Pastoralism: Research, Policy and Practice

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Land, sugar and pastoralism in Ethiopia: Comparing the impact of the Omo-Kuraz sugar projects on local livelihoods and food (in) security in the lower Omo Valley

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Abstract

This study assesses the impact of a large, state-sponsored sugar plantation scheme on agro-pastoralists' livelihoods and local land use change in southern Ethiopia, specifically in the lower Omo Valley. The study compares the local perceptions on the ongoing Omo-Kuraz sugar project — sugar cane plantations and a cane-crushing factory — and describes how it has affected local communities' environmental and livelihood strategies vis-à-vis the alleged 'new development opportunities'. Focus group discussion, key informant interviews, and field observations were applied to get in-depth information about the socio-economic and environmental impacts of large scale land acquisitions. The results show that the implementation of large scale land acquisitions in the lower Omo Valley has put enormous pressure on local land use and land management systems. The Omo-Kuraz I and II projects, started in 2011, neither met the stated economic purposes of the then Ethiopian federal government nor satisfied the pastoral communities' needs. The LSAI project is still highly contentious among the local community, the project office, and the local government. Our study recommends that shifting the perspective towards the local agro-pastoralists' activities, understanding their views and ways of 'using' the environment, and creating a broader consultation platform with them may create opportunities for cooperation and synergy to optimize benefits and sustainably adapt the development project to the local context.

Keywords: LSLA, Sugarcane plantations, Nyangatom people, Food insecurity, Land governance, Local consultation

Introduction

This study considers the impact of a large, state-sponsored sugar plantation scheme on agro-pastoralist people and lands in southern Ethiopia, specifically among the Nyangatom agro-pastoralists in the lower Omo Valley (LOV), and focuses on the effects of the Omo-Kuraz V sugarcane project, which started in 2011. The problematic nature of the 'developmental' relationship between authoritarian state interventions and rural agro-ecological systems/societies is a much-studied topic in recent decades: recent literature has shown the nature of the problems often being manifested in the ecological, socio-cultural, and political-economic domains (Behnke and Kerven 2013; Fana and Kamski 2019; Milman and Arsano 2014). Pastoralism and agro-pastoralism suffer from biased policy measures and because of wrong perceptions by state actors, as a result of which they are still characterized as 'backward', 'non-productive', and 'vulnerable' and in need to be developed and transformed for the 'better'.

In the aftermath of global food price hikes in 2007–2008, a significant increase in large-scale land acquisitions (LSLAs) occurred in Ethiopia. The country's pastoral land use and investment policy changes took effect

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in the early 2000s (Abbink 2011; Dessalegn 2011), reflecting the global changes in this respect (cf. (Cotula et al. 2009; Vandergeten et al. 2016)). Land allocations in lowland areas had the potential to undermine (agro)-pastoralist production systems and access to water and pasture resources without clear overall benefits for the regions. For instance, the 1970s cotton and sugar plantation development projects in the Awash Valley in the Afar region (see (Ayalew and Getachew 2009)); the projects around the Omo-Kuraz I, II, and III in the LOV and Bench Maji Zone (cf. (Abbink et al. 2014; Abbink 2018; Kamski 2019)); and the Didessa sugar plantation in Oromia region (since 2015; (Tolessa et al. 2019)) had major deleterious impacts on pastoralism and the environment. These projects reduced the viability of pasturelands and livestock productivity by limiting the pastoral space and herders' mobility to take productive advantage of spatial and temporal variability of the pasture and water resources (Abbink 2012; Gabbert et al. 2021; Mulugeta et al. 2019; Turton 2011). These exogenous factors, which are given free reign, significantly disturbed the existing dynamic equilibrium of the ecosystem and its carrying capacity (cf. (Hodbod et al. 2019)). This is the source of growing resource competition and ongoing environmental degradation. Overgrazing and eventual rangeland degradation disrupt the traditional socio-environmental system, enhance conflict even between previously allied ethnic groups, and increase confrontations with state and private farm owners and employees. These changes in socio-environmental conditions may cause frequent havoc and increase the vulnerability and instability of the (agro)-pastoralist livelihood patterns, adding to food insecurity, climate change, and conflict.

Looking beyond fiscal and other revenue benefits, large-scale land investments may not always be the most economically beneficial use of land. For instance, a noted study by Behnke and Kerven (Behnke and Kerven 2013) found that, on similar plots of land, returns to cotton and sugar plantation investments in the Awash Valley of Ethiopia were found to yield less economic benefit compared to pastoralist livestock production. Also, Tsegay et al. (Tsegaye et al. 2010) and Sonneveld et al. (Sonneveld et al. 2010) noted that extensive agricultural encroachment in the Awash valley led to land degradation and negatively affected livestock management strategies. In this context, there is a real risk that land considered 'empty' or 'idle' is leased to investors without taking into account the important services this land already renders to local communities' livelihoods and economies, in particular to extensive livestock production systems. The agro-pastoralist in the LOV is the most affected by the violation of fundamental human rights created by the rapid increase in declining livelihood strategies, because of the government favouring the establishment of large-scale agriculture to support economic growth. The Government of Ethiopia argued that the private sector and public investment in the agriculture sector will create more jobs for the local population and contribute to the country's economic growth. This has impacted not only food security but also 'food sovereignty' and productive economic autonomy of the local agro-pastoral communities.

Studies have claimed several negative impacts felt in communities hosting these large-scale agricultural investments, ranging from loss of land, food insecurity, and increase in poverty to loss of livelihoods, environmental degradation, and social and cultural problems (Keeley et al. 2014; Moreda 2017). Households affected by the operations of large-scale agriculture have lost access to land, water, and other natural resources that support local food production (Abbink 2018; Kamski 2019). This is in particular when high fertile soils used for crop and pasture production are predominantly occupied with energy crop production and sugarcane plantations and not available for food production which affects the local livelihoods. Also, households claimed a host of unfilled promises made by the private company and Omo-Kuraz sugar plantations at the onset of the operations of the investments.

The current study specifically aims at a better understanding of the (possible) effects of the Omo-Kuraz V sugarcane project and thereby refers to previously implemented Omo-Kuraz I and II projects in the LOV. Since the Omo-Kuraz V project is in the early stages, we could not do a comprehensive economic analysis on it yet. But we brought empirical data from the Salamago and Dassanech districts to compare them with the projects in the Nyangatom district. We present a socio-environmental analysis to understand the impacts of LSLAs in progress on local livelihoods and the environment. The key variables used are changes in access to pasturelands and water resources, food security, climate change adaptation, employment, contract farming, and environmental degradation, as well as some aspects of conflict dynamics. The study hereby also refers to the perceptions of agro-pastoralists and experts on local livelihoods and environmental changes associated with the LSAI activities. The study used empirical data collected between May 2017 and October 2020, both from the agro-pastoralists who experienced the changes following LSLAs and from institutional representatives at the district, zone, and regional levels. Against this backdrop, this paper asks four questions: First, who are the stakeholders involved in local land governance in the LOV? Second, what are the impacts of LSLAs on local livelihoods and the natural resource base of agro-pastoralists? Third, what are the emerging patterns in Nyangatom coping strategies from livelihoods and

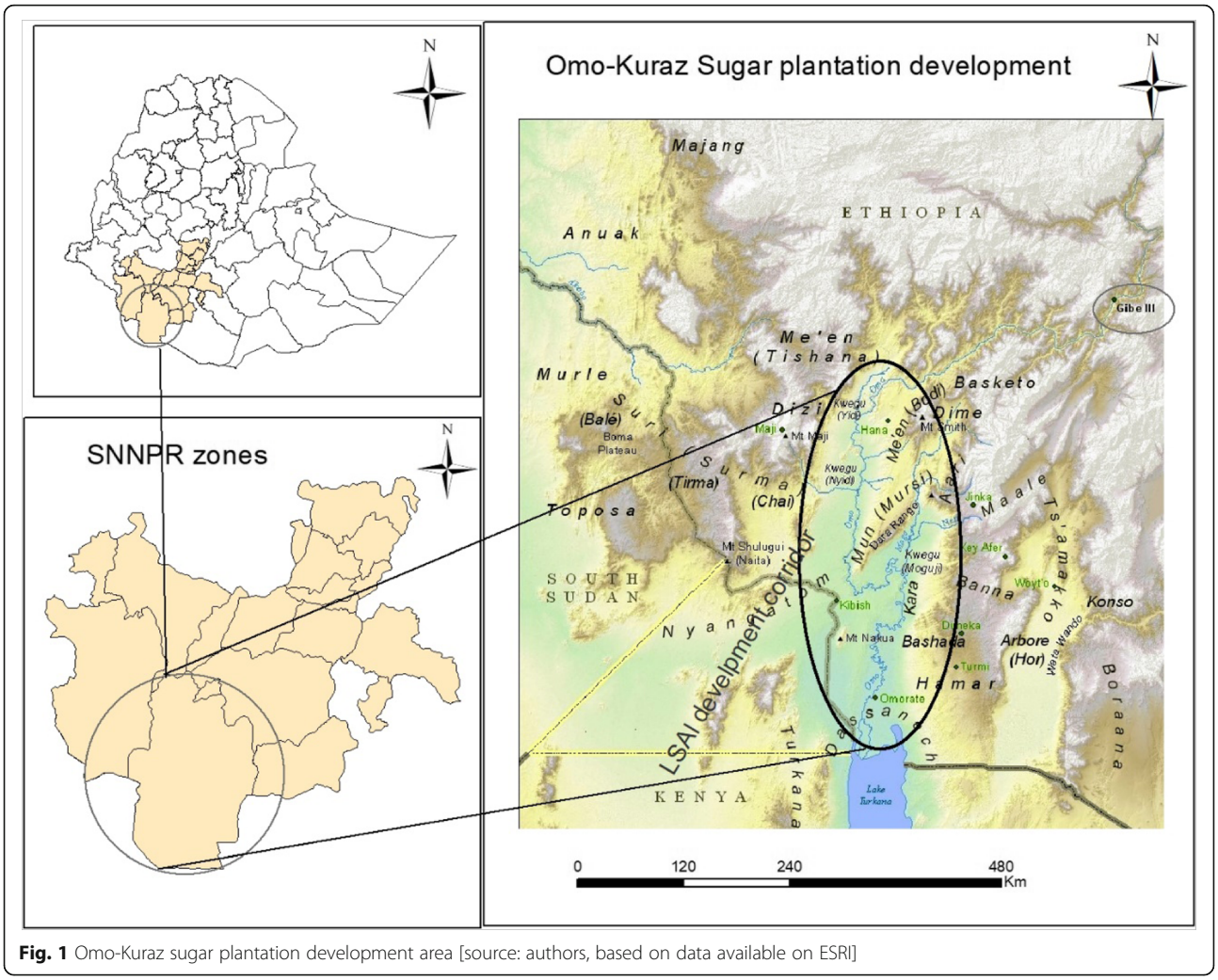

Fig. 1 Omo-Kuraz sugar plantation development area [source: authors, based on data available on ESRI]

cultural perspectives? Finally, how do the investments affect the people's local food security and climate change adaptation capacity? In sum, this study aims at scrutinizing the implications of LSLAs for livelihood security and natural resource management in the LOV. Furthermore, the article demonstrates the link between LSLAs and the challenges and transformations of agro-pastoral livelihoods in the LOV.

