Western science and household strategies in the light of a long predicted Malthusian crisis in the West-Usambara Highlands of Tanzania (ca.1900-2015).[1]

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- draft-, not to be quoted.-

Introduction:

West-Usambara is part of the ancient Eastern Arc mountain chain of isolated mountains stretching along the East African coast from southern Tanzania to southern Kenya. It has great amplitude of relief consisting of highlands ridges with peaks reaching up in the west to 2,300 meters, upland valleys and steep slopes. Especially impressive are those steep slopes reaching more than 1,500 meters down to the surrounding dry plains, called *nyika*. On its eastern site is the Luengera river valley which divides the circa 1,970 square kilometres western mountain range of the Lushoto district from the smaller and lower eastern Usambara mountains of the Korogwe district. The Usambaras (East and West) are located in northeastern Tanzania near the Indian Ocean coast and form both part of Tanga province.[2]

This well-studied area experienced the intensive impact of colonialism right form the end of the 19th century. From the 1930's and 40's onwards (colonial) research focused on the effects of population growth and the continuation of "traditional" African agrarian practices.[3] This combination led, according to (colonial) researchers to an interactive process of overexploitation of the area's natural resources, deforestation, land degradation, erosion and, as a cause and consequence, rural poverty.

From the post Second World War period onwards a number of colonial, governmental, non-governmental and international donor programs were introduced, aimed at tackling these agro-ecological problems of the West-Usambara mountains. Although some progress is made with reforestation, most advocated practices to change this trend of land degradation and erosion were - and still are – only poorly adopted by farmers in the area.[4] Several researchers today state that the West-Usambara highlands are still among the areas most effected by soil erosion in Tanzania.[5]

Over the past 120 years the population in West-Usambara grew more than six fold. Indeed, historians writing about Usambara notice a process of agricultural and environmental change, caused by a combination of population growth, increasing pressure on agricultural land and forests, reduction of soil fertility and erosion.[6] For some auteurs this process started in the early British colonial period. Others noticed that this process already took shape from at least the 1870 onwards or even long before that time.[7]

[1] I would like to thank Ken Giller and Fred Baijukyaa for their cooperation during the research in January 2015, and the N2AFRCA "research-in-development" project, Wageningen, for financing this research.
[2] The Lushoto district as a whole is an area of 3,497 km2
[3] See an example of European prejudices against African agriculture and agricultural knowledge, Annual Report on the Tanga District for the year 1923: 20-21; Lyamchai et al., 1998.
[4] German et al., 2010; Wickama, 2009; Wickama et. al., 2014.
[5] Mascarenhas and Madulu, 1997: 15; Tenge, De Graaf & Hella, 2004; Tenge, 2005; Tenge, Sterk, & Okoba, 2011.
[6] Jambiya, 1998: 3.
[7] Huijzendveld, 1997; Conte, 1999.

Historians concerned with agricultural and ecological change do use the research of agronomists, geographists and ecologist. However, the later give no or just little attention to the historical dimension of societal processes. Their research and connected projects are strongly focussed on technical solutions, such as packages of sustainable land and water management and agroforestry measures, and the best way to implement them. Most research concerned with West-Usambara start with a baseline study in which the same problems of overpopulation, soil erosion, deforestation and inadequate food security are revealed.[8] In determining significances between factors, such as household composition, gender, farm size, indicators of wealth and poverty and food security, data are collected at a single point in time in a small number of selected villages by the use of structured questionnaire surveys, and correlation and linear regression analyses, sometimes completed with selected interviews and personal observations. The limited acceptance of most of the technical innovative solutions to change the Malthusian features are often explained by external conditions, such as lack of markets, infrastructure, good governance, finance and education.[9]

There are two general problems with the kind of advocated technical solutions for the assessed agro-ecological situation in Africa in general and those in the western Usambaras in particular. The first problem has to do with "good" innovations and the analysis of the reasons of the poor adaption of these innovations by local farmers. Sumberg explains that in the literature there is a mix-up of internal and external factors that explain the level of adaptation of curtain agro-technological innovations. According to Sumberg, a limited success of a "good" innovation should not be explained with an analysis of external factors, such as socio-economic conditions, policy issues, institutional issues and biophysical conditions. Good innovations, according to Sumberg, should fit the external circumstances.[10]

The second problem is that many western agro-ecological projects are designed with a kind of Malthusian tunnel vision and a concern with the ecological fate of the earth in mind. This lead to a strong emphasis on, and concern with food security in small farmers subsistence agriculture and agrarian-ecological sustainability.[11] Although development around population growth, food security and ecological sustainability are major issues on national (Tanzania), continental (Africa) and world scale level[12], the question however is if these are also the mean concerns of the local farmers involved, living at marginal level. To understand their decisions we need, from a historical point of view, to explain the long-term resilience of the local households in West-Usambara, in the light of changing restraints and opportunities, and against the background of the since the 1910s predicted Malthusian crisis.

This paper starts with a historical impression of the area and the forecasted Malthusian crisis. Then we will look at households economic strategies from the 1870s onwards in relation to changing restraints and opportunities against the background of a developing money economy. This will give insight in the economic resilience of local households and the reason why a majority of farmers is reluctant to invest and implement technological solutions for "their" agro-ecological problems, advocated by western (research) projects. The paper will demonstrate that the opportunities households grab are related to an increasing need for money in cash.[13] Although still a very modest part of households economic input, this need for money in cash became a decisive element in households decisions and survival strategies. This had an influence on the faming systems and stimulated (a still modest) social-economic

[8] See for instance: Mascarenhas and Madulu, 1997:15; Kaswamila & Tenge, 1998; Johanson 2001; Mowo, et al., 2002; Mwango, et al., 2015; Temu, 2015.
[9] German, et al., 2010; Mascarenhas, 2000: 4.
[10] Sumberg, 2004, idem, 2005.
[11] Mascarenhas, 2000; Songoro, 2014; Winowiecki, 2014; Temu, 2015.
[12] Mascarenhas, 2000: 1-2.; Baudron, Andersson, Corbeels and Giller, 2012.
[13] Jambiya, 1998: 10

differentiation. Changing farming practices and social-economic differentiation interacted with one and other and explain why a minority of households are more willing to implement (some elements) of the western recommended packages of technical solutions, while a majority is resistant to them.[14]

The area:

Early impressions of the Western Usambara mountains came from the first missionaries and explores who visited the area in the second half of the 19th century. Johan Ludwig Krapf, a missionary of the Church Missionary Society, was the first European to visit the mountainous area in 1844 and again in 1852.[15] To him West-Usambara was, for several reasons, a suitable place for the establishment of a mission station. The malaria free mountains had a mild climate, which was healthy for Europeans, and a relative dense population. Krapf made an impressive accurate estimate of the population of 60,000 living in the Mountains in the mid-19th century.[16] Other qualities were the political and economic stable situation and the fact that the area was still outside the sphere of influence of the Islamic coast. In those days West-Usambara was the core area of the Kilindi "kingdom", ruled by the *Simbamwene* (the only true lion) Kimweri, who had his residence at Vuga.

Explorers also visited the Usambaras on their way further into the interior. Burton and Speke for instance visited the Kilindi ruler in 1858. They stayed only twenty-four hours during which they had a short meeting with Kimweri. Others, members of the Anglican missionary initiative, such as Alington (1867) , New (1874) and Farler (1875-1888), give some insight in the period of civil war directly after Kimweri's death in 1862. However, these sources give only limited political and environmental information of the area. Though, a detailed image of the political situation is provided by Abdullah bin Hemedi 'l Ajjemy, who was attached to the local Kilindi elite during this period.[17] More social and economic information is to be found in the publications of the German explorer Baumann and those of the missionaries of the Bethel Mission, such as Buchwald, Döring, Dupré, Johanssen, Langheinrich, Warneck and Wohlrab. They took up missionary work in the mountains from 1891 onwards. Their publications and those of German researchers and settlers, such as Von Eick, directeur of the Kwai research station in West-Usambara, and Karasek, an early settler who was married with a local Shambaa women, give us more detailed information about the land, the people and their agriculture during the early colonial era (1888-1916).[18]

The Germans found a highland with a population of ca. 70-80.000 people. These could be divided over several ethnic groups of which the Shambaa was the largest, followed on a distance by the Mbugu, the Pare, and small numbers of people belonging to ethnic groups from the surrounding areas, such as Zigua, Kamba, Bondei, Taita, Digo and Kwavi. It is important to notice that ethnic categories result from complex historical processes. Although one can find certain continuity in pre-colonial and colonial processes of group formation and ethnic identity construction, boundaries between ethnic groups are very amorphous and variable in time.[19] For this research it is sufficient to divide the population according to their main economic activity. By far the largest part of the mountain dwellers consists of agriculturalist and only small numbers are genuine cattle-keepers. These cattle-keepers, of which only a small number still remain, all belong to the Mbugu ethnic group. They settled sometime in

[14] De Graaff, et al., 2008.
[15] Krapf, 1860, chapters V and chapter IX.
[16] Krapf, 1860, 223.
[17] Abdullah bin Hemedi 'l Ajjemy, (J.W.T. Allen) 1963.
[18] Dupré, no date; Baumann, 1889, 1890, 1891 and 1894; Karasek/Eichhorn, 1911, 1912, 1918-22, 1923-24.
[19] Intermarriages between different ethnic agriculturist in Usambara were and are quite common, though less with Mbugu partoralists.

the 17th century in West-Usambara, in parts of the mountains which were less suitable for the already in the mountains living agriculturalist, such as the Sume and Magamba forest areas, where they found ready-made grazing in large open glades or *viringo*.[20]

The scattering of settlements and fields of the agriculturalist in the 19th century was dictated by safety, the availability of water and the possibilities for irrigation or *itagata* as it was called, and ecological factors, such as soil types and climate niches, resulting from the geological structure of the mountains and the Indian Ocean rainfall regime. Safety played an important role in the settlement structures, especially during the second half of the 19th century. The death of Kimweri in 1862 and the following war of succession in West-Usambara and insurrection of the Bondei people in East-Usambara coincided with the intensification of the slave trade from the hinterland to the coast and an increasing import of discarded firearms, especially after the end of the American civil war.[21] For security reasons most larger villages were settled as eagle nests on the mountain ridges. If necessary villages were also protected by fences of impermeable throne-bush, palisades and trenches. Other small villages, situated in upland valleys and along slopes, lay hidden under a roof of dense foliage of trees and banana plants.[22]

Although more dangerous and less suitable for permanent settlement, because of slave traders and malaria mosquitos, some agriculture plots were situated in the low lands (*nyika*). These were concentrated in the so-called *vitivo* (*kitivo*, sing.). A *kitivo* was a place with fertile, mostly alluvial soils, deposited from the floods of Usambara's mountain streams as they debouch onto the plains. The combination of fertile soil, available water for irrigation and the hot climate made these *vitivo* very suitable for the cultivation of crops, such as maize, rice, sorghum, millet, sugarcane and cotton.

