ecdpm Making policies work

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Making markets work for indigenous vegetables

TOWARDS A SUSTAINABLE FOOD SYSTEM IN THE LAKE NAIVASHA BASIN, KENYA

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Summary

Like in other parts of Kenya, the population around Lake Naivasha produces and consumes various indigenous vegetables, such as black nightshade or amaranth. Despite their sustainability benefits, the local food system is reticent to expand the cultivation, marketability and consumption of indigenous vegetables. A key problem is that most Kenyan farmers rely on one crop: maize.

Yet, monoculture often has repercussions for human health, agricultural biodiversity and the soil. A more systematic combination of indigenous vegetables and maize is particularly important in parts of Kenya, like Naivasha. This paper looks at how to increase awareness and willingness of consumers to buy indigenous vegetables, and to ultimately make markets work for them.

One way would be to create labels or certificates to signal to consumers the sustainability benefits of indigenous vegetables. Options for this include 'voluntary sustainability standards', 'landscape labels' or 'participatory guarantee systems'. These market schemes allow consumers to choose products that tend to be more nutritious, but often at a higher price. All three schemes are already used for various food products in Kenya.

We put forward three recommendations for a process to set up similar schemes that could be possibly piloted in the Naivasha basin:

- Integrate sustainability benefits of indigenous vegetables into an existing market scheme;
- Promote indigenous vegetables as organically produced food and benefit from the growing organic market in Kenya;
- Involve public authorities closely in the set-up of a scheme to strengthen the policy, legal and institutional system that can support market development in favour of indigenous vegetables.

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Acronyms

GI	Geographical Indication
IFOAM	International Federation of Organic Agriculture Movements
IPES-Food	International Panel of Experts on Sustainable Food Systems
IPR	Intellectual Property Rights
KOAN	Kenya Organic Agriculture Network
MP	Mountain Partnership
PELUM	Participatory Ecological Land Use Management
PGS	Participatory Guarantee Systems
SASS	Sustainable Agrifood Systems Strategies
SFS	Sustainable Food System
TPC	Third Party Certification
VSS	Voluntary sustainability standards

1. Introduction

The world population is expected to grow from the current 7 to 9 billion by 2050. More than half of this growth will occur in Africa, also the second fastest urbanizing continent. These trends will cause an unprecedented rise in demand for food that will be especially challenging in Africa, a continent that already has high food and nutrition insecurity.[1] This **insecurity is in many cases caused by the lack of crop diversification, due to dominant monocultural systems** that have increased the dependency on chemical fertiliser, often with repercussions for human health, agricultural biodiversity (agrobiodiversity) and the soil (De Schutter, 2015). Climate change and variability further exacerbate the risks on agro-food systems (Knaepen *et al.*, 2017).[2]

The International Panel of Experts on Sustainable Food Systems (IPES-Food)[3] calls for *"a paradigm shift from industrial agriculture to diversified agroecological systems"*, as these latter systems can be competitive, perform particularly strongly under environmental stress, and pave the way for improved health. According to IPES-Food, a Sustainable Food System (SFS) consists of five interconnected dimensions: it is economically viable, environmentally healthy, social equitable, and it takes into account cultural differences and good health through sufficient nutrition (IPES-Food, 2016). Given the current rate of depletion of Africa's resources, an important solution lays in promoting SFS. **One way is diversifying single-crop based food systems by supporting the production, processing, marketing and consumption of 'neglected and underutilised species'**, such as *amaranth*, *millet* or *Bambara groundnut*. These species, most of which are plants, are also known as 'orphan crops' or 'indigenous vegetables'. They are generally highly nutritious, commonly perform well under extreme weather conditions and they can contribute to protecting agrobiodiversity. Their diversity also allows to generate income for the rural poor, especially for women who often cultivate, process and market indigenous vegetables (Rudebjer *et al.,* 2014; Baldermann *et al.,* 2016; Chivenge *et al.,* 2015).

However, **despite their myriad of advantages, indigenous vegetables have characteristics that make their cultivation, marketability and consumption difficult to expand**. A key problem is that agricultural markets often favour uniform varieties of a few high-yielding staple crops such as maize or rice.[4] Other barriers to indigenous vegetables' cultivation include the limited seed availability, low yields, laborious processing, and the lack of markets or the lack of awareness and consumer demand. In addition, indigenous vegetables carry the stigma of 'food for the poor' (Baldermann *et al.,* 2016; Porras *et al.,* 2015). Consequently, they risk to be wiped out in a world where about ninety percent of the food consumed comes from only fifteen plant species.[5]

So, how to develop, for a specific food system, value chains for intercrop diversity, including indigenous vegetables, from a holistic perspective? And, what are the options to concretely support enabling market conditions in favour of indigenous vegetables' consumption, and ultimately SFS?

The objective of this brief is to provide answers to this two-fold question, following preliminary evidence that is based on studies and field research in the Lake Naivasha Basin in Nakuru County (Kenya), an area with potential to diversify the food system, by combining more systematically locally available indigenous vegetables with staple crops such as maize. It looks in particular at three market schemes that can be used

1 See: http://www.globalhungerindex.org/.
2 According to the Food and Agriculture Organisation, around 75 percent of crop diversity has been lost since the 1900s, caused by economic, social and demographic drivers. See: http://www.fao.org/docrep/007/y5609e/y5609e02.htm.
3 See: www.ipes-food.org.
4 See: http://www.economist.com/news/middle-east-and-africa/21665005-small-farmers-africa-need-produce-more-happily-easier-it.
5 See: http://www.nuscommunity.org/research/themes/value-chain-development/.

to promote indigenous vegetables, including voluntary sustainability standards (VSS), landscape labels and Participatory Guarantee Systems (PGS).[6]

The paper is organised in four sections:

- The **following section** briefly discusses the food system in the Lake Naivasha Basin region, with a special focus on indigenous vegetables and the barriers to their further development;
- The **next section** gives an overview of the key steps required for the holistic development of value chains of indigenous vegetables;
- The **fourth section** discusses three types of labels or certificates to promote indigenous vegetables' consumption and it formulates three practical recommendations when setting up this type of market schemes;
- The **final section** concludes by looking also at the strengthening of the supply side of indigenous vegetables and it gives suggestions for local actors in Naivasha to push for change.

