves and leaf sheaths used for construction

Results

Enset cultivation and processing requires very high seasonal labour input (Fig. 9-11, Tab. 3). In each region very specific techniques in enset cultivation were developed but others were found in all regions (Fig. 12 and 13, Tab. 1-3). The Rift-Valley separates two large enset cultivation types which differ by certain cultivation techniques, transplanting and thinning, respectively, and tools used for cultivation and processing. Gardula represents a third system of several enset cultivating ethnics in south-western Ethiopia which are less specialised but highly diversified than the described systems.

Fig. 6: enset provides labour, i.e. processing food

Fig. 7: fermented enset starch for sale at a local market in Chencha, southwestern Ethiopia

Only slight differences are observed in the diverse use of enset (Fig. 1-7, Tab. 2), and seem to correspond to the introduction of enset cultivation to each particular ethnic group. Few landraces were found in all regions, some in a very limited area and most landraces in a wider area with slow export to neighbouring regions (Fig. 8). A mixture of different cereals, pulses, vegetables and fruits is cultivated according to the climatic conditions, some of them within the enset plantation (Fig. 14, Tab. 1). Animals are kept to provide manure (Fig. 2 and 11, Tab.

Fig. 12: plantations consist of plants of different ages

Fig. 14: enset cultivation systems include agricultural and horticultural crops as well as animal husbandry

3). As a forage crop enset is used only in few regions depending on the availability of further forage crops or grazing areas (Fig. 2, Tab. 2). All processes interact within the system and within a single farm. Soil tillage is of high importance to preserve fertility and drainage. Besides permanent hoeing and manureing the soil is covered either with natural vegetation or mulch which prevents erosion (Fig. 11, Tab. 3). Changes of one factor have impact on the whole system. In recent years a conflict arose with rising population numbers enforcing larger enset plantations and reducing pasture areas which resulted in damaging enset plantation due to lack of sufficient manure and lower yield due to early harvesting.

Figure 1: factors affecting enset cultivation and interactions within the cultivation system and a single farm (continued).