The availability of water and the possibility of irrigation also played an important role in highland agriculture. Most of the rainfall in this area comes from the direction of the Indian Ocean. As a consequence, the west-facing slopes of the mountains are drier compared to the east-facing slopes. The rainfall distribution is bi-modal in the north-west. The long rains or *masika* peak between March and May. Sometimes they start with some rain in Februari called *guaka*. The short rains or *vuli* fall from October to December. In the Mlalo-basin there is in reality only one real rainy season from October to May and one dry season from June to September. In the south-east you have a tri-model. Next to the *masika* and *vuli*, there is an intermediate period of rain from July to September, called *unyisi* (July) and *mluati* (September). Different crops are planted in each of these 'seasons'.[23]

Before the early colonial period most of the cultivation in the mountains was found in a belt between 700 and 1,400 meters in the north-western and south-eastern part of the mountain range. On the high plateaus above this region relatively low temperatures and aridity limited the possibilities for agriculture. This is why the relative dry central parts of the mountains were not used by agriculturalist but by the scattered Mbugu pastoralists and covered by natural forests.

Irrigations systems could be found in almost all important agricultural areas in the mountains. Nineteenth century German agricultural specialists, such as Holst, Warburg and Buchwald, admired the engineering skills of the Shambaa.[24] In constructing irrigation works, the people of Usambara made use of several techniques and materials. Mud, clay, branches, stones and wood were used. Small and larger

[20] Conte, 1996: 96-122; Conte, 1999: 294-296, 299-303.
[21] Huijzendveld, 2008.
[22] Krapf, part II, 1858: 100, 124; Baumann, 1890: 162; idem, 1891: 172, 177; Döring, 1900a: 1, 21; idem, 1901: 156; Holst `*Die Kulturen der Waschambaa*', 1893, Bundesarchive, Deutschland, Reichs kolonialambt, 444: 42-44; H. Meyer, 1909: 209; Karasek/Eichhorn, 1911: 155; HABM BIX 16, nr. 1; Gleiß, 1914: 155
[23] Tanga Provincial Book, 1932-1957, Tanzania National Archive.
[24] Holst in: *Deutsche Kolonialzeitung*, 1893: 129-130; Warburg, 1894: 134; Buchwald in: *Der Tropenpflanzer*, 1897: 106.

channels, ponds and reservoirs (*kunisa*)[25] were constructed to irrigate the banana plantations or *gunda* and other agricultural land or, in some cases, to drain wet croplands in swampy mountain valleys. The core of the irrigation systems was formed by main channels or *muezi* (*ng'wezi*, sing.) by which water was transported over long distances to places where it was needed. Karasek, one of the early German settlers, was deeply impressed by the extend of these channels and irrigation works. He wrote:

> "*In West-Usambara almost every slope has an irrigation channel of many hundreds of meters long; Thousands of hectares are irrigated*."[26]

A forecast of a Malthusian crisis in the Usambara:

The mid-nineteenth century agricultural economy of West-Usambara consisted of a variety of agricultural practices, showing extensive as well as intensive features, with at its core the irrigated *ghunda*.[27] Forms of slash and burn cultivation, seasonal rain dependent agriculture, irrigation farming, intensive permanent cultivation and commercial farming were essential elements of the agricultural practices.[28] And, most of these practices were integrated around the production of the *kande nkuu* or main staple food crop, the banana. In the *ghunda* bananas were intercropped with other useful plants, such as yam, taro, pineapple, mango and citrus. Other plants were just left to grow naturally, such as tree tomatoes, blackberries, eggplants, mushrooms and all kinds of plants which could be used for religion and medicine, and as aromatics or dyestuff. [29] If well maintained, these *ghunda* could bear fruit for 40 to 60 year. In early ethnographic material this agricultural practice, with features of a agroforestry system, was presented as an intensive system.[30]

However, agricultural systems are never static. Conte describes for the Mlalo basin in the north-west of West-Usambara a long-term ecological history, from the Iron Age onwards.[31] Indeed, the agro-ecological history of the whole of the Usambaras points towards long-term occupancy and a tendency for innovation and adaptation in relation to demographic, socio-political and environmental change. However, in the second half of 19th century the pace of change started to accelerate. This had to do with new political-economic activities, such as the development of clove plantation and ivory and slave trade, of the Omani rulers at Zanzibar, and the process of colonial penetration. From 1895 onwards the importance of banana gardens and irrigation systems started to decline. Before the colonial area 50% to 80% of all the cultivated land in West-Usambara consisted of irrigated *ghunda*, producing banana as the main staple crop. However, already before 1914 it was maize, later followed by the Irish potato and cassava, cultivated in rain-fed fields with the use of extensive techniques of slash and burn, that replaced the banana as the main staple crop.

> "'*Our ancestors constructed the large banana plantations' the Washambaa told me* [settler Karasek in 1903]. *And indeed these plantations cover three quarters of all native agricultural*

[25] These ponds and reservoirs, called *kunisa* at the turn of the 19th/20th century, are presented in the work of Sokoni & Shechambo (2005) as *Ndiwa* and are not from the 1940s but a much earlier date. See Sokoni & Shechambo, 2005: 3, 12, 20.
[26] Karasek & Eichhorn, 1911: 175.
[27] Holst in: *Deutsche Kolonialzeitung*, 1983: 113.
[28] Huijzendveld, 1979; Johansson, 2001.
[29] Warburg, (1894), 141-142, 145-148, 150.
[30] Huijzendveld, 1997: 347.
[31] Conte, 1999:

land, but the people of today plant bananas only on a small scale (…) *many irrigation canals lie dry, whereas the irrigation of fields is diminishing*" [32]

People still grow bananas but in 1983/1984 only 8.4% of all agricultural land was used for this crop. Bananas were also intercropped with coffee on 4.9% of the agricultural land. More than 70% of the acreage was in use for maize, cassava, Irish potatoes, beans, yams et cetera. Irrigation was used for land under coffee and for commercial vegetable production in valley bottoms or *vidau (dau,* sing. Nowadays also called *vitivo,* plu. and *kitivo*, sing.). In pre-colonial times most valley bottoms were used for fodder collection for livestock during the dry season. And in colonial times they were still not used very intensely. This changed from 1980 onwards.[33] Around 1985 3.8% of all acreage under cultivation was used for this kind of market orientated crop production.[34] The changes that took place had a visible impact on the environment and a forecast of a Malthusian crisis in the Usambara started to appear in European reports of the area.

The forecast:

In 1874 the Usambara mountains were romantically described by the missionary, Charles New, who wrote:

"*There are mountain peaks, the loftiest of which cannot be less than 7,000 feet above the sea level: these present every variety of shape; there are ridges upon ridges, rising one above another till lost in the clouds; there are rocks and crags and `threatening steeps' ad infinitum; there are enormous valleys, gloomy ravines, and glens as romantic as Glencoe; there are dark majestic forests, compact woods, wildernesses of brown jungle, expanses of tall, waving grass, beautiful slopes of short green turf, and everywhere patches of cultivated land, fresh and verdant as an Eden; brooks and streams and torrents trickle and murmur, tumble and splash and roar on all sides.*" [35]

Even today we can find locations in the mountains which evoke the same kind of romantic emotions of being in commune with nature as Charles New seems to have experienced. We can find them for instance in protected forest areas, such as Ndelemai and Mazumbai. But there were also different, less romantic images of other parts of the Mountain area, such as the late 19th century descriptions of the areas around the capital of the ruling Kilindi-dynasty, Fuga (or Vuga).

"[T]*he mountains of what I* [Johnston, 1879] *have called the Fuga* [Vuga] *plateau, seem to be almost bare*."[36] "*Fuga is* (as a result of agrarian activities and the harvesting of building material and firewood) *nowadays the worst land in Usambara.*"[37]

[32] Karasek & Eichhorn, 175-176. See for the many reports on neglected or abandoned banana-gardens in the Tanzania National Archive e.g. the Plantantions Ambangulu and Sakarre, G8/127: 86, G8/121; G54/351; G8/310: 239-242.
[33] Interview, Mr. Hussein Shelukindo, District Agricultural and Livestock Development office, Lushoto, January 2015.
[34] Sender & Smith, 1990: 8. Cf, Mersman, 1993: 206.
[35] New, 1874-1875: 319-320; New, 1875: 417.
[36] Johnston, 1879: 349-350.
[37] Tanzania National Archive, G8/605.