2. Mapping the food system of indigenous vegetables in the Lake Naivasha Basin

2.1. Policy frameworks and indigenous vegetables in Kenya

Kenyan policy frameworks and decisions have increasingly emphasised the importance of traditional food species from a nutritional perspective. The **National Food and Nutrition Security Policy**, adopted by the Government of Kenya in 2011 and currently under revision, is the country's main policy framework in the area of food security (Government of Kenya, 2011). It states that the use of 'traditional high value crops' should increase by 10 percent by 2020, because it is a key solution to poverty-based food insecurity and transitory food insecurity, caused by emergencies. The importance of diversified systems is also reflected in the **Crops Act (2013)** that aims to *"promote competitiveness in the crops subsector and to develop diversified crop products and market outlets"* (Part I, Art. 3). Indigenous vegetables, including *black nightshade* and *spider plant*, have been selected as priority crops in this Act.[7] In addition, the **Agricultural Sector Development Strategy** underlines the need to transform smallholder agriculture from low-productivity subsistence activities to innovative agribusiness enterprises. Research on drought-tolerant crop varieties as well as organic farming is important to achieve this (World Bank & CIAT, 2015).

2.2. The Lake Naivasha Basin: characteristics and policies

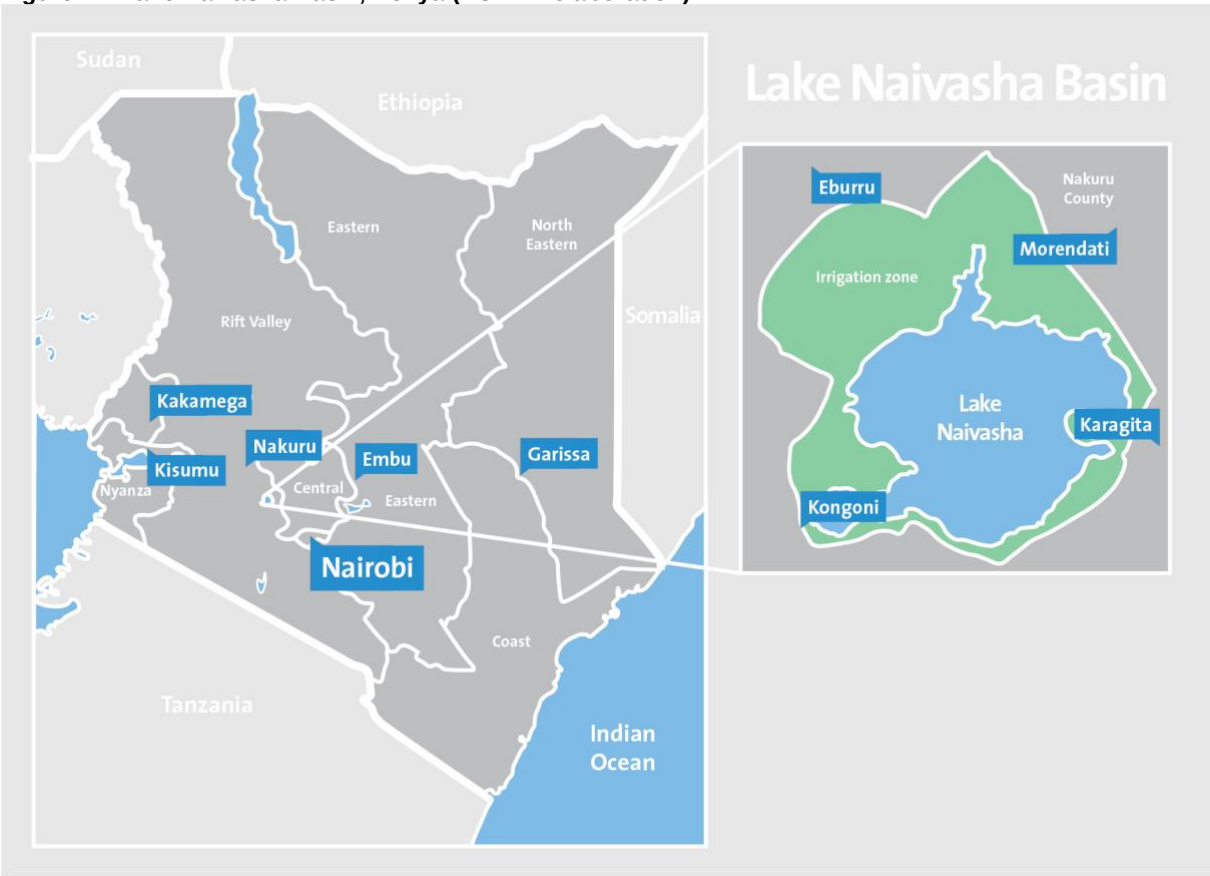
The Lake Naivasha Basin is located in the central southwest part of Kenya, approximately 80 km northwest of Nairobi (Fig. 1). It is situated in the Kenyan Rift Valley and it covers an area of 3400 km^2 with a climate that is predominantly semi-arid. The catchment is home to a diversity of fauna and flora, that contributes to the region as a popular tourist destination (Mulatu *et al.,* 2013). The Basin has a diversity of production systems, including large-scale horticulture as well as small-scale maize farms, spread out over 504 000

[6] The analysis is based on a broad literature review, two field missions to the Lake Naivasha Basin in Nakuru County (June and November 2017) and a multi-stakeholder dialogue, inviting various local stakeholders, organised by the SASS team on June 8th, 2017. This brief is aimed at food system experts, policy-makers at multiple scales and private sector actors.

[7] See: http://www.kenyalaw.org/lex/actview.xql?actid=No.%2016%20of%202013.

hectares of arable land. The Lake Naivasha Basin is located in the Nakuru County and it represents about 67 percent of the total land area in the county (MoALF, 2016).