The paper has four sections: the first is a literature review to assess the implications of LSLA/LSAI on local livelihoods and natural environments. This section systematically reviews the literature on the LSLAs, local livelihoods, climate change, and food security at a local level. The second section briefly discusses the study area — the Nyangatom district in the Lower Omo Valley — and outlines the methodological approaches used to collect data. The third section provides a detailed discussion, with supportive empirical data, on the impacts of the LSLAs on local agro-pastoral livelihoods, specifically of the Nyangatom, and their efforts in climate change adaptation and food security. Finally, the analysis integrates the different perspectives and data to conclude about LSLA/LSAI in the LOV. We thereby also identify how the LSLA/LSAIs affect local livelihoods and their natural environmental conditions in the face of increasing climate change and end with the conclusions.

Materials and methods

Study area background

The South Omo Zone in the Southern Ethiopian Nations, Nationalities and Peoples Regional State (SNNPRS) covers a total area of 23,535 km^2 with an elevation ranging from 360 to 3500 m above sea level. The Nyangatom, Dassanech, and Salamago districts are the focus of this study (Fig. 1). The (projected) population for 2017 was 722,955, or almost 31 persons per km^2 (CSA 2013).[1] The agro-

[1]We used the 2013 population projections by the Central Statistical Authority of Ethiopia, as the last population census field data available date from the 2007 national census.

ecological zones are arid lowland semi-desert (34.4%), lowland (60%), medium highland (5.1%), and highland (above 1800) (0.5%). The mean annual temperature ranges between 26 and 35°C, and rainfalls are between 350 and 1600mm.

Most of the agro-pastoral groups depend, to varying degrees, on cultivation and livestock; cattle are still regarded as the most important possession. Rain-fed shifting cultivation is widely practised. Crops were also cultivated along the banks of the Omo River (Tornay 1981; Tornay 2001; Turton 2011), which flooded seasonally until late 2015, when the Omo Gibe III Dam became operational and cut off the natural flow (cf. (Abbink 2012)). The zone thus has large land and water resources exploited for the development of large-scale commercial farms with lowland crops such as oilseeds, cotton, spices, fruits, and certain staple food crops. The livestock resources of the zone (in 2019) comprised 3,244,500.7 TLU[2] (SZAFD (South Omo Zone Animal and Fishery Department) 2019).

Dassanech

The 2017 population projection for the Dassanech district was 64,960 people (CSA 2013). The people are traditionally transhumant pastoralists, mostly living on the northern shores of Lake Turkana and along the eastern banks of the Omo delta in the LOV. The Dassanech raise cattle, sheep, goats, donkeys, and in some parts, camels (Gebre 2012). While livestock herding remains a significant source of income, as among the Nyangatom, Bodi (Me'en), and Mursi, the Dassanech have lost a considerable amount of pastureland because of large-scale commercial farms. Quite many Dassanech earn a significant income from agriculture and other subsidiary economic activities, such as fishing and now also seasonal employment on the irrigated large-scale farms.

Salamago

The Salamago district, populated by Bodi, Mursi, Bacha, and Dime peoples, had a projected population of 34,323 for 2017. The annual average temperature of the area is 29°C (ranging between 20 and 37.5°C). Communities in Salamago engaged in both livestock herding and subsistence cultivation. Like the Dassanech and Nyangatom, they have two annual harvests, from flood retreat and rain-fed agriculture, and during the dry season, they rely heavily on livestock, kept in the east of their territory.

Nyangatom

The Nyangatom district, the main case study area, is economically marginal and also among the least developed in the South Omo Zone (Fig. 1). The district contains the Nyangatom, Murle, and Kwegu ethnic groups (with a projected total population of 20,999 in 2017) (CSA 2013) and occupies an area of approximately 2,680 km^2. The territory includes the fertile plain near the Omo River, from north Mursiland and Omo National Park to Dassanech to the south and north-west bordering the Surma (Suri), following the Kibish river to the west extending to the Kuraz Mountain bordering the Dassanech and the Turkana of Kenya. The Nyangatom still primarily engages in livestock production (cattle, goats, sheep, and donkeys) in the plains, while many households combine it with lowland rain-fed and river flood crop cultivation (Adane et al. 2021a; Tornay 1981).

The Nyangatom households contain on average 6.6 persons. They have about 362,860 TLU livestock, with a density of 9.26 TLU/ha (129.4 $TLUkm^{-2}$) (Adane et al. 2021b). Access to agricultural extension services and credit are limited. Crop productivity is further limited due to the shrinking of the Omo River flow and the ceasing of the river bank flooding. Like among other local peoples, a large portion of the Nyangatom households engaged in hunting-and-gathering activities in times of scarcity to supplement household subsistence and income.

Study methods

Research design and data collection

A mix of primary data collection methods was employed: a household survey with structured and semi-structured questions, focus group discussions, and key informant interviews. Lists of households were obtained from purposely selected *qebele*s (local administrative units) in Nyangatom (10), Dassanech, and Salamago (2 *qebele*s each). The background information about household composition, general livelihood characteristics, and land use activities was gained via a randomly sampled household survey with heads of households from Nyangatom (384), Salamago (20), and Dassanech (20). Quantitative data was collected via a household survey on incomes, access and rights to grazing land and water points, and anticipated LSLA/LSAI impacts on the local economy, security, and relationship with the investors. The information was updated with the key informants, the elders who had lived in the area for many years, and the local district administration.

Focus group discussions and semi-structured interviews were subsequently used to explore emerging themes in greater depth, and both group participants and individual interviewees were selected to cover different gender, age, and socio-economic conditions. Semi-structured interviews were carried out repeatedly with

[2]Tropical livestock unit.

twenty government[3] officers at the district, zone, and regional levels, including medium- to large-scale agricultural investors. Visits to large-scale agricultural farms (Omo-Kuraz I, II, and V) and selected five private farms were also conducted. All interviews at the local level were conducted in Nyangatom, the local language via translators, in July–August and November–December 2017/2018 and October–November 2019 and 2020.

Ethnographic methods were also employed in several field stays during 2017–2020. The primary areas were communities at Kibish and along the Omo River, including areas allocated to the Omo-Kuraz V sugarcane plantation, and at cattle camps at Tirga. The long exposure that the researchers have in Nyangatom and other local communities (Suri, Me'en) helped them to understand the real feelings of the community about the development projects. They thus had a chance to discuss the upcoming projects in the LOV with local community members and note their perceptions on present and future socio-economic and environmental impacts.

Secondary data was gathered from academic and grey literature (Gibe III Dam and Omo-Kuraz project EIA documents and Ethiopian Sugar Corporation reports). Published academic papers set the foundation for the research, while the grey literature supports an understanding of the LOV context regarding the socio-ecological impacts of LSLAs. Data on local revenue from investment and agro-pastoralists were collected from the Nyangatom revenue office at Kangaten. Investment agreements, reports, policy documents, and community reactions were considered in the analysis. The Ethiopian Investment Commission (EIC) and SNNPR investment (SI) databases were explored to collect information on the number, types, size, origin, and duration of the investments in Ethiopia and the LOV.

Data analysis

The analysis was primarily qualitative, aiming to understand communities' livelihood experiences within the framework of the upcoming LSLA/LSAIs, climate change, and food (in)security at the household and community levels. The assessment explored the characteristics of the communities, the land governance systems, and household members' views in the context of participation in LSLAs, benefit-sharing between project owners and local authorities, and perceptions of socio-ecological and economic changes. The individual questions helped the researchers to explore community characteristics and social processes that influence action (or inaction) related to LSLA and food insecurity mitigation strategies.

[3]Among them, the Agricultural and Natural Resources Department; Department of Environment, Forest and Climate Change; Investment Commission; Department of Trade and Industry and the Department of Labor and Social Welfare.

Discussion

Socio-economic characteristics and local perceptions

The survey of households in the Nyangatom, Dassanech, and Salamago districts shows that all the study communities are rural. About 61% of Nyangatom and 77.5% of Dassanech and Salamago district survey participants are male households. About 95% of the Nyangatom and 82.5% of Dassanech and Salamago respondents were non-literate. The average age of survey participants in Nyangatom was 40 years and in Dassanech and Salamago 45.2 years. The main economic activity in Nyangatom is livestock rearing (75%), followed by crop cultivation (19%), livestock-crop mix (18%), fishing (4%), and harvesting non-timber forest products (NTFPs). About 70% of the surveyed households in Nyangatom, Dassanech, and Salamago reside along the Omo River, which enabled them to cultivate using the periodical river flood. A few households were engaged in off-farm activities such as petty trade (via small shops, selling of food and local drinks, mobile phone charging centres, and selling/buying of ruminants), casual labour, and charcoal and fuel wood selling, particularly in Dassanech and Nyangatom.