Land degradation, deforestation and erosion as a result of agrarian activities in the Western Usambaras were in curtain areas already in the 19th century a known phenomenon. This was especially the case in relative dense populated areas, such as around Bumbuli, Fanfa and Vuga. In these areas large tracks of former cultivated land were eroded and covered by a local fern called *mshinto* in Kisambaa or *Shiuu* in Kiswahili. This fern (*Pteridium aquilinum L.*) is seen as a negative indicator of soil fertility.[38] In the also populated area of the Mlalo-basin in 1895 the problem of erosion was not that serious yet, but deforestation around the settled area already led to a relative scarcity of firewood.[39]

With the death of Semboja of Mazinde in March 1895 and the hanging in April 1895 of his son by the Germans, the *Simbamwene*, Kimweri Mputa of Vuga, the last political obstacles for German "pacification" of the Western Usambara mountains were removed.[40] This opened the road for the colonial exploitation of this area. In 1896 the first German coffee plantation was effected near the Shambaa village of Sakarre, which gave its name to this enterprise, the *Sakarre Pflanzungs Gesellschaft*. Soon other plantations and forestry companies followed. And, because of its healthy (malaria free) climate the Western mountains were also seen as very suitable for Mission stations and European colonist settlement. For all these purposes between 1895 and 1911 ca. 62,000 hectares of land in the mountains were claimed as crown land.[41]

All areas suitable for agriculture and cattle keeping were by 1912 occupied by African farmers, European plantation companies, mission stations and settlers or by forest reserves.[42] The German district commissioner of Wilhemstal (Lushoto), Köstlin, felt that land alienation in favour of European settlement already overstepped the mark. The pressure on land caused by alienation and population growth had led to an increasing concentration of local people in the mountains in ever smaller and in many cases more marginal areas. This caused changes in agricultural practices and ecological circumstances, with a progressing decrease of soil fertility as a result. Based on a report on West-Usambara by a member of the colonial government, Schmidt, Governor Von Schnee wrote:

> "*With the bad soil conditions, locals should use year long periods of fallow. But, this land is so densely occupied, that this is no longer possible*."[43]

The earlier mentioned Köstlin was even afraid that further concentration of people in for Africans reserved areas in West-Usambara could lead to an uprising.[44] However, under the British the alienations by townships, freeholds, lease and missions in 1941 was around 116,000 hectares, but still no uprising, since people found ways of dealing with their problems.[45]

Durging the British colonial period debates over environmental degradation and a preoccupation with soil conservation occurred in the 1930s in the context of a general crisis in colonial society and the American Dust Bowls of 1934 and 1936. Jacks and Whyte's book titled "*The Rape of the Earth*" of 1939 stimulated the conviction of British colonial officers further that the general problem of erosion in southern and eastern Africa should be tackled immediately. West-Usambara became one of the core

[38] Vigiak, et al, 2005, 310-13
[39] Bundesarchive, Deutschland, Reichs kolonialambt, 8642: 100, 110, 123.
[40] Deutsche kolonialzeitung, 1891: 21; Bundesarchive, Deutshland, Reichs koloniolambt, 404: 51-54.; Döring, 1901: 84
[41] Huijzendveld, 1979: 256.
[42] Idem, 255-261; 398-402.
[43] Gouvernor von Schnee, Bundesarchive, Deutshland, Reichs koloniolambt, 17: 55.
[44] Köstlin, Tanzanian National Archive, G54/44: 57-58, 60; Köstlin, Tanzanian National Archive, G8/116: 138.
[45] Tanzania National Archive, Lushoto District Book.

areas for this kind of action.[46] However, crisis and war delayed the implementation of the plans. The *Staple's Scheme of Conservation* for instance was not implemented by lack of finance and war-economy priorities. After the war new initiatives were taken. In 1945 a report was published in which the situation was explained.

> "*The hard facts are that the whole region* [West-Usambara] *has reached a very low level of fertility owing to over-cultivation, over-grazing and failure to manure the land; and progressive erosion and deforestation have led to excessive run-off of water. In the long run these conditions can only be rectified by a vigorous soil-rehabilitation programme and a reshuffle of the human and cattle populations*."[47]

The urgency for taken this kind of interventions was repeated by the Provincial Commissioner of Tanga in August 1946.

> "*It seems probable that the people are at present living in the final stage before their overworked worn out land ceases to carry them. Every new baby is an added burden which cannot much longer be borne*."

To turn the tide a pilot-program was started in 1946-1949, called the *Mlalo Basin Rehabilitation Scheme*. Notwithstanding the strong local resistance, this pilot was extended to the whole of the mountain area by the use of the enforcement of laws and the use of penalties to prevent overgrazing and deforestation and to stop the soil erosion on slopes with rain-fed cultivation of food crops, such as maize, beans, cassava and Irish potatoes. Under the pressure of local resistance, which was directed against the *native authority* and the colonial government and supported by local organizations of the *Tanganyika African Association* (TAA), such as the Lushoto Branch van de TAA, the *Usambara Citizens Union* and the *Tabarare Citizens Union,* all laws and penalties were suspended in 1957. Most of the under force realized changes disappeared like snow before the sun.[48] Only in some areas with a market directed agricultural production, such as around Soni with its commercial vegetable production, elements of the Rehabilitation Scheme remained, such as terracing and irrigation.[49]

> "*1958 is the first full year since the abolition of the Usambara Scheme rules and, as was to be expected, there has been a marked deterioration of land use practices throughout the area*." [50]

However, the population kept on growing, resulting in a population increase in the mountains from 219,152 in 1948 to 438,273 in 2014, and with it a further increase of the pressure on local natural resources.[51] So, from the end of the 1970s early 1980s onwards a number of governmental, non-governmental and international donor programs were introduced, such as the German *Soil Erosion Control and Agroforestry Project* (SECAP), starting with a pilot in 1979, *The Tanzania Forestry Research Institute* (TAFORI) of 1981, the Dutch *Traditional Irrigation Project* (TIP) of 1989, Participatory Agricultural Development Program (PADEP) and *The African Highlands Initiative* (AHI) of 1997. They all

[46] Jacks & Whyte, 1939.
[47] TARDA, 1945: 120
[48] Baum, 1984: 67.
[49] Attems, 1967: 45; Heijnen, 1974: 7; Fleuret, 1978: 7, 106.
[50] TARDA, 1958: 20.
[51] Songoro, 2014: 5, 7. 492,441 people is the whole of the Lushoto district. – 11 % = 438,273.

aimed, in their own way, at tackling the agro-ecological problems of the West-Usambara mountains.[52] This time they advocated a bottom-up approached by taking local knowledge of stakeholders into account.[53]

Giving the above presented sketch of the forecasted Malthusian crisis, it is understandable that most of the research and plans up to this day are focused on smallholder agriculture interventions which are guided by ideas of resource conservation, sustainable production and food security. However, even with the change from a top-down to a bottom-up approach a majority of rural households in West-Usambara is still reluctant to implement technological solutions for the agro-ecological problems suggested by western research and projects.[54] One reason is that, although a bottom-up approach is advocated, the requested needs of the local rural population are still top-down formulated and solutions are, for the most part, of technological design only.[55] To understand resilience and why a minority of households is more willing to implement (some elements) of the western recommended packages of technical solutions for "their" agro-ecological problems, while a majority is resistant to them, we have to look at some of the restraints and opportunities local households experienced in extending their portfolio of economic activities to meet their needs.

Restraints and opportunities for agricultural cash income (ca. 1870-2015).

Food-security of small-scale farmers is, along with environmental issues, since the 1980s one of the main priorities of most western research and development projects.[56] Food security, according to Makupa (2005), consists of food availability and food accessibility, and means an adequacy food supply quantity and quality for the whole household at all times. Food availability relates to the quantities of food produced by the household themselves and food accessibility relates to households meeting their food needs through financial ability and stable income to purchase their food.[57] However, food is not the only need households have. People have a lot of other needs as well, such as clothes, medicines, tools, transport, and human social and financial capital. And, they also need to pay taxes, licenses and school fees, to name just a few. To meet the need for food and cash people developed, within the given possibilities in time and location, portfolios of farm and non-farm activities. In the following pages we will first look at the roll money in cash played from pre-colonial times. Then we will focus on how people tried to meet their needs for cash. We will do this by showing how and when they investing in the production of specific crops and under what circumstances they stopped investing in money and labour in these crops. Before coming to a conclusion we will look at portfolios of farm and off-farm activities in relation to farmers resilience and social differentiation.

A modest money economy:

In pre-colonial times food accessibility and many of the needs could be obtained by market exchange in kind. However, at least from the mid-19th century and specially from the colonial era onwards, money in cash started to play a modest but increasing role in securing food accessibility and in the fulfilment of other household needs.

[52] Jambiya, 1998; Mascarenhas, 2000: 8; Mowo, et al., 2002.
[53] SECAP, 1991.
2002; Johansson, 2001
[54] Ezaza, 1988: 157-163. De Graaff, et al., 2008.
[55] Cf. Sayer, et al., 2007.
[56] See for instance Temu, 2015.
[57] Makupa, 2005: 9-10

Earlier we stated that the pace of change started to accelerate from the mid-19th century onwards. The impulse for this acceleration came from the Omani rulers of Zanzibar. They initiated a slave labour based agrarian production on the islands of Zanzibar and Pemba, along the coast and along the Pangani estuary. This development made Zanzibar into an international market for cloves, copra and molasses, as well as for mainland ivory. Indian, American, English, French and German business houses settled in Zanzibar city, trading in exchange for cloves, copra and ivory all kinds of industrial products, which found their way into the interior, such as Indian cloth (thin blue *kaniki*, *calico*, and colourful *leso* and *kanga*) and American coarse white cotton cloth (*merikani*), glass beads, brass, copper and iron wire, Indian hoes, guns, bullets, flints and gunpowder.[58]

Trade between inland regions and the coast was enhanced by caravan trials and local markets. The caravan trails consisted of footpaths of less than a meter width, meandering over hundreds of kilometres across the *nyika*, connecting distant inland markets with the coast. Local markets formed networks of trade connections between people in different regions and different ecological zones. In West-Usambara markets, which were held every 5 or 10 days or every month, attracted 200 to 3,000 people. On these markets all kinds of products were traded, such as by women made food, beer, baskets and pottery, all kinds of life stock, ceremonial items, such as impala skin from Upare called *mpaa*, all kinds of medicines, salt, dried fish, ghee or *mavuta* (rancid boter), honey and tobacco. Many products on the markets came also from the coast, such as knifes, cowry shells, glass beads, cotton cloth, shirts, kofia (hats), copper and iron wire, brass jewellery, gunpowder, bullets, guns and Indian hoes. This larger Indian hoe, called *gembe*, almost completely replaced the traditional smaller Shambaa hoe, called *khonta*, during this period. To trade on the market people had to pay a fee called *kodi*. This fee was paid in kind, but from the beginning of the 20th century also in cash.[59]