Figure 1 – Lake Naivasha Basin, Kenya (ECDPM elaboration)



Following the decentralisation process, undertaken after the redrafting of the Kenyan Constitution in 2010, the responsibility to support the key agricultural sub-sectors, including the crops sector, were devolved to sub-national level. The first **County Integrated Development Plan (2013-2017)** of the Nakuru County Government stated that the food poverty index was at 41 percent, meaning that a significant proportion of people was suffering from hunger. Unpredictable and erratic rainfall was seen as an important constraint. Poverty is caused by low agricultural productivity, due to high input prices, low output prices and a lack of capacity for value addition, in combination with high unemployment rates. Importantly, the County Plan is the reference framework for the allocation of resources to priority projects. It promotes traditional high value crops, because they are considered as part of a strategy to address hunger in Nakuru. The **2017/2018 Nakuru County Annual Development Plan** is the latest plan that actualises the Nakuru County Integrated Development Plan. It aims to promote drought tolerant food crops, such as cassava and sorghum and to support school feeding programmes to enhance nutrition. The plan also aims to exhibit traditional cuisines to promote the consumption of traditional food in the community (Sassi & Zucchini, 2018).

2.3. Production, consumption and demand of indigenous vegetables

The population in Nakuru County produces and consumes various indigenous vegetables. According to a recent survey of a representative sample in the Lake Naivasha Basin (606 rural households) by Sassi

and Zucchini (February 2018),[8] *black nightshade* is mostly consumed (7,1 percent; Lat. *Solanum nigrum*; indigenous name, *managu),* followed by *pigweed* (4,1 percent; Lat. *Amaranthus sp*.; indigenous name, *terere*) and *vegetable cowpea* (1,8 percent; Lat. *Vigna sp*.; indigenous name, *kunde*).[9] The survey also found that traditional species are often associated to a certain tribe or community.[10] Over time, most of these species' germplasm has been harnessed and multiplied to the extent that the seeds can be bought and planted. Even in this case, the vegetables retain the tag 'traditional vegetables', because they keep their original characteristics and they do not require complex agronomic farming. Some other traditional vegetables remain 'wild', only spontaneously sprouting when it rains (Sassi & Zucchini, 2018). Generally, indigenous vegetables are cultivated in small-scale farms of less than two acres: black nightshade and cowpea are often intercropped with maize, beans or potato, as learned during field research in June and November 2017. During interviews, the majority of farmers claimed that indigenous vegetables are easier to plant and grow faster than maize and other crops per unit area of cultivated land. Also, they stated that pests in indigenous vegetables can easily be tackled through natural remedies, while pests in maize, such as armyworms, require chemical pesticides.[11]

Indigenous vegetables are in the first place cultivated for self-consumption, but their market demand is growing: indigenous vegetables are widely sold on local markets in the Naivasha area, as observed during field research in June 2017. Market surveys show that the demand for indigenous vegetables is often not fully met in Kenyan urban and peri-urban markets, such as Nakuru market. There are even potential regional and international markets (e.g. people in the diaspora in the United Kingdom and the United States have expressed an interest to get more indigenous vegetables supplied to them) (Abukutsa-Onyango, 2010). In bigger cities, such as Nairobi, indigenous vegetables are sold to hotels and restaurants to be promoted as 'authentic, traditional dishes'. For instance, Amaica, a small but significant restaurant chain in Nairobi, buys its cowpea leaves and spider plant from groups of women growers. Amaica distributes the vegetables to its eateries in Nairobi, including its new outlet at Jomo Kenyatta International Airport. Other branches will soon be opened outside the capital.[12]

In general, **when indigenous vegetables are not sold directly on the market, they are sold to middlemen, who set the price**.[13] Furthermore, **production, handling and marketing of indigenous vegetables are mostly done by women and profits can be considerably high**: at each exchange point, it seems a profit of well over 75 percent could be made. In the Naivasha area, farmers who have surplus tend to sell their indigenous vegetables, mostly via middlemen, to supermarkets in Kasarani, Nairobi and Naivasha, depending on the prices and demand on a particular day.[14]

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8 In February 2018, Sassi and Zucchini did an analysis of the state of food security in rural areas of the Naivasha region. They found that the majority of households consumes *kale* (85,15 percent; Lat. Brassica sp.; indigenous name: *sukuma wiki*) (Sassi & Zucchini, 2018). According to Bioversity International, kale is indeed the most commonly grown and eaten vegetable in Kenya (See: https://www.bioversityinternational.org/fileadmin/bioversity/publications/Web_version/500/ch14.htm). Kale is also a recently introduced species. Therefore, we do not consider kale as an indigenous vegetable in this paper.

9 For a comprehensive list of traditional food plants in Kenya (1999), refer to: https://bit.ly/2pQuIyC.

10 For more details, see also: https://www.bioversityinternational.org/fileadmin/bioversity/publications/Web_version/500/ch09.htm#TopOfPage.

11 Presentation by Dr. Sila, Jomo Kenyatta University of Agricultural Technology, Kenya, given at during ACP S&T Project Inception Workshop "Strengthening Capacities and Informing Policies for Developing Value Chains of Neglected and Underutilized Crops in Africa" (12-14 March 2014), World Agroforestry Centre (ICRAF), Nairobi, Kenya.

12 See: https://www.fairtrade.net/new/latest-news/single-view/article/rekindling-interest-in-african-vegetables.html.

13 SASS Field Research, Gilgil area, June & November 2017.

14 A wholesaler purchases a bundle of vegetables for Ksh 2 (US $0.04). He/she splits the bundle into two and each is again sold at Ksh 2 to the retailer. The retailer repeats the same procedure before selling to consumers. So, one person producing indigenous vegetables provides employment to two others: a wholesaler and a retailer. Labour and time commitment is high, but the average purchase is rarely more than one bag, because of perishability and limited supply. See: https://www.bioversityinternational.org/fileadmin/bioversity/publications/Web_version/500/ch14.htm.

2.4. Barriers within the value chain of indigenous vegetables in the Lake Naivasha Basin

Despite indigenous vegetables often constituting a relevant part of the diet of food insecure households in the Naivasha Basin, they face many barriers to their market development. According to field research by Borrelli *et al*. (November 2017-February 2018) in small farms in Gilgil sub-county in the Lake Naivasha Basin, key obstacles include:

- Some indigenous vegetables demand irrigation or other forms of input to which farmers do not have access;
- Most indigenous vegetables are quickly perishable and consequently there is a need for processing technology and storage techniques to which farmers often do not have access;
- Indigenous vegetables require (additional) space to grow, but smallholder farmers have limited land available;
- Farmers are not sufficiently experienced in marketing techniques;
- There is a lack of good infrastructure to easily reach the market;
- Farmers are often members of social organizations such as Self Help Groups, but their governance systems do not easily facilitate access to credit for farmers, risk and cost sharing arrangements, and other business services.