Surprisingly, a considerable number of households revealed their positive view of the ongoing Omo-Kuraz V sugarcane project in Nyangatom territory. About 43% of the Nyangatom showed their agreement to the upcoming Omo-Kuraz V sugarcane development projects. Among those who agreed with Nyangatom, 82% of the household heads responded that the potential benefits and importance of the investment might outweigh the potential negative aspects of the project (see Additional file 1: Annex C). In contrast, 40% of Salamago respondents indicated that the project was less beneficial and failed to fulfil its promises. Yet, 80% of Salamago survey participants reported that there was 'insufficient technology transfer' following the Omo-Kuraz I and II sugarcane plantation to support their farming systems. The technology input promised by the Ethiopian Sugar Corporation (ESC) and the project was not provided to local people. The company had announced to facilitate the transfer of technology to the agro-pastoralists and local governments following the establishment of the Omo-Kuraz I and II. But it failed to deliver. Modern irrigation techniques, farm inputs, and market linkages were not built or provided. There has been no sign of such transfers, and most smallholders continue to use traditional farming techniques. Furthermore, it is unclear how exactly large-scale commercial farming, using intensive capital, herbicides and pesticides, intensive irrigation methods, and large-scale machinery, could implement such

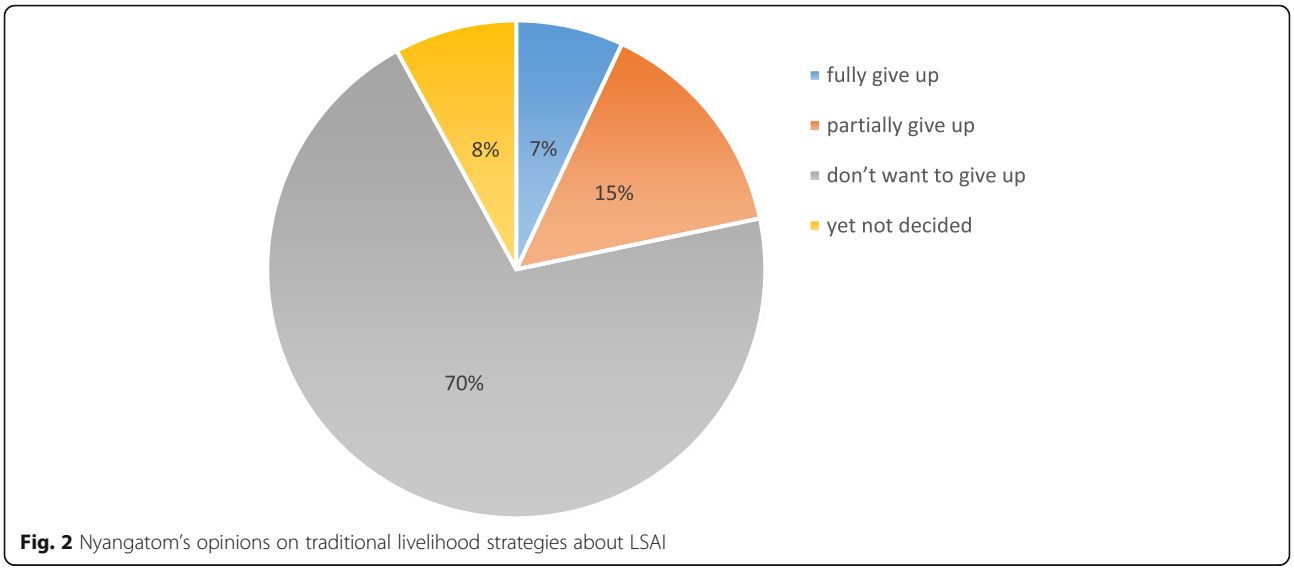

Fig. 2 Nyangatom's opinions on traditional livelihood strategies about LSAI

technology transfers to small-scale and poor livestock herders and smallholders. The government claimed that apart from improving food security through livelihood enhancement, the investments would facilitate such technology transfer, as well as create employment and develop infrastructure. But in practice, sugarcane cultivation-related productive assets (e.g., mini-dams, canals, sprayers, etc.) were not directly adaptable or transferable to the activities of agro-pastoral livelihoods and had little welfare/well-being value. In Dassanech also, some 90% of respondents perceived that the agricultural investments in the district were not sufficiently linked with job creation and contract farming, or with technology transfer which the government aimed to achieve (cf. (Gebre 2012)). Still, optimism was very high in Nyangatom on the Omo-Kuraz V project because of the promise that the ESC and the local government gave to connect modern irrigation systems that would be extended from Kuraz to Tirga as compensation for lost river retreat cultivation. Among those who agreed in the Nyangatom district, 16.5% doubted the contribution of the project to improve their livelihoods, due to potential negative impacts like the loss of grazing land. They further explained that the problems associated with population pressure would follow, due to the expected influx of huge (numbers of external employees for ~100,000 jobs). Both Dassanech and Nyangatom claimed that they were not ready to reduce the number of livestock, neither entirely (70%) nor partially (15%). They were interested in practising *both* modern irrigation and traditional livestock rearing. The other 7% wanted to fully give up and 8% did not decide yet (Fig. 2). This indicates that most of the agro-pastoralists are against the government plans and do not want to give up their traditional ways of life, at least not in the short run. About 47% of respondents from Nyangatom reported that they lost lands along the Omo River. The remaining 53% used either the Kibish river banks or pond retreat cultivation. Similarly, about 68% of the respondents from the Dassanech and Salamago districts lost fertile lands around the Omo River due to LSAIs.

Land governance and stakeholders involved in land leasing

The land tenure system and its implication for LSLA in the LOV

The most prominent negative impact arising from the investments was frequent disputes over access to land and water. Resource tenure systems, including but not limited to the land tenure (either customary or statutory), are part of local rules/institutions governing the way land, water, and other resources are accessed, managed, used, and transacted (cf. (Cotula 2007)). Tenure rights affect customary land use rights, under which land is communal and managed by customary systems. The country's current land leasing policy often leads to the transfer of customary land use rights to private and state-owned large projects, which dwindles the livelihood base of the local peoples (cf. (Alelegn 2020)). Our key informants (KIs) indicated that there are serious gaps between pastoral land use policy as defined by the state and the socio-culturally embedded use rights. In Ethiopia, land ownership is still in the hands of the state, and there is a lack of minimum compensation for land use rights loss of local inhabitants/users. State policy does not recognize customary land use rights for agro-pastoralists, despite laws issued on this.[4] This state approach to land tenure in the LOV is purely political-economic and has become the source of persistent conflict among local

[4]See Mohammud Abdullahi (Mohammud 2007: 118) citing the relevant laws nominally recognizing '…. the rights of land users to a secure and uninterrupted access including grazing lands' and the '… recognition and protection of customary rights over land.' (*ibid.*) In the past few decades, most of such laws were only recognized in the breach.

communities, investors, and the central government, as the land leasing processes are opaque to the local communities.

The 1995 Ethiopian constitution stipulates that any land-related activities shall be done with close consultation with land users and that pastoralists have the right to free land for grazing and cultivation and the right not to be displaced from their land[5]. All citizens also have the right to live and develop the land that they traditionally owned and get compensation in case of leasing lands to any development projects. All respondent households in Nyangatom and most in Dassanech and Salamago stated that they did not have formal land title deeds regardless of private ownership and had not received compensation due to land/property lost ensuing the investments. The majority of households claimed to have lost access to fertile river banks due to the reduction in the volume of the Omo River (cf. (Abbink 2012; Hodbod et al. 2019)). For the loss of access to river retreat cultivation, the agro-pastoralists need to be compensated with functional irrigation systems, instead of being provided with short-term food aid, which only increases their dependency.

As the custodian of all land under the 1995 Constitution, the Ethiopian government has directly concluded deals with investors and given away land previously used by Ethiopian farmers/pastoralists to lessees, thereby displacing communities. Indigenous land use rights and land acquisition with respect to the LSLA in the LOV valley have been discussed and referenced to federal constitutions and rural land proclamations. But the Ethiopian government does not recognize the ownership rights of indigenous people to their ancestral land and therefore easily displaces them without consultation and compensation. Recognizing some form of the ownership right of these communities is paramount for their protection and economic survival. The LSLA-induced forced displacement of indigenous communities in Ethiopia has thus resulted in the loss of livelihoods and violated their right to adequate grazing areas.[6] The indigenous communities of the Lower Omo Valley especially (the communities that are directly affected include the Mursi, Kwegu, Dassanech, Nyangatom, Karo, Hamer, and Bodi peoples) have also faced various human rights violations through the establishment of more than 200,000 ha of private commercial farming and other large developmental projects, in various instances with the use of force.[7]

[5]Article 40 (4) (5) of FDRE Constitution, 1995, and (Article 8 (1) (5) and Article 9 (2) of Proc. No. 456/2005, 2005)

[6]Which Ethiopia's pastoralism policy in theory had granted; see note 4 above, and Federal Democratic Republic of Ethiopia (2001), *Statement on Pastoral Development Policy*, Addis Ababa: Ministry of Federal Affairs

[7]Cf. Wagstaff 2015; Fana 2020

Although it was mentioned in the 1995 Federal Constitution specifying equal opportunity and the right to use their ancestral lands, Ethiopia has no specific legislation on indigenous people's rights. Therefore, it is recommended to have a framework that respects the minority/indigenous people's rights in land use and other resource management in the country.

This violated the UN Declaration on the Rights of Indigenous Peoples (UN, 2007). Indigenous communities of the Omo Valley have been displaced from their ancestral lands, forced to reduce the number of their livestock, abandon the Omo River area, and shift to a sedentary lifestyle. The other major problem with land tenure is that it currently does not secure the right of access to communal land for grazing, fishing, and collecting wood or the rights or interests of those who use the forest for hunting and gathering. These resources are paramount for exercising the right to secure the livelihood of the various local communities in Ethiopia. Communal grazing lands are crucial for livestock production. The indigenous peoples in the LOV also practise fishing, hunting, and gathering for subsistence. It is paramount to consider the customary rights of use and access to these resources for the effective protection of their right to adequate food security and locally tailored climate change adaptation.