At least from the 1840s onwards coinage played, on a modest scale, a role in the local economy of West-Usambara. The Indian rupee was the dominant currency, used along the East African coast during the second half of the 19th century where it had marginalized the American gold dollar and the Maria Theresa thaler (dollar). There are only a few impressions that gives us an idea of the money circulation in the Usambara before the colonial era. The Kilindi elite during the civil war in Usambara, for instance, were able in 1868 to buy guns, flints, bullets and gunpowder from the coast in exchange for 800 Maria Theresa dollar in cash.[60] When the Germans took over in 1890, they did not interfere with the existing circulation of money in order not to disrupt the local trade. However, in 1893 they started to mint their own coinage. This German *Rupie* was initially equivalent to the Indian rupee and was also subdivided into 64 copper coins, called *pesa* (equivalent to the Indian pice or paisa). R.W. Gordon, Keeper of the German Records, states that "*on 30 April 1893 all "pesas" of Portuguese origin in circulation at Masinde, Vuga and Mlalo were called in and exchanged for coins of German mintage"*.[61] Although he probably makes a mistake in the origin of the coin, which was Indian instead of Portuguese, it gives us an idea of the relative importance of money in cash in West-Usambara in those days.[62]

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[58] Sherrif, 1990: 12-18, 170, 172-74; Abdallah, 1963, LXXIII, 110.

[59] Farler, 1879: 87, 89; Reichard, 1892: 190; Kaerger in: Deutsche kolonialzeiting, 1892: 36-40, Zech in: Deutsche kolonialzeiting, 1899: 141-144; Luandai, LKV nr. 26, 2.10.1892, Tanzania National Archive, G54/97, The map of Triloff, *`Die Schambalai oder West-Usambara'. Nach einer Skizzenkarte des Missionars F. Lang-Heinrich in Wuga und verschiedenen gedruckten und ungedruckten Quellen*, 1: 200.000, Justus Perteles, Gotha 1897.

[60] Abdallah, 211, 218, 233 and note 202.22 on page xxxiii; A Maria Theresa dollar contains 23.3890 grams (0.752 troy ounces) of fine silver. Tanga Provincial Book 1932-57, page a23, Tanzania National Archive; Johnson, 1897: 545.

[61] R.W. Gordon, Tanga Provincial Book 1932-57, page a12, Tanzania National Archive

[62] The German *Rupie* was decimalized on 28 February 1904, with 1 Rupie became the equivalent of 100 Heller. At the same time, a fixed exchange rate of 15 *Rupien* for 20 German Mark was established.

The increase of a modest money economy is also represented in the development of the retail trade in West-Usambara. From the beginning of German colonial rule small shops or *maduka* (*duka* sing.) started to appear in the mountains. In 1899 there were already four shops in the district center, Wilhelmstal (later Lushoto town), one Indian and three Swahili owned. *Maduka* brought a range of modern consumption goods to every corner of the Usambara mountains. In 1912 there were, besides a number of Mission *duka* in mission villages of the Evangelic Mission Society for German East-Africa (EMDOA) and some large Indian firms in the larger villages, such as Wilhelmstal (Lushoto-town), Mlalo, Mtai, Gare and Bumbuli, some 50 local *maduka* spread over the mountains. These 50 *maduka* distributed two-third of all imported products in kilo's in West-Usambara. Around 1930 one could find a *duka* in every Usambara village.

Next to products which could already be obtain by caravan and market trade before the colonial era, now also industrial products came within reach of local villagers which were not available before 1900. Examples of these are American petroleum and petroleum lamps, soap, safety pins, matchsticks, pans, spades, shuffles, saws, umbrella's, boots, blankets, locks, tobacco form the Dutch East Indies, branded *Javaanse Jongens* (Javanees boys), and rolling paper to make cigarettes.[63] All these modern products could be obtained with cash only. The *duka* price of 5 rolled cigarettes in 1904 for instance was 1 pesa and a package of *Javaanse Jongens* shag in 1907 was 16 to 20 pesa. As a result of the distribution of modern cigarettes of imported tobacco in West-Usambara during the first decennium of the 20th century, traditional pipe smoking disappeared and the cultivation of local tobacco was reduced. However in West-Usambara grown tobacco was still sold in Tanga in 1931 and in the early 1950s there was a small tobacco boom among forest squatters as a result of favourable tobacco prices.[64]

Market opportunities around 1900:

To be able to acquire this kind of consumer goods people had to earn the money to buy it. Next to labour for money, this meant producing crops for the market. Before the colonial era the people of West-Usambara already produced crops for markets far beyond the mountains. For these crops they took special care. Tobacco was such a crop. *Gana* of *tjana* as the crop was called was cultivated on a piece of land called *shumo*. This was a place where prior to the tobacco cultivation all household garbage was dumped, including goat and cattle dung from the dwellings. To protect it against wild pigs, poisonous yams were planted along the contours of the fields, such as *Dioscorea astericus* and *Dioscorea sansibarensis*. Other protective measures that were taken were fences of palisades and thorn bush and trenches of a meter in depth and in span. When compared with the cultivation of maize, yam and bananas, much more attention was also spent to the crop itself. Seedlings or *shikio ya mpuku* of the during *vuli* and *muaka* rains sowed tobacco seed were carefully replanted at the right distance. The developing plants were protected against the sun and showered. Side shoots and flowers were trimmed to enhance the development of the tobacco leafs. In between the tobacco plants sometimes some maize was grown for shadow. In the middle of tobacco fields cannabis was planted. Together with some other seeds, the cannabis was mixed with the tobacco leaves to produce a snappier product called *tumbatu*. This product was a high valued stimulant for local consumption and for trade. All men and boys had their own tobacco field and all carried with them a nicely decorated pipe to smoke.[65] Young

[63] The empty petroleum containers were used for the storage of rice, maize flour, sugar, salt and coffee. Döring, 1900: 21.

[64] Nachrichten aus der ostafrikanischen Mission, 1907: 40-42; Karasek & Eichhorn, 1908: 285-287; idem, 1921: 71; Meyer, 1909:210; Lushoto District Book, 1931, 1932-1941, Tanzania National Archive; Conte, 1999: 303.

[65] Karasek, 1908.

boys were allowed to smoke only after they had offered their father two *migate ya tumbatu* (in banana leafs wrapped round dried cakes of tobacco) of their own cultivated tobacco. For trade the *migate ya tumbatu* were packed in bundles of fourthly slices called *zungu*. Around 1900 thirty-six of these *zungu* had a market value of a cow or 20 silver rupees. Tobacco from Usambara was traded to the coast and to regions far beyond the Kilimanjaro area.[66]

The German colonial era brought new opportunities for earning money and people reacted flexible to them. When there were possibilities to earn some money people not just sold their agricultural surplus, they were also stimulated to adjust their agricultural production to the new opportunities, as the example of labours at Kwai shows. Kwai was the first German agricultural research station and was located in West-Usambara in 1897. The institute started to educate their Shambaa labourers, who came to Kwai to work for money, by forcing them to grow Irish potatoes with the use of European techniques. The Shambaa workers were not very pleased at all with the running of things and resisted. However, when they found out that their harvest was bought by the institute, pressure was no longer needed. The workers even stated to extend their potato fields and selling the crop to the station and other buyers.[67]

Another example of new opportunities, which were picking up quickly, is the collection of latex form vines during the early days of colonialism. Because of the huge demand for rubber around 1900 wild rubber or *lugorotto,* as it was called, was collected in increasing quantities by local people in the forests of West-Usambara. The latex was sold to the early German colonists in the area, who made a good profit as middlemen by selling it at Tanga habour.[68] However, with the development of rubber plantations in West-Usambara and the instalment of forest reserves this collection of wild rubber was no longer allowed.

Other products were also sold to European settlers and missionaries, such as meat, chicken, rice, milk, corn flower, tobacco, dung, banana leafs -which were used as straw in European stables - and fire wood. These products were exchanged for cotton cloth and increasingly sold for pesa. Before the crisis of 1897-1899 new weekly markets developed, located on the first large plantations in the mountains, such as Balangai, Baga, Mazumbai and Sakarre.[69]

However, at the end of the 19th century East Africa was marked by intensive droughts, pests (locust and sand fly) and epidemics (smallpox, cholera, bovine pleuropneumonia and rinderpest). The ecological crisis resulted in famine and death among cattle and men. Before 1897 the agriculturist of West-Usambara were not that much effected by this general East African crisis. Many Zigua, Bondei and Digo from the surrounding plains were still able to obtain food in the mountains during the crisis years 1883-1885, 1894-1895 and 1896. They came in large numbers to the mountains to trade dried fish, game, salt, cloth and tools for food. At the foot of the mountains new marketplaces appeared.[70] The pastoralists of West-Usambara (the Mbugu) on the other hand were affected. The loss by the cattle disease and by raiding Maasai looking for new cattle, forced many Mbugu pastoralists to flee to more inaccessible areas

[66] Krapf, 1860: 217.
[67] Von Eick, director of the Kwai research station, October 1900, Tanzania National Archive, G54/481: 165.
[68] Ronicke, 1931: 108.
[69] Tanzanian National Achive, G23/105: 18-24; Bundesarchive, Dutschland, Reichs kolonialambt, 21: 173; idem, 118: 160, idem, 429: 14; idem, 8015: 17-21, 87-89, idem, 8642: 94; Nachrichten aus der ostafrikanische Mission, 1899: 3; Baumann, 1891: 229; Warburg, 1894: 183; Döring, 1900: 29; Fleuret, 1978: 18;
[70] Trittelviß, *Die Schwarze Kunst in Luandai,* Bethel bei Bielefeld: Verlag der Evangelischen Missionsgesellschaft für Deutsch-ostafrika (1911), 54.

in West-Usambara, around Malibwi, Kwai and Mshangai. Here they constructed stockades to protect their remaining livestock, and burned down tracts of forest for the cultivation of maize and pumpkins.[71]

In 1897 drought also hit the agriculturists in the mountains hard. Whilst drought continued and the sand fly spread, clouds of locust overtook the mountains. And above all that, from the first half of 1897 up to the second half of 1899 not a single drop of rain fell in the mountains. The people called the resulting famine "*saa ya mnyime afe*" (the hunger that made one to let one's neighbours die).[72] Around 60,000 people were at the brink of starvation.[73] Notwithstanding the crisis, local people, according to the German governor von Götzen, needed to get used to regular payment of taxes and labour duties.[74]

Market directed production during the colonial era: maize, coffee, tea and vegetables.