Another important barrier to the promotion of indigenous vegetables is the fact that Kenyan farmers prefer to produce maize, as it is the country's most important staple food. Maize production is highest among all cereals (2 900 000 tonnes produced in the year 2016). It is the basis of the Kenyan diet, mostly used for 'ugali', a dish made with maize flour. According to a 2016 study by the Foreign Agricultural Service of the United States Department of Agriculture, maize will remain the main staple food in Kenya and consumption is expected to increase (Gitonga, 2016). Maize also features strongly in Kenya's Agricultural Investment Plan.[15] Also in Nakuru County, maize is a key staple food and a major contributor to livelihoods: according to 2012 statistics, 250 065 tonnes of maize were produced, valued at 6.5 billion Kenyan shillings.[16] In the marketing of crops, 39 percent of households in Nakuru county had contractual agreements with buyers of their produce and maize was the mostly sold crop (34,4 percent). Between 61-80 percent of Nakuru County's population is engaged in the maize value chain (MoALF, 2016). Further, the produced maize in Nakuru County, as well as in the rest of Kenya, is sold to local households, traders, millers, large private companies (e.g. animal feed manufacturers) and public sector institutions.[17] In the latter case, the government buys the maize directly during the harvest season to keep stocks for periods of food shortages or to influence prices, particularly for electoral reasons (Kirimi *et al.,* 2011). In fact, one of the main reasons for the popularity of maize are exactly these decades-long governmental subsidies to the maize sector. These subsidies have taken various forms: the lowering of consumer prices, subsidies for fertiliser or other inputs or subsidies for maize import from other countries.[18]

However, an **overreliance on one crop, such as maize, can have negative environmental impacts**, including habitat loss, because of land clearing, soil degradation and greenhouse gas emissions from deforestation (Reynolds *et al.,* 2015). From a livelihood perspective, the reliance on one crop makes farmers extremely vulnerable to changing onset seasons and climate hazards that are expected to increase due to

[15] See: http://www.nepad.org/sites/default/files/kenya-investment-plan-aug-14-2010.pdf.
[16] Other main food crops are Irish potato (270 986 tonnes), wheat (58 000 tonnes), and beans (22 614 tonnes), valued at 4.7 billion Kenyan shillings, 1.7 billion Kenyan shillings and 1.2 billion Kenyan shillings respectively (MoALF, 2016).
[17] For a detailed overview of the maize value chain in Kenya, see: The United States Agency for International Development (USAID), 2010. *Staple Foods Value Chain Analysis: Country Report – Kenya*. http://www.fao.org/sustainable-food-value-chains/library/details/en/c/236730/.
[18] See: https://medicalxpress.com/news/2017-10-kenya-short-term-wont-maize-crisis.html.

climate change: in times of crop failures, farmers do not have other income sources (Knaepen *et al.,* 2017). Yet, it is positive to note that, while maize is central in farming and livelihood systems in Nakuru, it is increasingly integrated into a diversified intercropping system as a strategy for dealing with the challenges of increased rainfall variability and drought (Brooks *et al.,* 2009).[19] For example, field research in Nakuru by Borrelli *et al.* (Nov. 2017 - Feb. 2018) shows that there is a diversification of production in Gilgil sub-county in Nakuru: small farmers increasingly produce staple crops such as maize together with vegetables and often also indigenous vegetables.

3. Steps towards value chain development of indigenous vegetables

Successful market development for indigenous vegetables in the region will require the development of their value chain. This must be approached in a holistic manner that takes into account all aspects along the value chain from genetic diversity and seed supply to final consumption, as depicted in Figure 2 (Padulosi *et al.,* 2014; Lamers *et al.,* 2016).[20]

Figure 2 – Holistic approach to promote the value chain of indigenous vegetables [21]

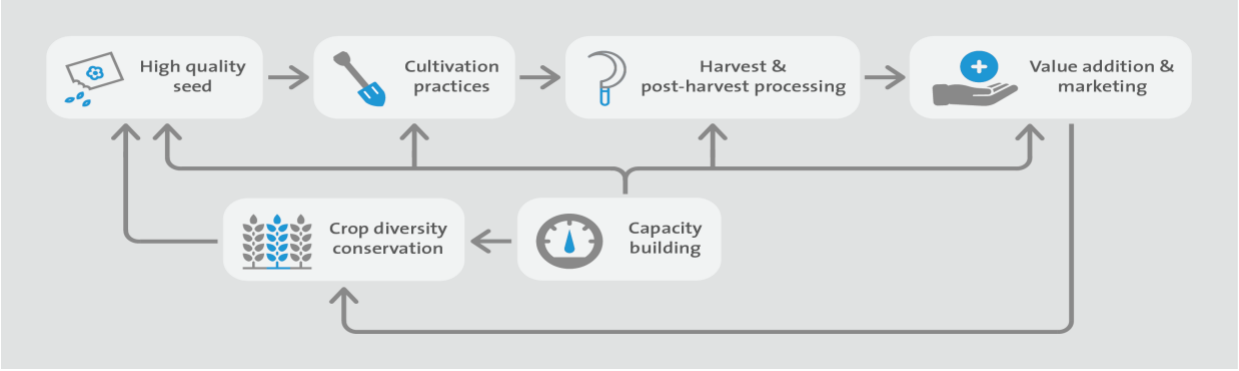

Table 1 exemplifies this gradual process, at the core of which are four key steps that could help overcoming the barriers to cultivation, marketability and consumption of indigenous vegetables.