Land acquisition strategies in the LOV and stakeholders involved

The local landscape of institutions having a role in LSLA processes in the LOV is complex. First, the investment councils of the Southern Region (the SNNPRS) play a critical part in all land leasing processes (see Fig. 3). There is also a land management council at the regional level, chaired by the regional president, and responsible for the enactment of the final decisions. At the lower administrative levels (zone and district), the chiefs of the administration are mainly responsible for the follow-up and implementation of the decisions made by the regional council (without any say regarding the decision). The stakeholders are the regional administration's president's office, administration vice-chair, the regional investment agency (secretary), and other members, including regional industry, the investment project monitoring, and support section, the vice president, and the head of agriculture and natural resources bureau, the rural road authority, the water resource bureau, Development & Commercial Bank of Ethiopia's branch offices, the Ethiopian Electric Power Corporation and Ethiopian Telecommunication South Region district, the regional chamber of commerce and sectoral associations, and selected model investors from agriculture and industry sectors. However, the functionality of some stakeholder engagement platforms is not extended to the district

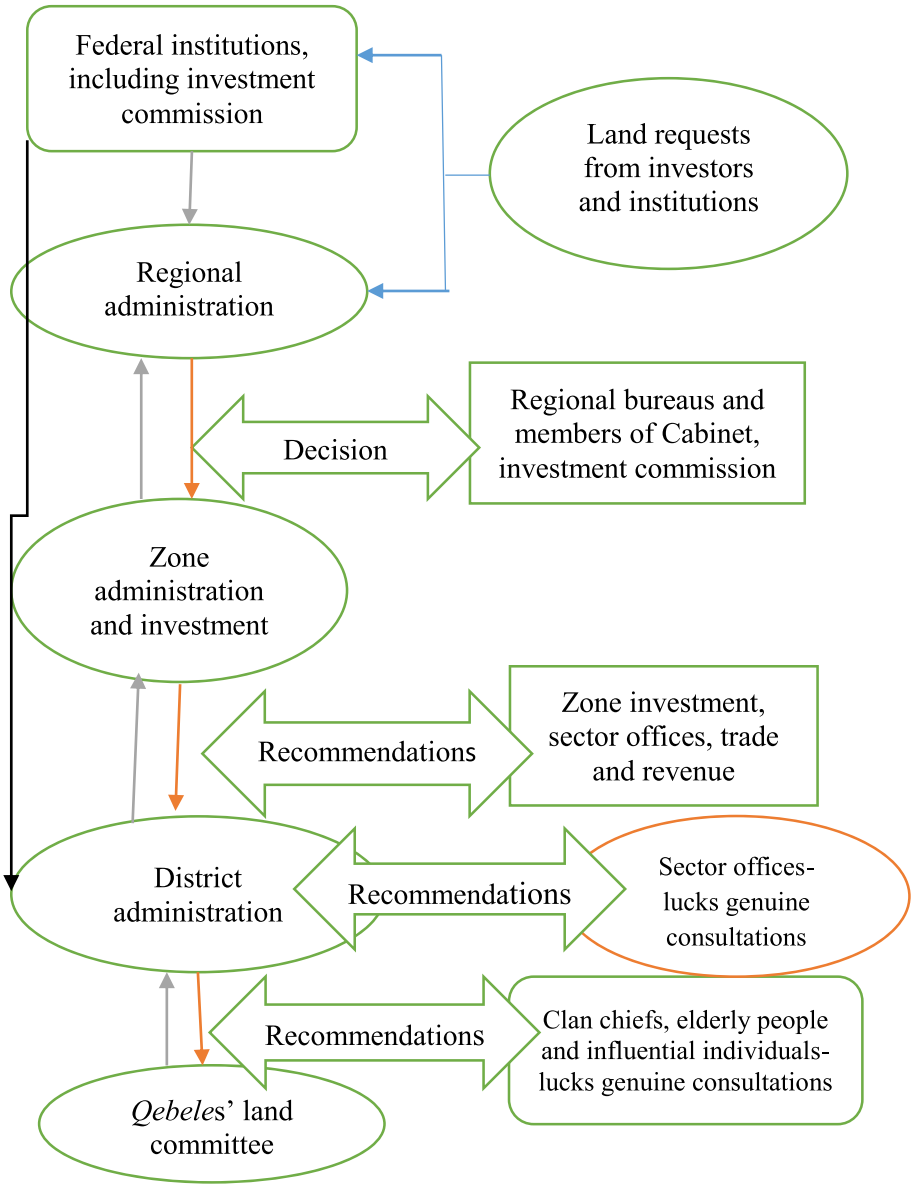

Fig. 3 Local land governance-investment decision process in the SNNPR, organized top-down (based on key informant interviews at district, zone, and region levels). (It was also mentioned by key informants at the *Woreda* (district), zone, and region that mostly decisions are made at the federal and regional levels without sufficient public consultations. If the consultation occurs, it is usually nominal.)

level, for some of the sectors do not have working structures at the lowest administration levels. For instance, the investment agency is not present at the district level and is only represented by a focal person, often from the Office of Agriculture. The Environment Forest and Climate Change Commission (EFCCC) and the Culture and Tourism Bureaus are neither regional nor zonal/district members of the Land Lease Committee.

The investors use various strategies to acquire land for investment. In the past, they used to come from the relevant federal and regional offices with a fixed amount of land requests without considering the actual evaluation of the types and nature of the lands at the local level (Fig. 3). The investors are responsible to present EIA-approved[8] investment documents to the local authorities: a necessary prerequisite to acquiring land[9]. The contractual agreement is top-down in all land acquisition cases. The local institutions have only limited authority to lease or not and transfer the land to investors or to regulate and monitor their performance. For example, the EFCCC offices at a lower administrative level

[8]Environmental Impact Agency
[9]Federal environmental proclamation No. 299/2002

reported that most investors are not willing to present a legal business license and EIA/SEIA documents upon request. A characteristic investors' argument is that '…it is none of your [offices] business and you are not responsible for our activities here; we are only in contact with the regional or federal government'. Here one can observe that some of the EIA/SEIA documents and investment business plans are neither well-prepared nor appraised properly at the various administrative tiers. This situation challenges the local offices to conduct appropriate monitoring and implement mitigation strategies to avert negative impacts of project activities. The land management capacity of the host districts is also debatable. This approach brings risks not only for the local communities but also for project performance and the natural environment.

To overcome these contradictions, the local administrative system would need to strike a balance between the development needs they have set and the protection of the indigenous community's land use rights. It would probably be beneficial if relevant decision-making power lay mainly in local communities' hands and if disruptive influences impinging from the outside (such as federal and regional agencies) could be contained at the border of the community. The transformation of land and water under the custody of households and communities into commodities suggests that the use of strategies of ownership and inheritance is now increasingly prompted by factors over which the community has little control and where the influence of state authority is expanding. These are common concerns raised among the local peoples all across the LOV due to the emerging political ecology and power dynamics (Abbink 2018; Gabbert et al. 2021). There is a deep tension between the objectives of large-scale agricultural expansion such as sugarcane development on the one hand and local communities' livelihood interests on the other hand, and this may reduce the sustainability and profitability of the projects and their returns to the local as well as the national economy (cf. (Kamski 2019)). This risk could be minimized through full and early assessment and consultation of existing customary and statutory rights. Such consultations should be first and foremost the responsibility of the investors, with appropriate monitoring from state and non-state actors. Therefore, it is critical to have a proper consultation with the local land users and (agro)-pastoralists to reduce the negative impacts of the development projects, as in the longer term the development is also critical to improving local livelihoods.

During the field data collection, the key informants from the Nyangatom (Nyangatom, Murule, and Kwegu tribes), Salamago (Bodi tribes), and Dassanech (Dassanech tribes) districts, communities reported that there were some consultations have been conducted. However, the consultation was limited and only a few prominent figures of the community members nominally participated in the consultation process. Similarly, it was reported that during the Omo-Kuraz sugar project formulation, there were limited consultations (top-down approach) (Ayele 2015). Furthermore, the private project investments were acquired lands with very limited or no consultation except having administration-level discussions.

Status of the investments in the LOV (Nyangatom, Dassanech, and Salamago)

In addition to the global food market developments of 2007/2008, the Ethiopian national Growth and Transformation Plans (GTP) I and II added demands for large-scale sugarcane/biofuel plantations in the LOV (Fig. 4) (Kamski 2019). Expressed demand in 2008/2009 alone focused disproportionately in the LOV, where 5 out of 10 sugarcane plantations and factories are concentrated. According to the EIC, between 2006 and 2019 Ethiopia leased about 1,190,000 ha of land to 406 investors, of which 49 were domestic. Similarly, 1023 registered projects (157 in LOV) are found in SNNPRS in various phases; yet 63% of them are (in 2021) still in the pre-implementation phase. LSLAs for sugarcane plantation and non-crop and non-pasture production are owned either privately or by government-sponsored parties. Most of the local user rights were transferred to investors, with limited participation of the local land users. These investment schemes, particularly the Omo-Kuraz sugar projects and some private farms, categorically undervalued the contribution of land to the pastoral economies. Insufficient attention to assessing the economic viability of the projected enterprises often led to negative impacts on the performance of investments. To date, more than 140,000 ha of fertile lands in LOV, Kafa, and the Bench Maji Zone were in the hands of the Ethiopian Sugar Corporation, of which 63% was allocated to the Omo-Kuraz sugar projects. Another 76,000 ha of land leased to private farms is found in Nyangatom, Dassanech, and Salamago districts alone (Table 1; Additional file 1: Annex A).