The combination of this crisis and the colonial policy of expropriation of land, forced labour and the introduction of a tax regime led to a period of disruption which took time to recover from. However, local people slowly started to adjust to the new reality by adapting and responding to new opportunities that came about. This trend became especially clear after 1904. In that year the very disturbing labour recruitment system, in which European plantations had their own area and villagers to recruit labour from, was abolished. Although a new system of labour cards came into being in 1907, people – especially men - became more able to take advantage of an increasing market for food.

The developing colonial plantations economy in the low lands of Korogwe, Pangani and Tanga needed food for their labourers. The first to take advantage of this new market were Nyamwezi-colonists who changed from being labourers to being producers of maize and cotton for the market.[75] However, in 1905 the colonial plantation companies accused these Nyamwezi of being the cause of a labour crisis. Furthermore, they competed with the plantation production of cotton and asked too high prices for their maize, according to the complainers. A problem was that the prices of maize in those days fluctuated strongly from 4 , 6 up to 16 pesa per *kisha* (*Visha*, plu.), a sting of 24 to 30 corncobs.[76] Under the pressure of complaining companies the government started to force the Nyamwezi back into plantation labour. However, the circa 5,000 Nyamwezi colonists just picked up their belongings and left for British East Africa. This was an opportunity for agriculturist of West-Usambara. It was they who started serving this growing market for maize.[77]

This developing market for food was related to the increasing number of contract labourers on European coffee, rubber and sisal plantations in the region. Between 1906 and 1911 the number of contract labourers in Wilhelmstal (Lushoto) who were coming from all parts of German East Africa and even beyond, increased from almost 2,500 to circa 6,300. Many more came to the rubber and sisal plantation in the surrounding low lands. Every individual contract labourer spended, according to a calculation in 1907, around 30 *Rupien* a year on buying food on local markets. While a contract labourer earned 12 to 14 *Rupien* a month by working 10 hours a day and a day labourer for the same workload

[71] Bundesarchive, Deutschland, Reichs kolonialambt, 5000: 110, BAP; Nachrichten aus der ostafrikanischen Mission, 1894: 25; Conte, 1996: 105.

[72] It was the custom for neighbours to eat together, each household contributing dishes for the meal which is eaten outside the house, men and women separately. This was no longer possible.

[73] E. Johanssen, *Führung und Erfahrung im 40 jährigen Missionsdienst*, Bethel bei Bielefeld: Verlagshandlung der Anstalt Bethel (1933), 195. BIX 16, no. 1 m, Haupt-Archiv Bethel Mission, Bethel bei Bielefeld.

[74] Von Götzen, November 1900, Bundesarchive, Deutschland, Reichs kolonialambt, 789: 11.

[75] A. Meyer to the Governor 25..3.1905, Bundesarchive, Deutschland, Reichs kolonialambt, 118: 179.

[76] Report by the Provincial Commissioner of Tanga, Amani 31st August, 1946. Hans Cory Tanga Provincial book.

[77] Nachrichten aus der Osatafrikanischen Mission, 1905: 35-36; Bundesarchive, Deutschland, Reichs kolonialambt, 118: 174; Archive of the Vereinigte Evangelische Mission, Wuppertal-Barmen, Germany M III 4.1.; Cf. Fleuret, 1978: 45-46.

6.5 *Rupien*, a local Shambaa producer of food for the market could earn 30 to 40 *Rupien* a month, with an average workload of two hours a day.[78] So, in reaction to this expanding and lucrative market, local farmers switched to food crops which were preferred by the genuine contract labourer. Next to sweet potatoes, Irish potatoes and vegetables, they extended their rain-fields for the production of maize and beans.

> "*In Usambara one can see clearly that, with the coming of strange plantation labourers and the increasing demand for food, the majority of the Shambaa are extending their fields*."[79]

At the same time increasingly less attention was paid to former important crops, such as in *gunda* grown bananas, but also yams, rice and tobacco. With a market production in 1912 of more than 3 million kilo of food, mostly maize, Wilhelmstal (Lushoto district) had evolved into the most important market for food in German East-Africa.

However, this increasing production of maize on rain-fed fields also had negative implications. The Usambara mountains are not the most suitable place for growing maize. Without the use of fertilizers exhausting of the ground is inevitable. And, maize grown higher up the slopes, as was done with the extension of the agricultural land, takes longer to mature while the harvest itself declines. Besides, the risk of crop failure is much higher in comparison to the banana culture. The now and then erratic rainfall pattern, especially the short rains which are essential for growing maize and beans, low night temperatures at higher altitudes, fungus, pests, such as locust and borer, and the strong winds in the from natural forest cleared open maize fields, made the risk of crop loss high.[80] An example of the risks of maize production in relation to erratic rainfall pattern is the difference between 1931 and 1933 in maize production for the market.[81] In 1931 the average rain fall in West-Usambara was as high as 1500 millimeters and local farmers were able to sell 432 tons of maize on the market. However, in 1933 the average rain fall was less than 700 millimeters and no maize was exported from West-Usambara at all.[82]

At the beginning of the First World War an allied navy blockade made the export of plantation crops from German East Africa impossible. Circa 85,000 plantation labourers, of which half were working in Panganital (the districts Tanga, Pangani and Wilhelmstal), were no longer needed. This meant also that the market for food collapsed. However, a temporary new market appeared at the same time. Food was needed for the German army at Moshi, consisting of more than 10,000 *Askari*, porters and workman.[83] At least 25% of the daily needed 20,000 kilo of maize flour had to be provided by West-Usambara farmers, along with huge amount of eggs, butter and meat. People could deliver the food at special depots at Korogwe and Mombo where they could sell it at guaranteed prices. Maize for instance was bought for the very reasonable price of 12.5 pesa per *vishe* of circa 3 kilo's. In the period between September 1914 and early January 1915 the district of Vuga alone was able to deliver 150, 000 kilos of maize, banana flour and beans.[84]

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[78] Bundesarchive, Deutschland, Reichs kolonialambt, 120: 79-81; Waltz, 1912: 99-103; idem, 1913: 132-133; Tanzania National Archive, G8/127: 98, G8/171: 37; G8/174; Tanzania National Archive, G8/872: 27

[79] Wohlrab, 1915: 117.

[80] Bundesarchive, Deutschland, Reichs kolonialambt, 8642: 95-97; Huijzendveld, 1997: 365.

[81] In 1931 Mlalo's main crops was maize. Other crops were European potatoes, sweet potatoes, beans, bananas, cassava and also a little tobacco was cultivated. Lushoto District Book, 1931, Tanzanian National Archive.

[82] TRADA, 1931: 27, idem 1933; See for rain patterns at ward level for the Lushoto district, between 1923 and 1957, Lushoto District book, Tanzania National Archive; Fleuret, 1978: 87-88.

[83] *Askari* are African (Nubian) soldiers in German service.

[84] Archive of the *Vereinigte Evangelische Mission*, Wuppertal-Barmen, Germany, M III 4.4.

The colonial government also stimulated the production of food for the war economy. Part of expropriated land was returned to local farmers. Areas were drained to make them suitable for agriculture, such as the swamp areas near Mombo and Vuga. At other places traditional irrigation systems were restored and new fields were prepared for cultivation, for instance at Ubii, and in Zimui, Mkuzi and Kimazi. Interesting is that in this area in the 1950s 38% of the areal was in use for irrigation agriculture, especially for the commercial production of vegetables, a development which had started, as we will see, during the first World War. The agricultural research station Amani in East Usambara started also to stimulate the production of cassava in order to secure the food production for German East Africa on the long run.[85]

Another opportunity to earn money was the production of Arabica coffee. During the colonial era this crop slowly developed into an important, and as we will see a risky, strategy to earn a cash income. After 1905 a small number of Christian farmers acquired coffee seedlings from the mission.[86] However, the general importance of the crop to local farmers stayed limited. Production for the market of coffee by local farmers took shape after the First World War. The mass repatriation of German colonists after the First World War brought the opportunity for local farmers to regain former alienated land of the abandoned estates and forest areas. In the middle 1920s this Enemy Property was resold to new owners and in most places local farmers were evicted. However, during this short time these local famers were able to experiment with European cash crops, such as coffee and fruit trees.

From 1912 onwards the prices for coffee on the international market had developed in a positive sense and this development went on into the 1920s.[87] These circumstances created opportunities for a local African production of Arabica coffee for the market. However, it was only a small group belonging to a kind of local elite who were able to take advantage. Most of them were former African administers in German government service, such as *Akiden* and *Jumben*, Africans belonging to the mission and local people who had made their money in trade. They were the ones who were able to pay for the needed wage labour and other needed investments, such as seedlings, dung and pesticides. It was this group of coffee producers who, during the 1920s and 1930s, consisted of circa 250 small scale coffee producers, that organized themselves, for instance in the Usambara Native Coffee Growers Association (1931) and the Vuga Coffee growers Association (1935). Most coffee was intercropped with bananas, which were used as food and as shadow trees. These kind of fields were known as *mashamba ya kighoshi* (the fields of the man).[88] The income of these fields were for instance used for buying cloth, small necessities and an occasional meat ration. In the early 1930s, during the "plant more corps campaign", coffee was for the first time stimulated by the colonial government under the condition that new fields be bench-terraced. This was done without any resistance. However, the extension of coffee production was only for those farmers who were able to invest in seedlings, insecticides, time and labour. [89]

The international economic crisis of the 1930s and the Second World War created a very instable and unbalanced economy. However, the American entry into the war created a demand for Tanganyika's previously unwanted exports. In 1941 West-Usambara some 900 coffee growers with at least 150 trees each marketed 20 tons of Arabica coffee. In 1943 there were 1,157 growers with over

[85] Tanganyika Department of Agriculture, Annual Report, 1945-1962; Attems 1967: 73-75; idem, 1968: 152-153; idem, 1969: 195-196.
[86] Nachrichten aus der Ostafrikanischen Mission, 1905: 10.
[87] Illife, 1979: 263
[88] Report by the Provincial Commissioner of Tanga, Amani 31st August, 1946. Hans Cory Tanga Provincial book 1932-1957, Tanzania National Archive.
[89] Lushoto distict book, 1931; Tanzania National Archive, 72, 3,2.