Table 1 – Four steps towards effective value chain development of indigenous vegetables (Author elaboration, based on Padulosi *et al.*, 2014)

1	**IMPROVE HIGH QUALITY SEED ACCESS** ○ **Create inventory for indigenous vegetables to define and promote a niche market for them**: document and characterise indigenous vegetables' seeds and related benefits, including with a documentation of smallholders perceptions/preferences on cropping choices and of farmers' traditional knowledge around these vegetables; ○ **Create an open source seed system** that allows participatory varietal selection in order to release improved varieties of indigenous vegetables, to document seeds, and ensure access for smallholders to a wide variety of seeds. The open source seed system should work towards seed certification that would allow registration of seeds to an official plant health service for certification (e.g. the Kenya Plant Health Inspectorate Service).

[19] There exists also a considerable varietal diversification within maize itself (Brooks et al., 2009).

[20] Other approaches are the Marketing Approach to Conserve Agricultural Biodiversity (MACAB) and the Participatory Market Chain Approach (PMCA). For instance, MACAB, created in 2004, was the first intervention strategy that consists of nine steps, ranging from (1) the discovery of crop attributes to (9) examination of enterprise behaviour and social impact. Its development was based on experiences with potato and yacon diversity in Peru (Bernet et al., 2004, cited by Lamers et al., 2016).

[21] See: http://www.nuscommunity.org/research/themes/value-chain-development/.

2	**IMPROVE CULTIVATION PRACTICES** ○ **Invest in research and innovation** to improve cultivation practices for indigenous vegetables; ○ **Train farmers on new techniques,** e.g. by strengthening the capacity of extension officers; ○ **Create manuals** on good practices, based on traditional knowledge, e.g. practices for pest and disease control for indigenous vegetables, and disseminate them to farmers.
3	**IMPROVE HARVEST & POST-HARVEST PROCESSING** ○ **Develop low-cost, innovative technology for (post-)harvest processing** (e.g. threshing machines, de-saponification machines) and affordable cooling and storage technologies in consultation with communities; **Share knowledge** on processing techniques with communities.
4	**IMPROVE VALUE ADDITION & MARKETING** ○ **Develop value addition technologies**, including fermentation, drying, flour production (e.g. mixed flour of maize and indigenous vegetables) that can extend the shelf-life and the marketability of indigenous vegetables; ○ **Share knowledge** on technologies; ○ **Invest in adequate infrastructure and transportation means** to increase marketing options; ○ **Share market information** with producers and other stakeholders, e.g. on financial services for producers, including credit, savings and insurances, information on pricing, supply and demand of indigenous vegetables; ○ **Raise awareness**[22] through promotional campaigns, diversity fairs, farmers markets and purchase-contracts via media (e.g. social media, video tutorials, cooking demonstrations on TV),[23] popular chefs and eco-tourism industry, and explore other market opportunities such as shops, restaurants and hotels (e.g. Slow Food Kenya can promote indigenous vegetables through 'Slow Safari' and the 'Chef Alliance');[24] ○ **Attract consumers via branding, labels and certificates** (e.g. eco-labelling, voluntary labelling schemes, private voluntary standards); ○ **Organise and strengthen collective action**: strengthen Self Help Groups and create farmers associations for the production and marketing of indigenous vegetables (e.g. for agreements on a minimum price for producers).

Bioversity International has been putting indigenous vegetables on the international research and policy agenda, since more than a decade.[25] Its activities have yielded considerable success.[26] Box 2 describes their work on value chain development for finger millet in India and cañahua in Bolivia.

Box 1 – Value chain development of indigenous vegetables in India and Bolivia

Bioversity International has been supporting the marketing link in food value chains of indigenous vegetables, such as finger millet in India and cañahua, an ancient Andean grain, in Bolivia. Both indigenous vegetables have lost out to modern agriculture. In order to establish markets for these vegetables, researchers first went back to the field to map the genetic diversity of finger millets and the cañahua. In doing so, they could start selecting, multiplying and distributing quality seeds that would be helpful for the farmers. They also looked at cultivation, harvesting and processing techniques to add value, for instance by helping with safer processing techniques. Furthermore, they pulled together recipes on millets and Andean grains into books that could be shared among

[22] The African Leavy Vegetable (ALVs) Programme (1996-2004), carried out by Bioversity, shows that ALVs have spread to new areas. The main reason for this trend was increased understanding of the nutritional value, leading to higher demand in cities and increased home consumption (Gotor & Irungu, 2010).

[23] A Smart Food Reality Show - basically a cooking competition - was launched in Kenya in 2017, based on a unique collaboration between scientists and the media to popularize healthy and drought tolerant foods, including indigenous vegetables. See: http://www.icrisat.org/smart-food-show-to-promote-healthier-lifestyles-in-kenya/.

[24] See: https://www.fondazioneslowfood.com/en/what-we-do/slow-food-chefs-alliance/.

[25] See: http://www.nuscommunity.org/ for details on indigenous vegetables promotion projects by Bioversity International. Since 2017, Bioversity, together with partner organisations, has been working e.g. on the promotion of fonio and Bambara groundnut in Mali.

[26] See: http://www.nuscommunity.org/ for details on promotion projects of indigenous vegetables by Bioversity International. Since 2017, Bioversity, together with partner organisations, has been working e.g. on the promotion of fonio and Bambara groundnut in Mali.

communities to safeguard indigenous food culture. They also involved policy-makers to help to develop food safety standards related to cultivation and processing, and to introduce species in school meal programmes. Furthermore, these marketing initiatives triggered other initiatives: e.g. a restaurant chain started to make dishes with cañahua (Bioversity International, 2013 & Padulosi *et al.,* 2014).

The value chain development of indigenous vegetables should be a gradual and monitored process, because **commercialization could have negative consequences**, especially by encouraging genetic erosion, due to the development of just one variety. Lessons from the international success of quinoa, formerly known a 'neglected and underutilized species', produced in Bolivia and Peru, teach us that it is important to focus on conservation of genetic diversity as the starting and end point of the process, as shown in Figure 2. Quinoa used to be 'food for the poorest' in these countries, but everything changed with the global appetite for organic foods: production in both countries grew tremendously and export earnings skyrocketed. However, the downside of this boom was that farmers abandoned their traditional fallows to maximise the production of quinoa, causing soil degradation. Local quinoa consumption declined, and farmers preferred to purchase less nourishing foods such as wheat noodles. Furthermore, in Bolivia, competition for land suitable for quinoa has caused outbursts of violence (Nelson and Coe, 2015).[27]

Orienting supply decisions to realistic and realizable existing or potential market opportunities has been an essential premise for success, since value chain development only translates into income once consumers buy the product. Therefore, **market schemes are essential to encourage consumers to purchase indigenous vegetables**, as discussed in the next section.