Most of the investors in the LOV are not efficiently utilizing all the leased lands (Fig. 4). The performance of the land leased is below the minimum requirement, which limits the economic and social benefits expected from the investments. Lavers (Lavers 2016) has noted a weak implementation performance of LSAIs in Gambella and Benishangul-Gumuz regions, though ignoring some benefits the investment brings to the population. Problems included a limited screening of proposals, project approval without due diligence, and in some cases neglect of the environmental and social regulations in the region's land governance policy. The overlap of

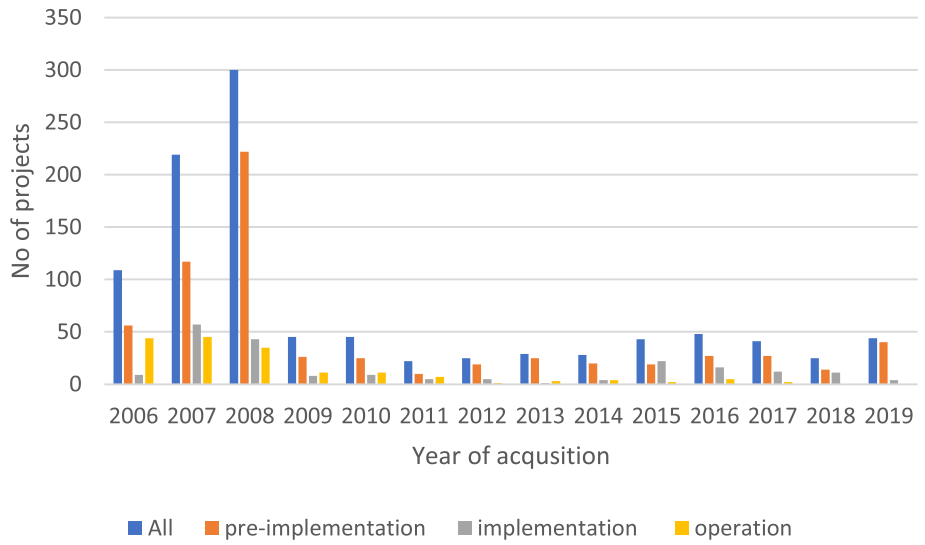

Fig. 4 Number of agricultural investments in SNNPR between 2006 and 2019, EIC/SI

responsibilities among institutions and non-transparent land acquisition processes is evident. Often, the land was not fully used: in the SNNPRS, it was found that per the anticipated schedule for 2006 and 2019 about 63% of the transferred land was entirely in the pre-implementation phase, 20% in the implementation phase, and only 17% in the operation phase. However, 2019 was the least performing year, and none of the projects started operation (Fig. 4). Trying to explain the weak performance of their projects, the investors were complaining about the poor infrastructure, poor administrative support, poor land governance, and labour shortages.

The amount of land leased to investors was highest in South Omo (Fig. 5), but the total number of investment projects is among the lowest in SNNPRS. The amount of land transferred also depends on types of land tenure rights and availability to investment on land in pastoral areas of LOV categorized as 'idle'. This is a clear indication of the LSLAs in the LOV which compete with the local livelihood systems without respecting agro-pastoral land use rights. The availability of relatively cheap land per hectare per annum in Nyangatom (among the lowest land rent rate in the country, for example, 49 birrs (USD1.28[10]) and good quality of lands with access to irrigation water coupled with favourable climatic conditions was also highlighted and contrasted to the situation in many other parts of the country. The first wave of land leasing was started in 2008, followed by a second in 2010; thereafter, a decreasing trend was shown, for various reasons (Fig. 4, Additional file 1: Annex B). As of October 2019, the South Omo Zone investment office had eight legally registered agri-investment projects in Nyangatom, holding a total of 20,334 ha of fertile lands along the Omo River. Similarly, 54,520 ha and 1,035 ha of land were allocated to private projects in Dassanech and Salamago, respectively (Table 1; Additional file 1: Annex A).

LSLA is not only a rush for land but also the freshwater resources available therein (Mehta et al. 2012). The majority of land deals target fertile land and/or land with easy access to water resources and infrastructures. Personal observations during fieldwork for this study confirmed that nearly all of the land leases are located near main roads and close to the Omo River (the main water body for irrigation in the LOV), which facilitates irrigation. When requesting irrigable lands, the investors did not provide a clear proposal for the amount and duration of water for irrigation they would need. During document analysis (e.g. of project proposals and agreements with local revenue bureaus), it could be noted that no article dealt with water pricing and management. Even though irrigation water pricing is considered an important tool to improve efficiency in resource utilization, it is not common practice in Ethiopia. However, the study by Teklay and Ayana (2014) indicated that irrigation water pricing has been practised in the Awash basin. In the LOV, Oromia, Afar, Somalia, and Gambella, for example, investors have been given unrestricted access to as much water as they need. In other cases, where investors must pay to use water, they are often charged according to how much land is irrigated rather than how much water is used. According to key

[10]1 USD = 38.7041 birr as of December 2020 and 37.2081 as October 2020

Table 1 Omo-Kuraz sugar industry profiles (ESC and EIC)

Omo-Kuraz projects	Geographical location	Total allocated land for sugarcane and factory	Sugarcane crushing capacity (tons/day)	Total energy generated (megawatts) and (contribution to the national grid)	Capacity of molasses production (tons/year)	Status
I	Salamago	20,000	12,000	45 (29)	120,000	Operational
II	Salamago	20,000	12,000	60 (40)	120,000	Operational
III	Kafa and Bench Maji	20,000	12,000	60 (40)	120,000	Operational
V	Nyangatom	>81,000	24,000	120 (80)	240,000	Preparation
IV	Nyangatom	Possibly stopped due to budget constraints				Unknown
Other projects	Nyangatom	20,334				Various phases
	Dassanech	54,520				
	Salamago	1,035				

informants, 'When land is assigned to private investors, the deal only impacts directly on existing users of that land', and 'Allocating water to irrigated agriculture potentially affects a much broader range of users - all indigenous groups who depend on the riverbank for crop cultivation and pasture production'. In this regard, there is no clear water budgeting and water pricing system in place. This impedes the control of sustainable water utilization and fair distribution among the different users, including the local agro-pastoral communities.

Even though the possible implications of land grabbing on the access to freshwater resources has started to be acknowledged (Bues and Theesfeld 2012), a quantitative assessment of the associated 'water grabbing' is still missing and non-existent in the LOV. The evaluation of the impact of LSLAs on their use of water resources requires a comprehensive quantification of the amounts of water grabbed in the LOV and at the country level. Furthermore, our study did not go through a detailed analysis of water allocation and pricing in the LOV.

During the land transfer in Nyangatom, for instance, 43% of the survey participants had agreed on the transfer to Omo-Kuraz V. Some 24% did not show any agreement with this process, while another 33% did not have any information about this transfer in their territory. Even most of them did not know the boundary and size of land transferred to Omo-Kuraz V. During the key informant interviews, one of the respondents (a member of the district council) at Nyangatom argued that most of them agreed on the transfer of land to the ESC. Furthermore, he said, '…. the agreement during community consultation was based on using water canals for irrigation and sugar tops and molasses for their livestock at homesteads' — against the ESC plan of generating energy from factory byproducts (Table 1). However, he realized that this was an empty promise, as evidenced in the Salamago or Dassanech areas. The non-realization of

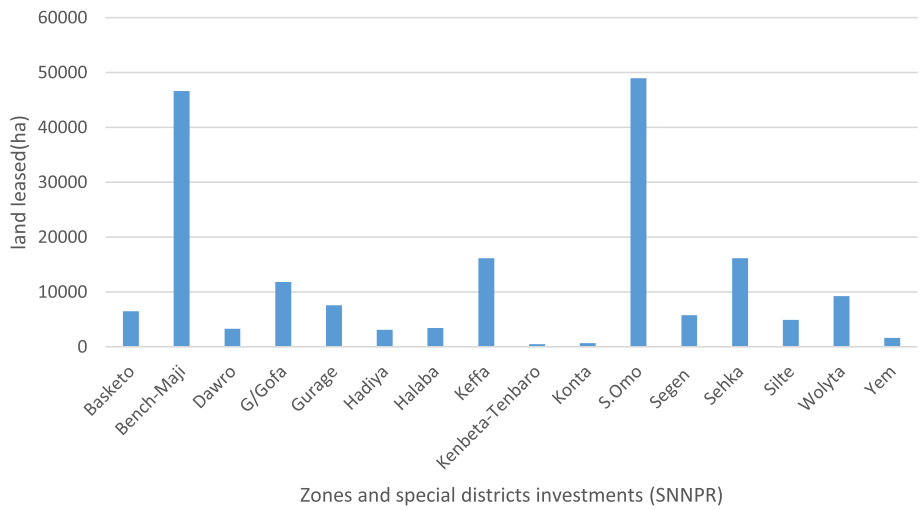

Fig. 5 Status of land leased in SNNPR (2006–2019, EIC) (note that the lands acquired by Omo-Kuraz I, II, III, and V are not included in this analysis)

the Omo-Kuraz V sugarcane project promises would be a challenge in Nyangatom too.

Expected local (socio-economic) benefits from LSAI

The objective of the ESC is to establish high standard sugar development projects that cater to the national sugar demand, earn foreign currency, and provide economic opportunities to rural communities (cf. GTP I and II). The national government and the local communities are expected to share in the benefits of the investments in the short and long term. These would accrue through four main schemes: social infrastructure and community development supported through land compensation; employment and jobs (including contract farming, such as out-growers schemes and cooperatives); access to markets and technology for local producers; and local or national tax revenue. Keeley et al. (Keeley et al. 2014) in an earlier study on LSLAs reported on the possibility of technology transfer, either through inputs made available as a by-product of farm investments or through the transfer of agronomic expertise. In all cases, the economic viability of investment is a necessary condition for positive social outcomes, including food security and climate change adaptation, to be materialized (cf. (Deininger and Byerlee 2012)).

Positive infrastructure spillovers would include better access to roads, schools, communication, and other social amenities when the project would be in full operation. On the Omo-Kuraz I and II project sites, a few water development schemes, schools, and health centres were constructed. Since the launch of the project, substantial investments were made in road infrastructure across the LOV, particularly between the zonal capital Jinka and the project sites in Salamago, Nyangatom, and Dassanech districts (Fana and Kamski 2019). A bridge was constructed across the Omo River at Kangaten and a tar-made road from Omo-Kuraz V to Turmi and Dassanech. This infrastructure interconnects and gives access to all process factories, sugarcane plantations, and marketplaces and creates economic opportunities for local socio-economic transformation.

Investors often argue that the integration of new markets and accessibility can be an additional opportunity for agro-pastoralists to cope with climate change and food insecurity brought by the emergence of large-scale agriculture-driven infrastructure developments (cf. (Vermeulen and Cotula 2010)). However, the evidence from Omo-Kuraz I and II and private farms do not point to clear improvements in farming infrastructure and incomes associated with the land investment in Salamago. For instance, the increase in crop productivity following a technology transfer and know-how was reported to be only 5% in Dassanech and 20% in Salamago. Besides, it is highly ironic if not cynical to argue that the new plantation and infrastructure development would help in mitigating problems that were caused by those developments themselves, disturbing a functioning and relatively food-secure and ecologically sustainable local economy. Similarly, limited infrastructure development and technological know-how impacts were reported in Dassanech (10% of respondents) and Salamago (60%) following development projects, but none in Nyangatom. Since the technology used on highly mechanized farms and private investments in Nyangatom, Dassanech, and Salamago differs considerably from the needs of small-scale subsistence crop cultivation existing in the area, the impacts are insignificant (cf. (Gebre 2012)).