400,000 trees. A further extension of coffee production was fueled by post-war world market price increase during the 1950s Korea-boom. At the end of that decade circa 260 to 270 tons of Arabica beans were marketed.[90]

Vegetable production for the market became also a possibility to earn income in cash. In the 1920s vegetable seeds were freely distributed to local farmers. Up to the war all potatoes, tobacco and vegetables transported by train to Tanga came from Lushoto. In response to (temporally) high war time prices offered by the War Supplies Board, local famers raised the production of vegetables from circa 200 tons to above 1,000 tons in 1943 and 1944. Thereafter the output sank but never to pre-wartime levels.[91] After the Second World War, West-Usambara was seen as a source of surplus food to supply the fast growing labour of sisal estates. Vegetables were among the crops in need. During the 1950s a steady stream of vegetables of circa 500 to almost 700 tons was flowing from West-Usambara to Tanga city in reaction to rising prices for the circa 5,000 local vegetable producers. This development of vegetable production was accompanied by a voluntary further restauration and extension of irrigation infrastructures and terraces.[92]

In the cause of the 1950 the limited group of coffee growers in West-Usambara earned enough money to construct their homes with concrete floors and corrugated iron roofs. Others acquired bicycles and lorries to earn further money in transportation and/or invested in trade. The same was true for local vegetable growers. Some of them begun purchasing lorries of their own to sell their crops on town markets, and so surpassing Asian and European transporters. However, until independence the bulk of vegetables for the European population in cities, such as Tanga and Dar es Salaam, was still produced by European farmers.[93]

Uhuru: crisis and recovery:

In 1961 Tanganyika gained its independence or *Uhuru* and in 1964 an act of Union was signed with Zanzibar which created the United Republic of Tanzania. In the decade preceding *Uhuru,* anti-colonial sentiments had culminated when measurements were enforced, such as terracing and irrigation, in areas were food crops with a low market value was cultivated. The local colonial government was confronted with a near-insurrection as a result. As we have seen, Nyerere's strive for independence had gained by giving support to these protesting Usambara farmers. After independence this support was rewarded by the opening up of circa 3,000 hectares of Shume forestland for settlement.[94] Nyerere's policy of an independent African socialism, based on self-reliance and *Ujamaa*-villagisation, introduced in 1967, gained a lot of sympathy from Germany, the Netherlands and the Scandinavian countries.

A combination of factors made an end to the promising early years of independence. Droughts (1973 and 1980-81), the failure of the *Ujamaa* policy, the world economic development, the oil crisis (1973), the end of East African Community (1978) and the Uganda war (1979) created an unprecedented economic crisis that started in 1974 and rock bottomed in 1983. Shortages of almost all goods, including essential, became the order of the day.[95] The lack of foreign currency, declining exports and imports, a fairly high rate of inflation, artificial foreign exchange rates and a control on a number of prices, created huge parallel markets and a climate of bribes and other forms of corruption. In West-Usambara, for

[90] Fleuret, 1978: 63.
[91] Lushoto district book, 1929; Lushoto district book, trade-export- Crop production –Usambaras, 1932-1941;
[92] Tanzania National Archive, 73/2/2 and 72/3/2.
[93] Fleuret, 1978: 6-7; Nyamba, et al., 2006:
[94] Jambiya, 1998: 3-6; Conte, 1999: 305.
[95] Lofchie, 1978; Svendsen, 1986.

instance, the result of African Socialism during this crisis was not social equality and a low degree of public control over market forces, but capitalist accumulation by a small group. According to Fleuret (1978) and Sender & Smith (1990), the benefits of both the land/forest policy and the *Ujamaa*-village policy were, for the larger part, captured by the wealthier rural accumulators, who dominated local leadership positions. In the opened up of forest area it were these influential farmers who acquired the better and larger pieces of forest land. Corruption was the order of the day. "If you don't give *chai* (a bribe), no *shamba* (field)" was the saying.[96] In the *Ujamaa*-villages it was the same group who dominated decision making and presided over opaque distribution and decision making, which allowed them to appropriate resource at the expense of other *Ujamaa*-village members.[97]

At the same time a German development initiative (LIDEP) started in 1964 to give technical advice, European seeds, chemical fertilizers, at very low subsidized prices, provided reliable and inexpensive means of transport for vegetables to distant urban markets and offered a relative high subsidized price to local farmers. This fuelled a further expansion in highland vegetable production.[98] In 1973-76 an estimated 2,500 hectares were planted with vegetables.[99] However, out of sympathy for Nyrere's African socialism the German extension workers had only focused on farmers in *Ujamaa*-villages. Others were neglected and had only limited excess to the organized and inexpensive transport of vegetables. False competition and bad transport facilities forced these farmers to reduce their output of vegetables at the end of 1975. They had no other option than to switch to maize.[100]

Because the size of a black market economy is not visible in official documents, it is hard to estimate the consequences of the crisis for the production of food crops for the local markets, such as maize. We do know that limited oil imports hindered transport of food products to distant markets. However, people tried to use *dala dala* (mini busses) and larger busses for transport whenever possible. Export products, such as tea and coffee, on the other hand are better traceable.

Coffee and tea up to 2014:

After the Arusha-declaration (1976) Tanzania's socialist government started a state controlled economy and a program of nationalization.[101] The nationalized sisal, coffee and tea plantations became so badly managed that workers were not paid out. And, small growers of coffee and tea were never certain when or if they were to be paid at all. The extent of the hardships and poverty endured by people was well documented at the height of the state control of the economy in the mid 1980s.[102]

During the second part of the 1960s the cards for coffee growers turned. The fall in world prices between 1966 and 1970 resulted in a price drop of circa 50% and the spectacular increases of the previous period came to a hold. Although International coffee prices during the 1970s and the 1980s were relative favorable again, towards 1978 the crop had fallen out of favour. This had to do with a socialist reorganization of the coffee market. In May 1976 the government started to organize coffee production on *Ujamaa*-level. In 1977 the government abolished all cooperative unions and all post-harvest functions were handed over to the villages or the Tanzania Coffee Board, renamed the Coffee

[96] Conte, 1999: 306.
[97] Sender & Smith, 1990: 109-116.
[98] The Kübel-Foundation funded Lushoto Integrated Rural Development project (LIDEP) initiated in 1964 included production and marketing of vegetables. Nyambo, et al., 2006: 16.
[99] TIRPED 75-80: 75.
[100] Fleuret, 1978: 159-160.
[101] Dias, 1970.
[102] Sender and Smith, 1990.

Authority of Tanzania. Farmers in Usambara reacted on the changing market opportunities by stopping pruning and spraying of their trees. The resulting deterioration of the coffee quality worsened the situation and the first farmers started to uproot the trees in favour of maize and cassava. [103]

In 1984 the government reinstated the cooperative unions and primary societies. Procurement, transportation, and processing functions were handed back to the unions and primary societies. However, the attractiveness of growing coffee degenerated further as a result of the collapse of the international coffee agreement (ICA), who had regulated the volumes of coffee exports as it placed ceilings to stabilize international prices for coffee, and the liberalisation of coffee markets in 1993.[104] Due to the negligence of the coffee trees during the coffee crisis of the late nineties to beginning of the year 2000, when coffee prices reached again rock bottom, productivity fell from 1 million kilos 2002 to about 250 thousand kilos in 2012.[105] The Usambara cooperative Union tried to help farmers in revitalizing their coffee production by providing 50% subsidized coffee seedlings and credit facilities. However, farmers remained reluctant to invest and had no interest in revitalizing their coffee stands, because of the insecurity of pay-off for their investments. There are still some 3,000 farmers in West-Usambara who produce Arabica coffee, but production and quality is decreasing because without the needed investment in fertilizers the soil fertility is declining.[106]

Tea producing farmers reacted in the same way to opportunities and restraints as the coffee growers. Commercial tea production on plantations began in 1926 and in 1929. As early as the 1930 ideas were developed to organise tea production as a small holders cash crop around central processing factories. By the 1960s tea had become an important smallholder cash crop for peasant producers in a limited part of West-Usambara, around Mazumbai in the Bumbuli Division.[107] The majority of tea farmers cultivated tea along with other crops, both for income and food. During the early days of independence tea offered a good price and a number of people were able to make a little capital. Some of them started to invest this in off-farm activities, such as *maduka* and *hoteli* (guesthouses), to diversify their portfolio.