4. Using markets to promote the cultivation, marketability and consumption of indigenous vegetables

4.1. Defining market-based schemes to influence consumer demand

Since more than a decade, global sales of sustainably produced food have increased.[28] In order to differentiate these from mainstream food products, market schemes such as sustainability standards, labels and certification (grouped under the common denominator 'schemes' in this brief) have become the leading mechanisms for determining what 'sustainability' entails, how to measure and assess it, prompted in large part by the ever-louder voices of consumers. These **schemes allow consumers to choose products with improved sustainability of production practices, often paying a price premium**.

In the literature and in practice, the various market schemes are often used interchangeably, causing confusion. Table 2 defines the most commonly used schemes, that will be discussed in relation to the development of the value chain of indigenous vegetables in the next section 3.2.

[27] See: http://www.economist.com/node/21554570.
[28] Note that the definition of 'organic agriculture' is narrower than 'sustainable agriculture' (IFOAM, 2013).

Table 2: Definitions of market-based schemes[29]

Scheme	Definition
Standard	A *standard* is "a documented agreement containing technical specifications or other precise criteria to be used consistently as rules, guidelines or definitions, to ensure that materials, products, processes and services are fit for their purpose" (ISO, 1996). Therefore, standards are used for standardization and as guidelines, i.e. for capacity building, compliance is not mandatory. Social and environmental standards in agriculture are essentially process standards (i.e. criteria for the way the products are made).[30] *Voluntary sustainability standards* (VSS), increasingly used since the 1980s, are rules that producers, traders, manufacturers, retailers, service providers as well as civil society organisations and governments follow so that workers' human rights are upheld and environmental impacts of production and consumption are moderated.[31]
Certification	*Certification* is a process by which the conformity of products and services to applicable standards is determined and confirmed, and operators receive written and reliably endorsed assurance of compliance. The process of assurance is crucial to creating consumer trust. The most widely accepted and implemented form of certification is individual *Third Party Certification (TPC)* in which an independent certification body (e.g. government agency, cooperative) provides an impartial and objective evaluation of conformity (Rundgren, 2007).[32] A common form of group certification is the *Internal Control System*, whereby a group of farmers is certified collectively by a TPC body that assesses system performance. A third approach is *Participatory Guarantee Systems (PGS)*, sometimes called participatory certification. It involves producers and consumers in the guarantee process. PGS are locally-focused quality assurance systems: they involve monitoring and internal controls by trained smallholder farmers, based on trust, social networks and knowledge exchange. Failure to comply with the certification requirements may result in expulsion from the group.[33] PGS, appropriate for small-scale producers, are an affordable alternative to TPC, effective to develop local markets for organic produce (Willer and Lernoud, 2018).
Label	A *label* is the result of a certification process. In other words, it is a symbol indicating that compliance with standards has been verified. The use of the label is usually controlled by the standard-setting body. An *ecolabel for sustainability* is a voluntary scheme conveying information of relevance to sustainability about the process of production of specific products according to a reference standard or measurement.[34]
Brand	A *brand* is a product, service, or concept that is publicly distinguished from others so that it can be easily marketed. Environmental and social certification schemes can therefore be considered brands. Brands are often expressed in the form of *logos*, or consistency in product packaging. Logos or product packaging are can convey product attributes in terms of provenance/source, quality, price, etc.

[29] See: http://www.fao.org/docrep/006/y5136e/y5136e07.htm and http://www.fao.org/docrep/010/ai002e/AI002E03.htm.
[30] Setting international standards for agricultural practices has proven to be very difficult, because they have to respond to differences in ecosystems, and are an integral part of cultural diversity. In response to this diversity, international environmental and social standards are often normative standards, i.e. generic standards to be used as a framework by local standard-setting bodies to formulate more specific standards. See: http://www.fao.org/docrep/006/y5136e/y5136e07.htm.
[31] See: https://unfss.org/.
[32] See: https://www.ifoam.bio/en/general-information-organic-standards-and-certification.
[33] See: https://www.ifoam.bio/en/organic-policy-guarantee/participatory-guarantee-systems-pgs.
[34] See: http://www.fao.org/docrep/006/y5136e/y5136e07.htm.

4.2. Market schemes to promote indigenous vegetables in the Lake Naivasha Basin

Market schemes have the potential to draw consumers' attention to indigenous vegetables, while targeting niche markets and facilitating sustainable production and trade. This section looks at three types of market schemes that can raise consumers' awareness with regards to the special benefits of indigenous vegetables and hence improve market demand.

First, **voluntary sustainability standards (VSS) are a way to adopt production and trade practices that can lead to overall sustainability**.[35] Although they started as serving a niche market, VSS have now found their way into mainstream markets. There exists a long list of VSS, including Fairtrade International, Rainforest Alliance and UTZ Certified.[36] Overall, in the group of sustainability standards, organic standards are the most commonly used, grouped under the umbrella of the International Federation of Organic Agriculture Movements (IFOAML – Organics International (Lernoud *et al.,* 2017).[37] The most successful commodity covered by VSS is coffee: at least 25 percent of the global coffee production area is certified for 'fair trade' and 8.5 percent of the global coffee is 'organic'. Further, a review of 'Voluntary Standards and Biodiversity' (IISD, 2016), that covered fifteen major VSS operating in the agriculture sector, confirmed the high contribution of sustainability standards to biodiversity protection. Virtually all of the major agriculture standards put strong emphasis on habitat protection, with many prohibiting production on converted land (IISD, 2016).[38]