The Omo-Kuraz V promised the agro-pastoralists in Nyangatom to cultivate sugarcane in out-grower schemes and allow them to sell it to the factory, in addition to cultivating food crops (maize, sesame, fruits, and vegetables) and fodder for livestock. This scheme required a reduction in the number of livestock and a shift to quality rather than quantity of livestock management (cf. (Abbink 2018): 160). This way, local livelihoods would transform into 'sustainable' livelihood strategies. However, as evidenced in Salamago and Dassanech, again Nyangatom pastoral out-grower schemes may not or did not yet materialize and might become disastrous. The project managers and other responsible government agents also failed to discuss reducing livestock numbers in Nyangatom, and the agro-pastoralists in Nyangatom do not want to reduce the numbers. They contend that only 'animal diseases and Turkana can do that, no one else', '…livestock is our life'. This argument indicates the potential conflict between the Nyangatom and the Omo-Kuraz V project.

As already noted above, the effect of LSAIs on employment generation and technology transfer is one of the debated issues. There is often a mismatch between pastoralists' experiences and skills and the types of investments (sugar farming is different entirely from livestock herding). Surely LSAIs and out-grower schemes have been resituated as important forms of land control (Vicol 2017), meaning that institutional and contractual arrangements are central to delivering expected livelihood outcomes. Out-grower schemes have gained importance in policy debate partly in relation to land use, commercial development, and social justice issues, with contractual arrangements presented as alternatives to LSLAs, and also as avenues through which smallholders can access market opportunities (Cotula et al. 2009; Hall et al. 2017; Vicol 2017). In the LOV, the expansion in sugarcane plantations and other large-scale agriculture re-organizes agro-pastoralists in out-grower schemes, which in turn shapes what smallholders engage in for their livelihoods, as alternative pathways. The ESC believes that integration into out-grower schemes can

allow smallholder agro-pastoralists to hold onto production that maintains current livelihood levels and enhance adaptation to climate-induced droughts. But due to the delayed commissioning of Kuraz I and II, out-grower schemes for sugarcane cultivation (with no legal agreements made between the Omo-Kuraz sugar development project and the agro-pastoralists) have not been successful and faced major challenges. The plan was for the agro-pastoralists to grow sugarcane on about 0.75ha per household for more than 2000 individuals, and supply the Omo-Kuraz sugar factory, with the support from the ESC, but only in Salamago. This did not provide any benefits, because the ESC just did not purchase the harvests from the out-growers. For the past 6 years (2012–2017), it failed to purchase the sugarcane cultivated by three out-growers' cooperatives in Salamago (interview with South Omo Zone Pastoral Affairs, 2018, and Salamago *Woreda* administration, 2020). The ESC had promised to organize communities into various out-grower and cooperative schemes, but only a few of these materialized.

On the other hand, since the project started in 2011, a large number of the community members got direct or indirect job opportunities around the project and with contractors and micro and small enterprises, either on a temporary, contractual, or permanent basis. More than 300 micro and small enterprises were organized following the Omo-Kuraz sugar projects and played their share in the creation of jobs. However, these jobs are not secure, and in Nyangatom, some of these enterprises are dying. According to KIs at Omo-Kuraz V, about 700 job positions were created for the Nyangatom at Omo-Kuraz V and by sub-contractors: watchmen, office cleaners, machine operators, etc. In contrast, the Salamago Labor and Social Affairs Office complained that only 171 locals were hired in contract form at Omo-Kuraz I and II. The complaints signal that most of the cooperatives in the wake of the Omo-Kuraz sugarcane projects are not benefiting the locals. We found that about 98% of the cooperatives were owned by groups/individuals of non-local origin. Those originally owned by 'indigenous' groups are not successful for various factors, including (un)profitability of the sector, alleged 'working culture' (little interest to engage in non-pastoral activities), and limited technical support (training). During a field visit in October 2020, we saw that one of the investors (*Damote* farm), which leased about 300 ha of land for animal fodder production and processing in Nyangatom, showed an interest to invest in a partnership with the local agro-pastoralists. The proposed investment was to engage them in oxen fattening on the basis of a transfer of technology and know-how and creating a market. Here funding and partnership were important elements of the out-growers' scheme as well as awareness among pastoralists to enhance trust and transparency.

Tax revenues from traditional livelihoods and local investment (the Nyangatom case)

Another positive expectation of the development projects in LOV was income tax revenue for the local and national authorities. According to the local revenue office in Nyangatom district, the tax revenues from all agricultural investment schemes — e.g. via land rent and tax from employees' salaries between 2011 and 2020 — were only 1,266,742 ETB (USD 34,045), while that of local livestock and land use was 1,827,198 ETB (USD 49,108) over the same period (Fig. 6). This is a clear indication of the disappointing benefits of the new investment projects and new local economic activities (cf. the argument in (Behnke and Kerven 2013)). Some argue that if the tax collection structure would be more systematic, the revenue from the local economy would be better, compared to some private investments. The government undervalued the socio-economic contribution of pastoralism and argued that LSAI was 'the only way out from poverty' and to 'eradicate root causes' of pastoral conflicts in the LOV. This narrative is not entirely convincing for the locals. They complain about the benefits from the investments being invisible and not making up for losing their own traditionally viable economic activities, such as river retreat crop cultivation along Omo River banks and their livestock-keeping way of life. They further note that '…we used to be relatively food secure while we cultivated using the Omo River flood'. This analysis indicates that the champions of the current LSAIs are neither the local community nor the government, but mostly the private investors and those who are affiliated with the projects. The agro-pastoralists seem to be the losers, as vulnerability to food insecurity, food 'sovereignty' (i.e. less agency in their food production and choice of products/varieties to cultivate), and climate change impacts have been increasing.

Impacts of LSAIs on local livelihoods and food security

Several studies have shown that by far not all agrarian investment projects in sub-Saharan African countries, after clearing grassland and forest lands, were yielding enough to provide the intended benefits to the local people and the national economy (Andrae and Beckman 1985; Behnke and Kerven 2013; Lane and Pretty 1991). According to our field informants at various levels, the progress in the implementation of development projects was often well behind schedule and simply unable to meet local and national expectations. As a result, local people often were disenchanted with the asset losses and received few or none of the promised socio-economic

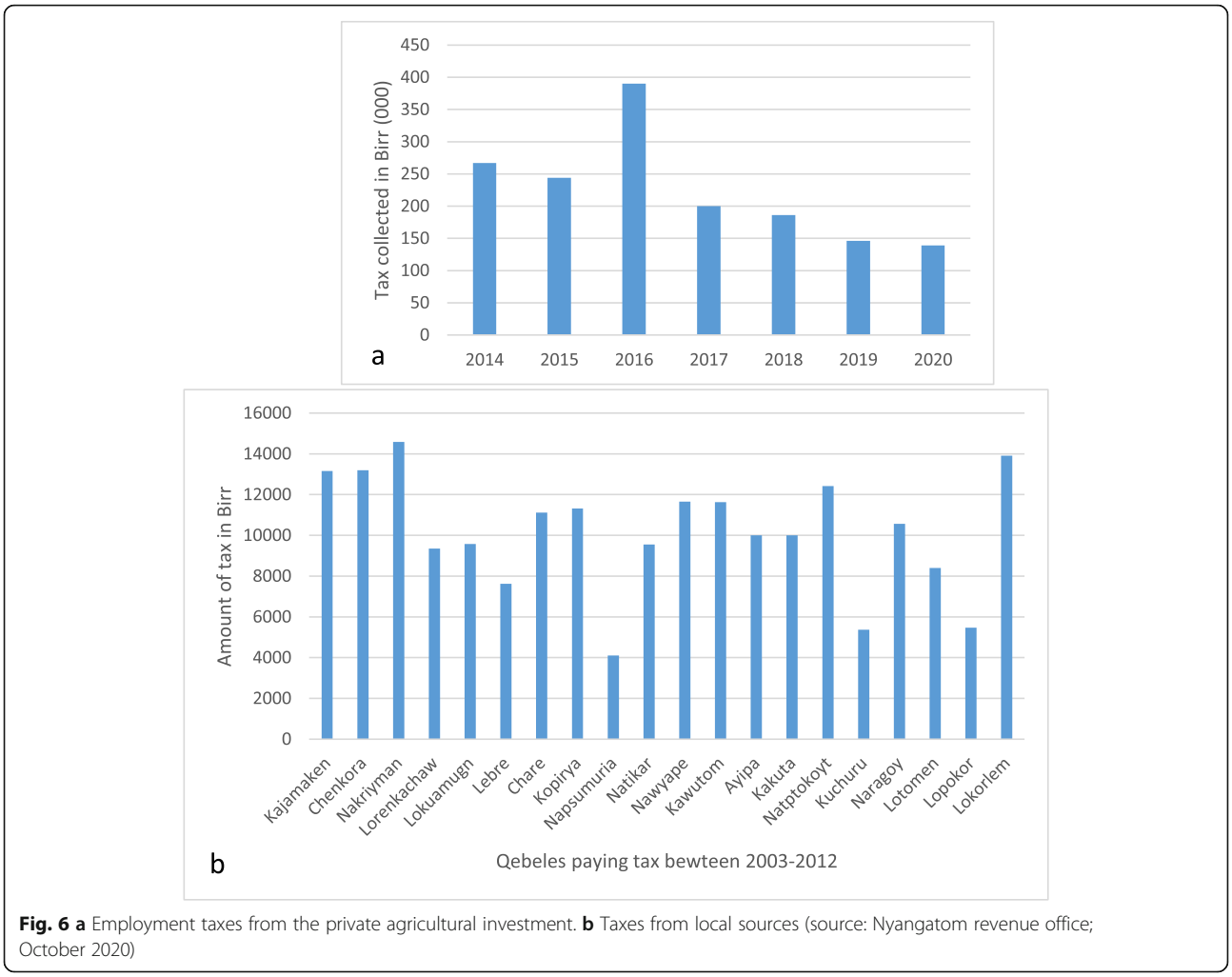

Fig. 6 a Employment taxes from the private agricultural investment. **b** Taxes from local sources (source: Nyangatom revenue office; October 2020)

benefits, implying that even if expected positive effects might materialize in the future, locals may end up subsidizing investors. For agro-pastoralists, such investments may result in further erosion of the viability of their traditional livelihoods over the longer term (Adane et al. 2021b).