During the post-independence crisis the inflation corrected producers prices for tea dropped between 1977/8 and 1985/6 with more than 50%. The following season prices increased again. However, this price increase followed the devaluation of the shilling. As a result, real producers incomes did not increase at all.[108] In 1996 for instance farmers received Tanzanian shillings (Tshs.) 50 per kilogram. The price in 2009 ranged, depending on its quality, between Tshs. 100 and 160 per kilogram. With an average inflation of 9% a year, this meant in reality a further decrease of buying power. Prices of agricultural inputs, particularly fertilizers, at the same time became too high for average farmers to afford on cash basis. In Tanga a 50 kilogram bag of NPK fertilizer was sold in the year 2000 at Tshs. 13,500 before transportation. The market price for NPK 25:5:5 fertilizer had risen to around Tshs. 50,000 per bag in 2009. This meant that, inflation corrected, the price for this agricultural input had risen with 32% during this period.[109]

Because prices for tea offered to the small-scale growers were either marginal or below economic viability, and the price of an input, such as NKP, became more expensive, especially the small-

[103] John Baffes, Tanzania's Coffee Sector: Constraints and Challenges in a Global Environment, 2003: 2
[104] Svendsen, 1986.
[105] Treichel, 2005: 11
[106] Agriterra and Rockin Soils, project http://www.agro-info.net/?menu=projects&view=project&project_id=24984. They estimates of famers producing coffee is between 2,800 and 4,000.
[107] Campagnola, 2009.
[108] Sender & Smith, 1990: 95-96.
[109] Ndamugoba et al., 2000.

scale farmers started to neglecter or abandon their tea fields. In 2008 a total of 862 tea farms had been abandoned or were poorly managed.[110] Farmers continued to abandon the farms despite rigorous campaigns being conducted by various Tea Stakeholders for rehabilitation.[111] Although they were offered subsidized tea seedlings, fertilizers and credits, small-scale farmers switched to other activities, such as cultivation of horticultural crops, the selling of their labour and the planting of other trees, mostly gravelia trees, on their tea plots. [112] So, low producers prices for coffee and tea as compared to production costs, high costs of agricultural inputs (particularly fertilizers and herbicides), delayed payments, lack of labour for smallholder farmers, poor payment systems, biased fertilizer loan schemes and the presence of high paying horticultural crops made tea and coffee small farmers to change their portfolio strategy for meeting their income needs.[113]

Horticultural crop production.

Next to tobacco, maize, Irish potatoes, tea and coffee, there were also other crops which had or have a relatively high market value which we left out of the argument. You can think of beans, cowpeas, pears, plums, apples, strawberries, peaches, citrus, pineapples, avocado's, macadamia, cardamom and wattle. The production of horticulture crops, such as tomatoes, onions, cabbages, carrots, cauliflower, cucumber and sweet/green peppers, needs to be discussed further because horticulture has developed into a local industry providing important cash incomes.[114] Horticultural crops give high returns. The availability of water through irrigation structures has enabled a high cropping frequency of up to three or even four times a year.[115] We have seen that the production of these crops for the market by local farmers started during the first World War and that up to independence the bulk of vegetables for the European population in cities, such as Tanga and Dar es Salaam, was produced by European farmers. Towards 1990 still a comparatively small number of local farmers in West-Usambara had specialised in vegetable production. However, this started to change from the mid-1990s onwards. Horticulture became the most attractive way of earning money in agriculture in West-Usambara.[116]

This development is related to the economic change that is taken place during the past 20 years. From circa 1995 onwards Tanzania is experiencing strong economic growth, low inflation and an increasing urbanization. Between 2002 and 2012 the population of Dar es Salaam for instance increased by 5,6% a year. The population of the capital increased from 769,445 city dwellers in 1978 to 4,364,541 in 2012. This economic and urban growth increased the market for Usambara's vegetables, beans (especially *soya manjano*) and fruits. A portion of the harvest is used for local consumption, but vegetables are mainly grown for the urban markets of Dar es Salaam (Kariakoo) and Tanga.[117] Urban increasing demand for horticulture crops encouraged the growth in the horticulture sector and stimulated the development of marketing networks and transportation.[118] In 2002 Lushoto was producing 54,020 tons of vegetables, most of which were tomatoes, followed by onion, leeks and cabbages.[119]

[110] Carr et al., 1992.
[111] TRIT annual Report 2008.
[112] Jensen, 2009. (42/56)
[113] As a result, mid-2013 the Mponde Tea Factory had to close its doors and the export of processed tea from Lushoto dropped with 40%, Tea statistical report for July to September 2013.
[114] Mowe, 2002; Nyambo et al., 2006: 12.
[115] Johansson, 2001
[116] Wickama, et al., 2006.
[117] Mascarenhas, 2000: 12; Sokoni & Shechambo, 2005: 12
[118] Sokoni & Shechambo, 2005: 27; Nyambo, et al., 2006; Wickama & Nyanga, 2009: 9.
[119] Leijdens, 2008: 4, 26.

The flow of horticulture products to urban markets became also the engine for a further revitalisation of irrigated agriculture in West Usambara, since vegetables are grown at specific location with the use of irrigation. The for horticulture suitable and fertile soils are, for the most part, located in the valley bottoms (*vidau*) and on the surrounding gentle slopes which hold the needed high levels of nutrients, fertile and moisture or fertile areas suitable for irrigation; most of it man owned land. The TIP and AHI initiatives stimulated several measures to improve the agro-ecological situation in West-Usambara. Amongst others, such as the creation of macro-contour lines, grass strips, terraces, ridges and the implementation of *fanya juu* and *kingamaji*[120], they stimulated the extension of irrigation systems to improve a sustainable production of maize. Surprisingly, this did not lead to an increasing but to a decreasing production of maize, as more land under irrigation became to be used for high value crops instead of low value crops, such as maize.[121] Indeed, most farmers are, if possible, shifting their production form maize to vegetables.[122] And, at places which are confronted with a decrease in water available for agriculture, the scarce water is often used for growing high value crops, most commonly vegetables. In some locations, which are not suited for high value crops, irrigation structures became abandoned. When farmers were confronted with a reduction in their ability to produce adequate food for their households and with a reduction of their incomes they stopped investing their energy in maintaining irrigation works in order to use their labour to earn money to buy food.[123]

Portfolio strategies, resilience and social-economic differentiation:

We have seen that demographic and (colonial) economic developments led to an interactive process of overexploitation of the area's natural resources, deforestation, land degradation and erosion that led to the predication of a Malthusian crisis. Still, most people in West-Usambara grow low market value crops for their own consumption, such as maize, cassava and banana's, without taken any modern measures to improve the harvest and to sustain the fertility of the soil. In other words, notwithstanding the ecological signs of degradation, people stay reluctant to invest labour and money in the fields where these crops are grown. We have seen however, that they do invest in crops which have a relative high market value. This was in pre-colonial time tobacco, in early colonial time maize and Irish potatoes and from circa the 1930s Arabica coffee and tea, and now especially vegetable and fruits. The problem with the income based on these cash crops is, as we have also seen, its high volatility.

Off-farm income:

For most people, agricultural activities are inadequate to meet all household requirements, especially today for those who do not have access to the *vitivo* or other land suitable for horticultural. They have a range of alternate options, most of which relate to non-agricultural activities, such as handicrafts, business, trade, services, amongst others the new taxi services by motorcycles, called *bodaboda* transport, the production of charcoal, bricks and stones for the production of concrete, and wage labour. To secure their livelihood as good as possible households develop portfolios of farm and off-farm activities. According to Jambiya (1998), the tendency to combine farm and non-farm activities

[120] *Fanya-juu*, the development of bench terraces over a period of time. The terraces are constructed by throwing soil up slope from a ditch to form a bund along a contour. *Kingamaji*, hill side ditches on the upper part of the fields to collect and evacuate the run off from outside the fields.
[121] Interview, Mr. Hussein Shelukindo, District Agricultural and Livestock Development office (DADO), Lushoto, January 2015.
[122] Mowo, 2002.
[123] Sokoni & Shechambo, 2005: 21-23, 30; Wickama, et al., 2006.

intensified especially from the second half of the 1990 onwards.[124] With the money earned they try to meet their needs in general and buy food to meet the deficits of their own food production, which mostly occurs between January and June, with May being the most critical month.[125] And, if possible they not only invest in promising high value cash crops, but also in all kinds of activities and business as well as in the education of their children in the hope for a better future.

From pre-colonial times people had all kinds of off-farm activities, the products of which were used to exchange and sell on local markets. Examples of these are beer (*pombe*) brewing and selling, making and selling of local medicine, handicrafts, such as the making and selling of baskets and pottery. In 1990, when I visited the markets of Lushoto and Mlalo, you could buy all kinds of handmade items, such as all kinds of baskets and large earthenware cooking pots. The woven baskets for winnowing, carrying and storage were also transported to and sold at distant markets, such as those of Tanga, Arusha, Same, Moshi and even Taveta in Kenya. When I revisited the Usambara markets in 2004 most of the baskets and all earthenware was replaced by plastic bags and buckets and aluminum pots and pans.

Others developed all kinds of non-agricultural village enterprises. We have seen that since the early colonial era *maduka* spread to every village in the mountains. Some people were able to invest in hoteli (guesthouses), local beer halls and bars, and specialised handcrafts, such as shoe repair and shoe shinning, butchery, tile making, electrical or diesel-operated milling machines to process maize, lumbering, tailoring, masonry and carpentry.[126] Missionaries of the EMDOA introduced new skills, such as masonry and carpentry, in the Mlalo area. Mid-1940 Mlalo held the best carpenters and masons in the whole of the Usambara district. Near Mlalo trading centre whole villages were inhabited entirely by carpenters whose frames and doors were sold within and outside the district. According to the elders that Cory interviewed in 1946, this kind of skilled work together with wage labour were the most important sources of income in the Mlalo district. [127]

Wage labour and remittances are also part of the diversified portfolio strategy that explain peoples resilience. During the early colonial era people hesitated to work outside the mountains out of fear for malaria. They did work in low land *vitivo*, but only during the day. Hans Cory noticed in 1946 that women from the villages of shortage went to work in the *vitivo* as day labourers and were paid in kind. In May and June, the months of scarcity as we have seen, he saw many women labourers returning daily with loads of *muhogo* (cassava) after work at Mbaramo. During the German colonial era most people from West-Usambara worked freely or forced via a labour card system for European plantation and settlers within the mountains. People still have paid labour on farms in the mountains, but now they are working for the relative well-off local farmers. Women, for instance, often sell their labour, a practice that is called *kinyange*.