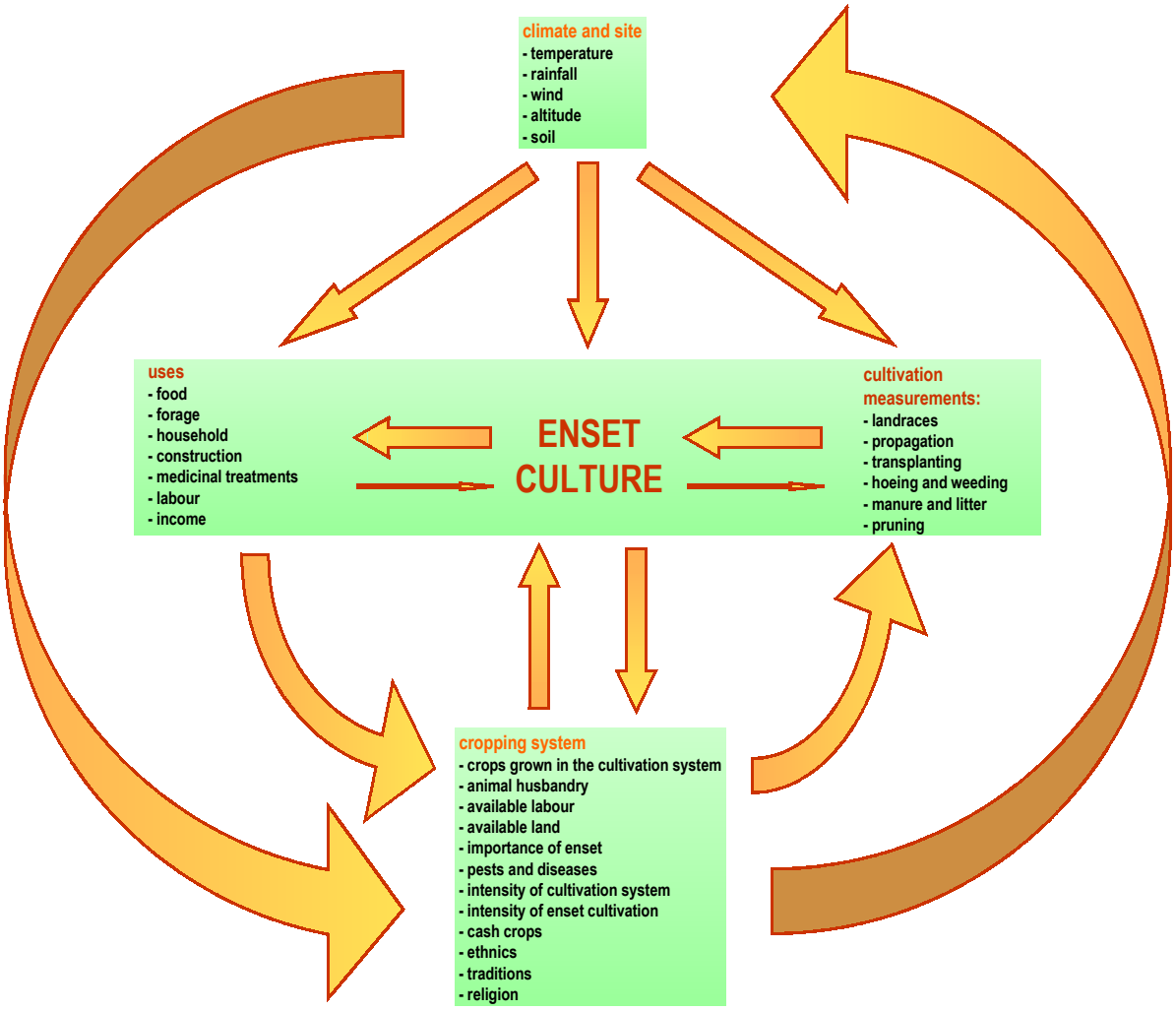

Table 1: crops grown in enset cultivation systems

region	ethnic group	cereals	oil crops	tubers	pulses	vegetables	fruits	condiments and spices	stimulants	others
Dorze-Dita Gardula	Omotic Omotic	barley, wheat, teff, maize		enset, Galla potato, kolto (*Araceae*), yam, taro	pea	cabbage pumpkin	banana lemon		coffee tobacco	cotton grain amaranth
Gurage Alaba Hadiya Kambatta Tambaro	Semitic Cushitic Cushitic Cushitic Cushitic	maize, sorghum t'eff, barley, wheat, finger millet	*Brassica* noug safflower	enset, potato, taro	horse bean, pea, chickpea, lentil, fenugreek, common bean	cabbage, onoins, garlic, pumpkin, tomato, Jack bean	lime, lemon, orange, shaddock, citron, loquat, grape, peach, banana, papaya	*Capsicum,* sweet basil, rue, coriander, Ethiopian caraway, black cumin, fennel, buckthorn, thyme	coffee, ch'at (*Catha edulis*), tobacco	cotton, sugar cane
Sidama Gedeo	Cushitic Cushitic	wheat, barley, teff, sorghum maize	*Brassica* noug safflower	enset, yam, taro, sweet potato, cassava, Galla potato, potato	horse bean, pea, common bean, lima bean, *Psophocarpus palustris*	cabbage, *Solanum dasyphyllum, S. nodiflorum*, pumpkin, tomato, onions, garlic	peach, passion fruit, orange, lemon, mandarin, lime, *Annona*, loquat, banana, grape, papaya, guava	sweet basil, rue, *Capsicum*, coriander, fennel, buckthorn, mint, ginger	coffee, ch'at, tobacco	cotton, sugar cane, lemon grass
Welaita	Omotic	wheat, barley, teff, sorghum maize	*Brassica* noug	enset, galla potato, sweet potato, yam, taro, (anchote, cassava)	common bean horse bean pea fenugreek	cabbage, *Solanum dasyphyllum, S. nodiflorum,* pumpkin, onions, garlic, *Moringa*	banana, lemon, lime, passion fruit, orange, papaya	*Capsicum,* sweet basil, ginger, buckthorn, rue, coriander, fennel, thyme, bishop weed	tobacco coffee	cotton, sugar cane, lemon grass, grain amaranth
Wenchi	Cushitic	maize, sorghum t'eff, barley, wheat, finger millet	*Brassica* noug	enset, taro yam, Galla potato, anchote, sweet potato, cassava, potato	lentil, chickpea, common bean, lima bean, runner bean, horse bean, pea, pigeon pea	cabbage, pumpkin, onions, garlic, tomato, *Solanum dasphyllum*	banana papaya, guava, passion fruit, orange, lemon, lime, citron, loquat, grape, tree tomato, peach, black mulberry, pomegranate, shaddock, mandarin, mango, pineapple, Italian apple, gooseberry	*Capsicum,* coriander, rue, sweet basil, fennel, ginger, buckthorn, rosemary, garden cress, thyme	coffee, ch'at, tobacco	cotton, sugar cane, lemon grass, grain amaranth