The current sugarcane and other private projects have a capacity of creating >200,000 jobs in addition to the out-growers' schemes and cooperatives organized around them. The SNNPRS Investment Commission estimated that of the 113,469 projected new jobs from private investments in the LOV only 12,814 (11.3%) were realized by 2020.[11] The employment opportunities at farms are insignificant: only a few households have members that work there, as observed in Dassanech (25%) and Salamago (30%). Some in Salamago and Dassanech complained that no local people are employed at higher positions, even though there are several qualified candidates. Furthermore, the population increase following the influx of tens of thousands of labourers from other areas tends to lead to population composition changes and competition for jobs, and newcomers often get involved in illegal activities such as charcoal making, firewood collection, and smuggling as well as alcoholism.

Failure to adhere to social agreements and not delivering economic benefits to the local community, often caused by the lack of economic success of the projects, can lead to significant negative socio-economic impacts and even instability (Moreda 2017). For instance, in Salamago, Omo-Kuraz I and II initial promises to cultivate lands for pastoralists and create a market for sugarcane producers did not materialize. The agro-pastoralists lost over 4 million ETB due to the failure of the Omo-Kuraz I factory to purchase sugarcane from agro-pastoralists. In Nyangatom and Dassanech, not only communities but also experts are claiming that the private investments are not honest to their promises regarding know-how and technology transfer (the 'Status of the investments in the LOV

[11]Source: South Investment Commission

(Nyangatom, Dassanech, and Salamago)' section) to agro-pastoralists and have failed to integrate with the local systems (cf. already (Gebre 2012)). The under-utilization of the leased pastoral land and water affects not only the pastoral livelihoods but also farm profits and local and national revenue collection. Similarly, private investors in the Nyangatom district complained that the reduction of the Omo River level also affected their production costs, by increasing the running costs for water pumps. For instance, during the regular Omo River flow, water pumping costs about 60 l of diesel a day but after the vertical drop of the water level, the costs doubled to 120 l a day: a 50% rise.

About 95% of the people in Nyangatom and most in Dassanech are now food insecure, indicating that the presence of the current development projects did not significantly contribute to local food security. Similarly, about 25% of the population in Salamago, and none in Dassanech and Nyangatom, experienced a change in daily diet composition — most are still dependent on the traditional food system. About 60% in Dassanech and 85% in Salamago had access to the local markets, but most agreed that the marketable items did not much change even after the investments. Similarly, 30% of Nyangatom obtained their income from the sale of livestock, food aid, and petty trade. In Dassanech, only a few reported that they recently started to sell vegetables and fruits at the local market. This indicates that the local livelihood still depends on traditional production systems, except for a few households. In general, the development projects in the LOV are not benefiting the local communities to any significant extent through infrastructure development and employment, except for a few households obtaining labour income from the plantation.

Hence, for pastoralists, the land investment projects may overall result in further eroding the viability of pasture and food security over the longer term. The transfer of farmland/grasslands to large-scale commercial farms has worsened the local food security situation and resulted in a loss of income. For example, about 56% of all crops produced using river retreat cultivation are now completely stopped in Nyangatom. It was reported that the contribution to food security for Nyangatom of river retreat agriculture was 50%, modern irrigation agriculture 37%, and pond cultivation 13% in the past few years (Fig. 7). Though using irrigation has increased recently, most agro-pastoralists still prefer river and pond retreat cultivation. During the field assessment, the respondents argued that crops from flood retreat cultivation used to be much better in terms of yield and wider distribution. For example, in Dassanech in 2018–2019, about 109,691 and 130,298 quintals respectively were obtained using irrigation and river retreat cultivation. While the development approach adopted by the federal and regional governments aims to enhance the food security and incomes of local people, it has not been achieved in the case of the Salamago, Nyangatom, and Dassanech districts.

Empirical data from Dassanech, Nyangatom, and Salamago, therefore, indicated that the communities are becoming more vulnerable to food insecurity and climate change. Some argue that this situation has even increased after the expansion of development projects in the LOV, which are displacing the agro-pastoralists from their fertile lands and failed to integrate them into the projects as planned. The local administration in

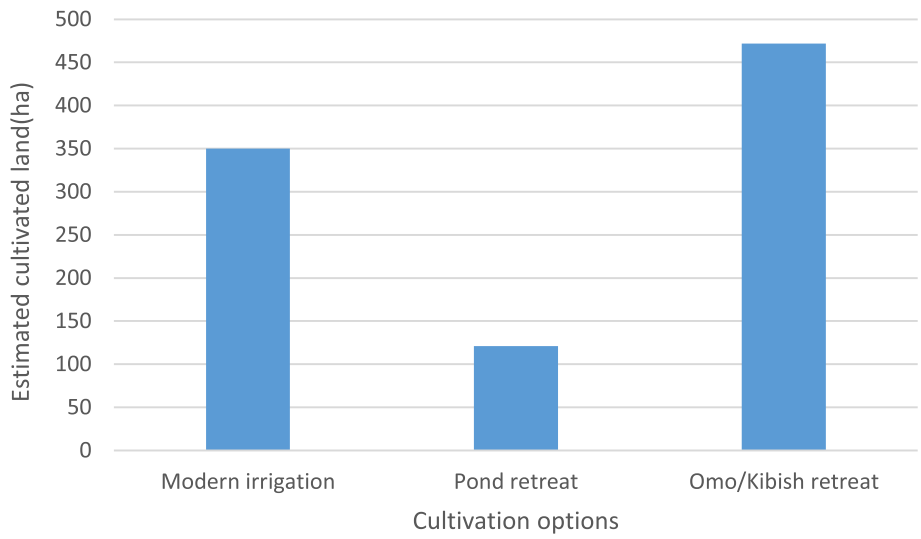

Fig. 7 Crop cultivation options in the Nyangatom

Salamago district has started reporting many more cases of food-insecure households in the past 5 years (55%). The cause for this is twofold: climate change and loss of fertile lands along the Omo River that used to be cultivated even during drought-intense years (Fig. 8).

The number of emergency food aid beneficiaries in 2020 in Nyangatom, Dassanech, and Salamago are 7663, 23,267, and 13,097 respectively, and safety net beneficiaries (the numbers are constant for some years) are 14,032 and 24,969 in Nyangatom and Dassanech respectively. Bekele et al. (2020), in a comparative study of five pastoral regions in Ethiopia, argue that the presence of LSAI has a positive impact on household food security. This contrasts with Shete and Rutten (Shete and Rutten 2015), who showed a significant negative effect of LSAIs on local food insecurity. According to early warning and food security offices in the district, zone, and region, Salamago is not included in the national safety net programme, but the number of people in need of emergency food aid is growing. In Dassanech, the number of emergency food beneficiaries has also increased: from 9,514 in 2005 to 24,969 in 2020. In September 2020, about 65,000 Dassanech were exposed to food insecurity following the discharge of the Omo River and drought. This was exceptional. Experts in the district and zone also noticed that few agro-pastoralists developed a dependency syndrome and do not want to invest their labour/capital in climate-resilience activities. The primary concern is that beneficiaries lose the motivation to work to improve their livelihoods after receiving aid benefits or that they will deliberately reduce their efforts to qualify for food aid. Providing food aid to those in need often discourages the well-off pastoralists and attracts them to the food aid programme.

In sum, the interruption of traditional livelihood strategies in the LOV has led to increasing dependency on the government. The distribution of aid is developing a dependency on external food aid and weakens the traditional culture of sharing. In the past, the Nyangatom used to support each other in times of drought through exchange and mutual aid, and so did people in Dassanech and Salamago (Adane et al. 2021a; Gebre 2012). Furthermore, the increasing penetration of the state apparatus is leading to social changes (Moreda 2017), like in the age-set system and in the authority structure of the generations. A key feature of the Nyangatom livelihood system is transhumance — the seasonal and recurring livestock movement whereby seasonal grazing areas and livestock mobility routes are fixed, using land resources extensively. This system is constrained due to the nationalization or privatization of grasslands, which restricts free grazing and may invite a shortage of labour force due to the labour-intensive Omo-Kuraz V project. Livestock mobility restrictions and limited access to grazing lands caused by LSAI have a negative impact on fodder supply, which again threatens the food security of the local community (Adane et al. 2021b). The presence of large numbers of migrant labourers in the project area leads to crowding, abuse, and weakening of traditional networks, cultural values, norms, and assets of the agro-pastoral communities.

Nyangatom society has a distinct social structure that includes age and generation sets. Generation-set elders are responsible for all sorts of traditional decision-making, including land management, livestock mobility, and conflict management. The active groups of the Nyangatom are called the Elephant, Ostrich, Antelope, Buffalo, and Crocodile (communication with elderly

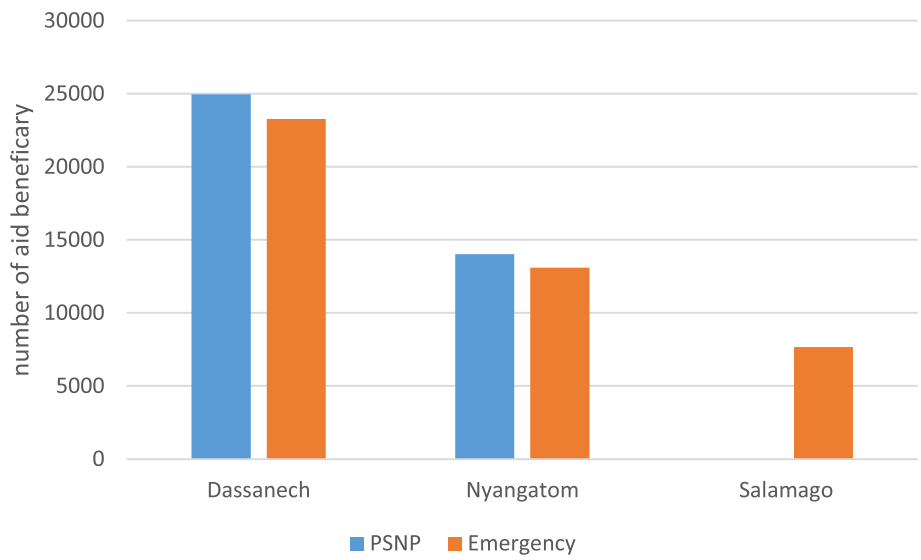

Fig. 8 Food aid-dependent households in Nyangatom, Dassanech, and Salamago

people, 2018). Each of these groups has a distinct functional role in the society that maintains socio-economic and environmental management. Traditionally, secular and ritual powers are vested in the hands of the Elephants — the seniors, and the top in the Nyangatom hierarchical decision-making structure. The Elephants are responsible for political, social, and environmental decision-making, whereas the Ostrich set is responsible to facilitate and coordinate the implementation of decisions made — in the sense of acting and coordinating with subordinates. Serious matters of public concern are brought to their attention for deliberation and final decision to be taken. The other generation-set members can be part of the process but with limited roles in the deliberation process and are responsible to protect the country (cf. (Tornay 1981; Tornay 2001); Gebre, 2014). However, recently, their decision-making role is gradually dwindling and is being replaced by the modern administration system except for some cultural and livestock mobility decisions and ritual functions. In particular, they are losing political and resource decision-making autonomy following the strong presence of the central government.