VSS are relevant in the context of indigenous vegetables in Kenya: Fairtrade International recently established the first Fairtrade Minimum Prices [39] for African, indigenous vegetables so that these vegetables can fetch better prices for farmers and producers, ensure decent working conditions and fairer terms of trade, while also contributing to the sustainability of the environment. The ultimate aim is to attract interest in these indigenous vegetables, further boosting consumption. Also, this initiative aims to specifically strengthen the role of women, as they often grow and sell indigenous vegetables. It creates a price premium mechanism to benefit these women, increasing their income and their role in the farming groups. This Fairtrade initiative is motivated by the growing demand from specialised restaurants in Nairobi to serve healthy, ethnic foods such as African leafy vegetables. For instance, Amaica, mentioned above, will work with Fairtrade to help certify women groups from which it buys indigenous vegetables.[40] This is a promising initiative, but Fairtrade has in the first instance a socio-economic commitment. Therefore, it should be further investigated whether it is the right vehicle for other sustainability targets of indigenous vegetables (e.g. agrobiodiversity conservation).[41]

Second, in recent years, a territorial approach to certification has emerged, termed **landscape labeling**. This is **a producer-driven approach that rewards producers from the same landscape for a bundle of ecosystem services**, by helping them to capture the market value of existing social and ecological assets in that landscape. A landscape label can serve as a mechanism for increasing the visibility of small producers,

35 VSS' rapid expansion in international trade is due to the effects of globalisation, in particular to the World Trade Organisation's technical barriers to trade agreements, in a context where the increased control of supermarkets over global value chains is coupled with food safety concerns and consumer interest in social and environmental sustainability (Loconto et al., 2017).

36 See: http://orgprints.org/29790/7/lernoud-VSS-2016-02-10.pdf.

37 IFOAM stands for 'International Federation of Organic Agriculture Movements'.

38 Land conversion from natural vegetation to agriculture use represent the most important driver of biodiversity loss, caused by agriculture. However, the vast majority of standards surveyed report having a critical criterion prohibiting the conversion of forestlands for agricultural purposes (IISD, 2016: p. 7)

39 The Fairtrade Minimum Price for certified products is beneficial to farmers and producers, because it ensures that when the market prices is higher than the Fairtrade Minimum Price, producers should receive the current market price or the price negotiated at the time of contract signing. For the full list of Minimum Prices and Guidelines, see: https://www.fairtrade.net/standards/price-and-premium-info.html.

40 See: https://www.fairtrade.net/new/latest-news/single-view/article/rekindling-interest-in-african-vegetables.html.

41 See: https://www.iddri.org/en/publications-and-events/blog-post/fair-trade-deforestation-free-cocoa.

improving market access, and generating premium payments by consumers (Drucker *et al.*, 2013. The concepts underpinning landscape labeling come from Payment for Ecosystem Services, especially certification approaches, and the related concept of geographical indication (GI; Hart *et al.*, 2014). Further, landscape labeling also addresses some of the concerns of exclusivity associated with farm- or plot-scale certification schemes, while limiting the cost through accountability and monitoring by members (Hart *et al.*, 2014).[42]

Landscape labeling has been piloted in the Lari landscape in Central Kenya, in cooperation with Ecoagriculture Partners.[43] The project was completed in 2014. It concluded that setting up a national landscape label in Kenya will require additional support for further adoption and scaling. For it to be successful, an inclusive, multi-stakeholder dialogue is necessary, led by a strong central organisation in charge of monitoring quality standards (Hart *et al.,* 2014). These early experiences show that landscape labeling can serve as a mechanism for social organization and it can link producers of different commodities at different points in the value chain and landscape. It can also raise the visibility of producers contributing to relatively small markets by sharing the label with more visible or well-known products for which the landscape is already well known (Hart *et al.,* 2014). **Landscape labeling is particularly relevant in the context of diversified food systems**: various crops, such as indigenous vegetables and staples, grown in one field or landscape, could receive a landscape label on the basis of their 'joint' promotion of agrobiodiversity, e.g. through intercropping. Another important landscape label with relevance to indigenous vegetables is the Mountain Partnership label. This is discussed in more detail in the next section.[44]

Third, **Participatory Guarantee Systems (PGS) is a relevant certification system for organic food. It is considered to be more democratic, cheaper and empowering to farmers** than Third Party Certification (TPC). The transaction costs of establishing and maintaining TPC can be high. Therefore in many cases, although the costs of setting up a TPC result eventually in retail prices that require consumers to pay a premium for certified products, this model has not provided a viable model for rewarding farmers for adopting sustainable practices (Hart *et al.,* 2014). PGS on the other hand is a local certification programme for smallholder groups that involves internal controls by trained farmers. This way, organic producers participate directly in the development and implementation of standards and control mechanisms. Hence, these mode of certification are considered socio-culturally and economically adapted to the reality of the local farmers: it can reduce certification costs and subsidise farmers' costs. However, the system still needs strengthening through legal recognition for equal validity with the TPC (Murumi *et al.,* 2017).

PGS certification is recommended by the Kenya Organic Agriculture Network (KOAN) for the Kenyan market.[45] In 2015, for instance, the Participatory Ecological Land Use Management (PELUM) Association of Kenya started working with KOAN to promote PGS certification among farmer groups for their organic products.[46] To date, there are six operational PGS initiatives, for a total of 178 certified farmers, including the Kamicha/Kabondo Fresh Organic Cassava farmer group in Kisumu County (Nyanza Zone) and the Mukika Self Help Group in Embu County that focuses on the improved poultry value chain. Nine other PGSs are under development, such as the Mariashoni Community Development Organisation that produces organic honey in the Mau forest escarpment in Nakuru County. Furthermore, as part of the next phase of the project, PELUM Kenya and KOAN started supporting two other groups to use the PGS model, including the

[42] See also: Ghazoul et al., 2009.
[43] See Hart et al., 2014, for a step-by-step overview of the projects in Kenya (and in Tanzania). The authors also suggest recommended steps for designing and implementing a landscape label based on the experiences of these two projects.
[44] See: http://www.fao.org/mountain-partnership/en//
[45] Organic agriculture is defined by IFOAM as *"a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects"* (IFOAM, 2013).
[46] See: http://www.pelum.net.

Kanyedero Women Group, focusing on the peanut butter value chain in Migori County (PELUM, 2017). Finally, **PGS can be highly relevant in the context of indigenous vegetables, because they have a number of features to be well positioned under the 'organic' umbrella**. As mentioned above, indigenous vegetables are generally grown without synthetic fertilisers, they are healthy and nutritious, and they are culturally important.[47]

A final important consideration is that consumers, regardless of any particular market scheme in place, usually purchase food on the basis of a number of decisive factors, including affordable prices, health benefits and to a lesser extent environment-friendliness. The market schemes discussed above usually require consumers to pay a price premium in return for sustainably produced food. Therefore, in the process of market promotion of indigenous vegetables, their health benefits and the fact that they can be sustainably produced should clearly be spelled out to convince consumers. At the same time, there should be mechanisms that could keep prices down.