The increasing need to earn money pressed people also to find paid jobs outside the mountains. During the British colonial era a noticeable percentage of the male population, young married men as well as bachelors, was employed away from home. The majority were employed by Indians in Tanga, Mombasa and Nairobi as domestic servants. A few worked on sisal estates in the plains. They maintained the closest contact with their homes and returned at frequent intervals. In the 1960s more young men began to go further and longer afield to seek employment or any other economic opportunities that they could find. By the 1980s this kind of migration labour had become widely

[124] Jambiya, 1998. 3, 20.
[125] Sokoni & Shechambo, 2005: 21, 24, 36.
[126] Sokoni & Shechambo 2005: 24, 36.
[127] Lushoto District Book 1926; Report by the Provincial Commissioner of Tanga, Amani 31st August, 1946. Hans Cory, Tanga Provincial book 1932-1957. Tanzania National Archive.

accepted, and is now perceived as the norm in West-Usambara. Relatively new is that also younger women are beginning to join the out-migration process to sell their labour elsewhere in urban areas to work as domestic workers or as bar maids. So, both young men and women are searching for work in urban or other areas. They leave their children with their grandparents or other relatives and send periodically remittances back home.[128]

Trade has also become an important off-farm occupation for villagers.[129] Everybody wants to go in trading or *biashara* as it is called, of whatever sort. Young migrants followed the vegetable trucks and headed for towns with the object to enter the trade in vegetable and fruit, second-hand clothes (*mitunba*) and all other modern items which can be sold on local markets and *maduka*, such as factory produced beer and food. However, this petty trade needs also investment, so a relatively small number of men are engaged in this kind of business. A trend is that more children are joining the market economy at a younger age.[130] Some people, especially women, engage themselves as middle-women and transfer vegetables and other crops to periodic markets in other wards and villages. A bigger proportion of women go to the lowlands to buy crops and commodities, such as rice, yams, cassava to sell at the periodic markets in the mountains.

Above we have seen that relative better-off farmers could invest in business and transport, young men and later young women were involved in migration labour, and more mature women in the transfer vegetables and other food crops to periodic markets. Indeed there is a clear interaction between the involvement in off-farm activities, gender, farm size, education level and the social-economic position of households and a trend to further social-economic differentiation. Marcarenhas (2002) noticed that in the highlands of West-Usambra there is a stronger social-economic differentiation than in the surrounding low land of Lushoto.[131]

Social differentiation:

The society in West-Usambara was never an egalitarian one. Differences in wealth or *mali* as it was called, became visible in the size of cultivated land and *gunda* controlled by the eldest living father of the family group or *mgosh wa mwango* (protector of the door). Other things that determined the condition of his *mali* was the number of wives, children and livestock he possessed, as well as the amount of cotton cloth, beads, iron and bronze wire and *pesa* he had.[132] We have seen that during the colonial era and even during the *Ujamaa* period especially people with relative wealth and (political) networks were more able to take advantages of opportunities.

The decreasing profitability of former important cash crops, such as coffee and tea and increasing profitability of horticulture production since the mid-1990s led to a scramble for land suitable for vegetable production. This stimulated the growth of a market for land, especially in valley bottoms. Here irrigation is widely applied. Increasingly fields under irrigation are becoming transferable through the local land market. Because it became easier to buy or rent land, it were especially the better-off farmers who were able to take advantage of the situation. Poor farmers, on the other hand, are often the sellers of land. They are forced to do this when they become unable to buy enough of the necessary inputs, such as seeds, fertilizers and pesticides, or when they are confronted with other serious social problems

[128] Tenge & Hella, 2004; Tenge, 2005.
[129] Sokoni & Shechambo, 2005: 27
[130] Moyo, 2002,.
[131] Marcarenhas, 2000: 34
[132] Huijzendveld, 1997: 55-56.

that require cash income, such as illness and court cases. Some are selling land to send their children to school in the hope of future remittances for the whole family, also a way to acquire cash.[133] So, a few better-off farmers have the opportunity to accumulate land at the expense of a majority of poor farmers. The later often rely on tiny plots of rain-fed agricultural land, mostly spread over distant locations, for the production of low value food crops, such as maize and cassava, for which they do and cannot buy any inputs.[134] As a result, most erosion-prone fields are those where maize is the main crop. These marginal households have to turn to the above mentioned off-farm occupations and casual labour to acquire, as far as possible, the cash income to meet their basic needs.[135] The well-off land accumulating farmers are able to invest in all kinds of business, the construction of new houses, consumer durables, health, education and cattle.[136]

Cattle is also a way to make money. Many households keep livestock which consists of one or two heads of local cattle and some sheep, goats and chicken.[137] Traditionally cattle grazed in the light woodlands and on fallow land. During the dry season they were fed with fodder from the valley bottoms. As we have seen, these came to be used for the production for high value crops. According to Baum (1984) this led to serous fodder shortages during the dry season and further overgrazing of the remaining slopes and hill tops.[138] However, the diminishing opportunities did not decreased the number of livestock. If we compare livestock numbers in Lushoto between 1941-42 and now, we see a general increase but not as big as the population growth. This increase was accompanied with a shift of cattle from the mountains to the lowlands, such as the Umba plains, Korogwe and Mlingano. Another development is that, with the introduction of exotic bulls by SECAP and the zero-grazing policy in most part of the mountains, cow milk production became an alternative way of making a cash income. Today, farmers with improved dairy cattle sell their milk to major milk buyer in the area, located in Tanga town.[139] However, they prefer to sell it locally to vendors, restaurants and individuals since these buyers offer a better price. All the manure is used either by the livestock keepers themselves, or sold to other farmers, which is also a source of income. However, again only the relatively well-off households can afford to invest in this commercial activity of exotic dairy cattle keeping to produce milk. [140]

Conclusion:

West-Usambara is an area with characteristic features of a highland belonging to East Africa Arc. The agricultural and environmental history, especially from the late 19th century onwards, is one that is characterised by population growth, increasing pressure on agricultural land and forests and by a reduction of soil fertility and erosion. From the 1910s onwards colonial officers started to recognise the negative features of this process and from the 1930s onwards an imminent Malthusian crisis was predicted. Since then most plans, research and development projects are guided by ideas of resource conservation, sustainable subsistence production and food security of small-scale farmers. Even with a change from the top-down approach of the colonial era to a bottom-up approach from the 1980s

[133] Mascarenhas, 2000, 12.
[134] Wickama & Nyanga, 2009: 10; Interview, Mr. Hussein Shelukindo, District Agricultural and Livestock Development office, Lushoto, January 2015; Meeting with farmers in Baga village, January 2015
[135] Sokoni, 2005: 24; Ezaza, 1988: 157-163.
[136] Sokoni, 2005: 29; TIRDEP, 2005: 10
[137] Baum, 1984: 68; Jambiya, 1998: 3.
[138] Baum, 1984: 68-69.
[139] Interview, Mr. Hussein Shelukindo, District Agricultural and Livestock Development office, Lushoto, January 2015.
[140] Lushoto District book, stock census, 1937, 1941-42. Morris et al., 2015;

onwards a majority of rural households is, in most situations, still reluctant to implement the (whole package of) presented technological solutions for "their" agro-ecological problems.

Considering Sumberg's remark that good innovations should fit the external circumstances, we presented in this paper a historical interpretation of the changing circumstances for rural households in West-Usambara. The central argument is that not subsistence production, but the (modest) need for cash income is the decisive element in households decisions and survival strategies. To illustrate this we have looked at the way households in the West Usambara mountains over a period of more than 120 years made adjustments in their way of making a living under major constraints, such as droughts and diseases, alienation of land, population growth, and opportunities for earning cash.

Forms of slash and burn cultivation, seasonal rain dependent agriculture, irrigation farming, intensive permanent cultivation and commercial farming were essential elements of the agricultural practices before the colonial era. The example of tobacco production and marketing showed that 19th century local farmers were very able to take sophisticated care of crops with a market value. The German colonial era brought new opportunities for earning money and people reacted flexible to them. This was illustrated with the examples of Irisch potato production at Kwai and the harvesting of vine rubber in the forests of West-Usambara. We have demonstrated that an important reason for the spread of maize cultivation over the mountains was the fact that maize became an important cash crop as a result of a developing food market for plantation labourers. This rain-fed cultivation of maize, with the use of extensive techniques of slash and burn, replaced the irrigated banana gardens or *ghunda*. As a result many irrigation canals laid dry, whereas the irrigation of fields diminished.

The same kind of shifts took place in relation to other upcoming cash crops, such as coffee, tea and vegetables. People did invest in these kind of crops and were prepared to innovate as long as the crops had a relative high market value. We have seen for instance that, with the developing market for horticulture, traditional irrigation systems were revitalised and extended. Several development initiatives claim results in this sector. However, in reality their success had to do with the fact that they just participated in a development that was already ongoing. Development initiatives for most part failed to reach their goals where low value crops were concerned. Households with often tiny plots of rain-fed agricultural land, mostly spread over distant locations, for the production of low value food crops, such as maize and cassava, were and are willing to accept new generations of seeds for free but don not accept the whole package of measurements to improve the amount of harvest and long-term improvement of the soil, since they cannot afford to invest money and labour for these low value food crops. As a result, most erosion-prone fields are still those where low value crops, such as maize, are cultivated. So, it is better to speak of high and low market value crops instead of subsistence and cash crops.

A minority of households, with already relative wealth and (political) networks, were more able to take advantages of the opportunities that pasted by. They were able to accumulate land at the expense of a majority of poor farmers and invested also in off-farm business to extent their portfolio's. Income of the off-farm activities was also reinvested in high value agriculture and cattle keeping. The majority of marginal households had to turn to all kinds of off-farm occupations and casual labour to acquire the cash income to meet their basic needs. This increasing diversification of farm and non-farm activities is an important explanation for the resilience of the ever growing population of West-Usambara, against the background of the deterioration of ecological circumstances around low market value food production and the reluctance of farmers to invest in that kind of agriculture for long-term improvements. Better-off farmers tend to adopt new innovations in high value crops, milk cattle and off-farm businesses because they have means and, because of that, the ability to bear higher risks.

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