source: MINKNER (1986), SHACK (1966), STRAUBE (1963), WESTPHAL (1975), ZIPPEL *et* KEFALE 1995

Table 2: use of enset

region	ethnic group	food	household	construction	forage	traditional medicinal treatment	labour	income
Alaba	Cushitic	++++	++++	++++	+++	+++++	+++++	++++
Dorze-Dita	Omotic	++++	++++	+++++	++++	+++++	+++++	+++++
Gedeo	Cushitic	+++	+++	++++	+++	+++++	+++++	++++
Gardula	Omotic	+++	+++	++++	+++	+++++	+++++	+++
Gurage	Semitic	+++++	+++++	+++	-	+++++	+++++	++++
Hadiya	Cushitic	++++	++++	++++	+++	+++++	+++++	++++
Kambatta	Cushitic	++++	+++++	++++	+++	+++++	+++++	++++
Sidama	Cushitic	+++++	++++	++++	+++	+++++	+++++	+++
Tambaro	Cushitic	++++	++++	++++	+++	+++++	+++++	++++
Welaita	Omotic	++++	++++	++++	+++	+++++	+++++	++++
Wenchi	Cushitic	+++	+++	+++	++++	+++++	+++++	++

source: MINKNER (1986), SHACK (1966), STRAUBE (1963), WESTPHAL (1975), ZIPPEL *et* KEFALE 1995

Table 3: cultivation and processing of enset

region	ethnic group	propagation	nursery	intercropping	processing	fermentation
Alaba	Cushitic	separate field, sprouts transplanted after 1 year	transplanting	+		
Dorze-Dita	Omotic	separate field, sprouts transplanted after 1-2 years	transplanting	++		
Gedeo	Cushitic	within the plantation or separate field, sprouts transplanted after 1 year	thinning	+++		
Gardula	Omotic	within the plantation, sprouts transplanted after 3 year, corm is used two times for propagation	thinning	+++		
Gurage	Semitic	separate field, sprouts transplanted after 1 year	transplanting	+		
Hadiya	Cushitic	separate field, sprouts transplanted after 1 year	transplanting	+		
Kambatta	Cushitic	separate field, sprouts transplanted after 1 year	transplanting	+		
Sidama	Cushitic	within the plantation or separate field, sprouts transplanted after 1 year	thinning	+++		
Tambaro	Cushitic	separate field, sprouts transplanted after 1 year	transplanting	++		
Welaita	Omotic	separate field, sprouts transplanted after 1 year	transplanting	+++		
Wenchi	Cushitic	separate field, sprouts transplanted after 1 year	transplanting	+		

source: MINKNER (1986), SHACK (1966), STRAUBE (1963), WESTPHAL (1975), ZIPPEL *et* KEFALE 1995

Fig. 4: enset fibre

Fig. 8: enset landraces

Fig. 9: propagation

Fig. 11: manuring and hoeing provides loose and humose soil

Fig. 13: cultivation and processing requires special tools

Conclusions

Enset is cultivated in subsistence farming systems with little connection of the producer with the market, low prices, and production mainly for personal use.

Due to intense soil tillage enset has a positive impact on soil fertility and micro climate, and shows soil preserving capabilities.

Systems with enset are integrated production systems, whose different production lines correspond with each other.

These systems respond much better to ecological or structural changes than systems which have only one or very few production lines.

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