Impacts on the local ecosystem and livestock mobility

Key findings, therefore, indicate that there are multiple drivers of socio-ecological change in the LOV, both internal (e.g. overgrazing) and external (e.g. large-scale land acquisitions and climate change). Most investors had cultivation and operational models, the environmental impacts of which are likely to be negative and the management of which was often deficient. Policies aiming to foster development by giving away land and water resources for large-scale monoculture cultivation led to environmental degradation. In the LOV, the unclear boundaries and status of community land, weak enforcement of national environmental regulations, and top-down state legislation contributed to a rapid expansion of monoculture agriculture and ecosystem degradation. Concerns abound about sugarcane plantation expansion as a major contributor to loss of biodiversity, greenhouse gas emissions, and social conflict due to a failure to recognize local land rights and enforce concession obligations (Moreda 2017).

Currently (2021), about 50,000 ha (62%) of the original plan for sugarcane plantation and other infrastructure developments in the LOV, including road networks, is under preparation. The local ecosystem has not been properly considered as a factor to take into account. The LSAI projects end up massively clearing the natural vegetation cover and causing species reduction, as we observed practically on the ground. Dereje et al. (Dereje et al. 2017) and Moreda (Moreda 2017) reported that LSAI damaged large areas of vegetation and forest cover in the Benishangul-Gumuz region, and Tsegaye et al. (Tsegaye et al. 2010) reported the same for the Northern Afar region. As mentioned above, besides the seasonal influx of substantial numbers of migrant labourers and the permanently settled new communities, there is a rapidly growing and continuing demand for fuel wood and timber that will aggravate deforestation unless recommended remedial measures are implemented.[12]

Although the ESC (2015) claims that due construction of a number of wildlife corridors was undertaken to facilitate the movement of animals, the project undoubtedly is affecting the fauna and flora of the LOV. The disappearance of 'buffer zones', which are vital for biodiversity and wildlife conservation, has a destructive effect on the local ecosystems. The investment projects affect biological diversity through the introduction of monoculture cultivation in the forested lands and national park areas. Informants from Salamago reported that the wildlife, in particular elephants, is significantly decreasing in numbers. They clearly trace this change to disturbances in the landscape caused by large-scale farms, which motivates agro-pastoralists to move further into the wildlife core conservation areas. Gibbs et al. (Gibbs et al. 2010) also reported that the environmental impact of agriculture expansion includes losses in wildlife habitats and degradation of the landscape. This has negative implications for bio-geochemical and biophysical climate regulation, as well as for people who critically depend on natural ecosystems for food and freshwater provision (Abbink 2018; Fukui 2001; Hodbod et al. 2019; Moreda 2017). The other environmental externalities include soil and water pollution because of agro-chemicals and excessive pesticide use and over-utilizing natural resources like water for irrigation (EEPCO (Ethiopia Electric Power Corporation) 2009).

Conclusions

This paper analysed the impact of the Omo-Kuraz sugar projects in southwest Ethiopia on local agro-pastoralists' livelihoods and food (in)security in the Lower Omo Valley. The data gathered raise questions about the cost-effectiveness and ecosystem-economic rationale of the current LSAI approaches, which are government-run with centrally determined prescriptions relating to the LSLA. Our analysis, based on the local context and within a regional political-ecological perspective, is aimed at understanding these social-economic and ecosystem impacts of the development projects in the LOV. The rural poor, such as (agro)-pastoralists, face the socio-economic costs of LSLA, which take up a huge surface and were constructed in a short time period.

[12]See SNNPR rural land administration article 10 of Proclamation no. 110/2007

The agro-pastoralists in Nyangatom, Salamago, and Dassanech districts are the first to be impacted by the LSAIs in many ways: first, by a reduction and then a complete stop of traditional riverbank agriculture and reducing crop production and hence threatening food security, despite that the existing system was a rather productive and secure source of food and income; second, increased movement and out-migration of locals in search of pasture and water where the traditional mobility routes are interrupted due to the Omo-Kuraz sugarcane projects. This blocks mobility corridors and might result in more resource-based conflict. Third, a loss of biodiversity and forest/woodland resources blocks and limits the availability of non-timber forest products, wildlife mobility, and species breeding between the Omo and Mago National Parks, which the project had planned to reconnect via bridges. This will also negatively affect wildlife conservation and thus the tourism sector. Agro-pastoralist livelihoods are not immutable to change and will adapt to new challenges and circumstances, and the analysis in the paper is not meant to 'preserve' them in their 'traditional state'. But the top-down implementation of LSLAs and the one-size-fits-all commercial agrarian investment policies do not tap the potential of the local economies, trample customary land use rights (and even human rights), and thereby do not enhance the growth and success of the local population of indigenous to the area, nor to their effective response to climate change effects.

It has been observed that land acquisition lacks some level of transparency in the land transferring process. Furthermore, it did not strictly follow the legal frameworks of land transferring to the private and public investments in the LOV. It is advisable to develop a policy framework and guidelines for large-scale land acquisitions by both federal and regional governments for LSLA that will protect the interests of investors and the welfare of agro-pastoralists and landowners. Hence, this paper is an attempt to contribute to the policy debate on the formulation of such a framework in the LSLA process or at least to abide by the existing structure and considers all relevant actors. The traditional council are part of the problem due to the lack of consultation and opaqueness of their land transactions, but they must also be part of any enduring solution because of their traditional roles and political clout. Ultimately, the government will need to generate the political will to push through the policy changes and legal reforms that will allow land use and management as well as social and environmental standards to be factored into future large-scale land acquisition deals in a transparent, equitable, and efficient way. These lapses call for strengthening institutional arrangements and measures to plug existing loopholes and allow the government to strike the right balance between providing the security of leasehold sought by large-scale agricultural investors and protecting the equally legitimate land rights of small-scale (agro)-pastoralists.

The Nyangatom getting employment in state or private farming will by no means be better off than under their current livelihood strategies of livestock management and (former) river flood crop cultivation, which provided the yearly basic nutritional and food requirements. In addition, beyond being a source of income and food, livestock management in Nyangatom was very important as a socially integrative mechanism: it has socio-cultural and saving values. The Nyangatom never think of reducing their livestock numbers: it is wealth, prestige, and social standing. Top-down appropriation of the agro-pastoralist land rights by state and private investors threatens the local livelihoods, value systems, and environment and also affects the customary interaction between different ethnic groups living in the LOV. A new coexistence with or integration of local agro-pastoralist livelihoods into a modernizing national economy via development schemes is better built gradually, to ensure local peoples' benefits and project sustainability. Hereby, it would work better to improve the consultation, information, and consent basis for LSLAs and to make free, informed prior informed consent of locals mandatory. For this, it might be advisable to establish an independent institution that makes sure this is applied. Establishing clear agreements between the communities and the investment projects to ensure transparency and enhance sustainable development would be a way forward, including the strengthening of local traditional/community authorities, and would build support and counterbalance the land investors' negative and arrogating activities in the landscape. The aim would be, in line with national laws on respecting the rights of pastoral peoples, to ensure fair benefit-sharing and increase the pastoralists' voice.

We do not suggest not to categorically stopping any development projects but rather recalibrating them towards responsible and sustainable investment that recognizes indigenous peoples' rights, realizes benefit-sharing, and includes them and their ecosystem as parties, agents, and stakeholders. Their continuous rights to use the local resources and sustain their traditional living strategies should be respected, as also their right to change their livelihoods. This would mean not only making prior socio-ecological impact assessments but in some cases, scaling down projects and fine-tuning them to local socio-ecological conditions. It is critical to design projects that consider the dynamics of local livelihood strategies, cultural preference patterns, and social systems before commencing the blanket operationalization of investment projects. Local peoples have for centuries

been the custodians of the 'natural wealth' now exploited by state enterprises and private investors. Livestock mobility corridors need to be preserved so that the local livelihood strategies — time-tested and based largely on cattle rearing as the main wealth — can be sustained and can contribute to climate change adaptation and food security. Context-based extension services, including environmental protection measures,[13] must be developed to contribute to local livelihood strategies, integrating into modernization processes. The outgrower schemes are better based on the local agro-pastoral community's needs and supported with sufficient training, financing, and marketing strategies that do not rely on the existing sugar plantation project only. This study adds to the body of academic literature on the LSLA/LSAI debates by providing empirical evidence on the role and impacts in arid and semi-arid lands and in particular in the LOV. Furthermore, the study brought the (agro)-pastoralists' views and concerns relating to development issues to the policy agenda, presenting concrete cases from the field.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13570-022-00242-8.

Additional file 1.

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Authors' contributions

AG is the main investigator involved in planning, design, data collection, analysis, and drafting of the manuscript and designed the figures and tables. He develops a map of the study area. JA supervised the data analysis, drafted the manuscript and layout, and reviewed the manuscript. The author(s) read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

[13]For example, controlling invasive species and blighting the pasture lands (see above)

Competing interests

The authors declare that they have no competing interests.

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