4.3. Key recommendations when promoting market schemes for indigenous vegetables

Taking into account the sustainability benefits of indigenous vegetables and the role of market schemes for value chain development, discussed above, the introduction of these schemes could also be piloted in the specific case of indigenous vegetables. Many local stakeholders seem to agree with this, as observed during field research in the Naivasha basin in 2017 and 2018. This process should also benefit from the fact that market schemes are already used for various food products in Kenya. This **section puts forward three strategic recommendations that should be taken into account when setting up market schemes for indigenous vegetables**, to be possibly piloted in the Naivasha basin. In doing so, it also discusses mechanisms that can lower consumers' prices and that could attract attention to the health benefits of indigenous vegetables as well as their positive contribution to the environment.

(1) Integrate the benefits of indigenous vegetables into an existing scheme

Two options exist with regards to the establishment of the market schemes discussed above:

1. the creation of a new dedicated scheme that indicates that products were produced from traditional, indigenous or threatened plant genetic resources by custodian farmer communities; and,
2. the integration of the benefits of indigenous vegetables, such as on-farm agrobiodiversity, climate resilience and nutritional gains, into existing schemes.

These two options both have advantages and disadvantages.[48] The first option would guarantee to define the content and create a single scheme or logo that would allow to immediately identify a product with certain characteristics. It would also raise awareness on the importance of agrobiodiversity or other objectives of the scheme. The main downside is the specific skills required and the high costs, associated with the creation and promotion of a new label or standard. This is especially challenging for smallholder producers in low income countries. Also, the market of sustainability labels is already highly crowded and competitive. The second option could have a wide impact for safeguarding agrobiodiversity. It would also avoid to make consumers choose between various 'good causes', at the risk of consumers losing their way in the cacophony of ever more colourful labels, whose true meaning is often unclear. Therefore, **the most viable option for indigenous vegetables in the Naivasha Basin would be to build on existing schemes**. This option is

[47] Interviews with KOAN and PELUM by SASS researcher Cecilia D'Alessandro, May 2018, Kasarani and Thicka, Kenya.
[48] Options were discussed during a roundtable session in April 2013, organised by Bioversity International (Padulosi et al., 2013).

also supported by research by Grunert *et al*. (2013) in six European countries: it appears that the understanding of the concept of sustainability among consumers is limited. However, the recognition of four selected labels, including Fair Trade, Rainforest Alliance, Carbon Footprint and Animal Welfare, is stronger, because they are self-explanatory (Grunert *et al*., 2013).[49] In addition, making use of an existing system can reduce costs and consequently, it can lower the final market price and help the price premium to remain relatively low.

In the case of indigenous vegetables, an option could be to integrate their characteristics into a voluntary labelling scheme, such as the one set up by the Mountain Partnership (MP), a UN voluntary trans-national umbrella organisation of mountain actors created in 2002, in collaboration with SlowFood. The MP scheme includes value chain improvement, marketing strategy development and the granting of a MP product label. It places a premium on goods that support local biodiversity and production methods that are linked to the cultural traditions.[50]

(2) Jump on the organics bandwagon

As mentioned above, indigenous vegetables are usually organically produced. Therefore, there is **considerable potential to consistently apply organic conservation practices to indigenous vegetables' production and to underline their health benefits as organic food.**[51] In doing so, indigenous vegetables could benefit from the overall advancements in the organic labeling sector.[52]

Certified organic agriculture in Kenya dates back to the early 1980s, mainly among horticultural companies that started growing organic vegetables for export. In 2004, KOAN was formed as an umbrella organisation representing all organic organisations in the country (UNEP-UNCTAD, 2010, cited by IFOAM, 2013).[53] Currently, Kenya has close to 3000 organic farmers, mainly concentrated in the former Central Province near Nairobi.[54] They mostly produce vegetables, fruits or processed products such as jams. As said, originally, Kenya's organic produce was destined for the export market, including vegetables, fruits and increasingly essential oils, dried herbs and spices. In 2005, organic produce worth over 4.6 million US dollars was mainly exported to Europe or the Middle East. There is also a **growing domestic market, because Kenyan consumers, especially the wealthier middle-class, are increasingly interested in organic food** (UNEP-UNCTAD, 2007, cited by IFOAM, 2013). This creates market potential for Kenyan farmers, because the prices offered for organic products range between 30 to 40 percent above prices of conventional food.[55] In addition, organic agricultural practices can lead to significant yield increases. For instance, Hine *et al*. (2008) found an average crop yield increase of 116 percent across Africa and 128 percent for projects in East Africa, when farmers switched from low input traditional farming to systems using organic or near-organic practices (IFOAM, 2013).

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[49] Experience shows that retailers are more successful when they team up with Fair Trade, because the Fair Trade label guarantees consumers that strict economic, social and environmental criteria were met in the production and trade of an agricultural product. Organic initiatives, including Baobad Social Business GmbH for baobab products such as oil, powder and sweets, could also offer opportunities (Baldermann et al., 2016).

[50] The MP Product label is a customized narrative and supplementary label that tells the story of a specific product, and highlights what makes it unique. The MP label does not certify the quality, safety or any of the characteristics or components of the Product, or its suitability for any use. It integrates, but does not replace, any existing label mandatory under any applicable law. See: http://www.fao.org/mountain-partnership/about/mountainpartnershipglobalmeeting/documents/en/.

[51] Organic based soil fertility amelioration techniques for improved production of African indigenous vegetables have been created. See: http://knowledge4food.net/research-project/arf1-vegetable-systems-kenya/.

[52] However, according to an OECD study (2008) in OECD countries: where significant price differences remain, labelling is generally not sufficient - as in the case of many organic products - and standards may be needed (OECD, 2008, p. 51).

[53] KOAN aims at developing and promoting local and export markets, supporting development of affordable local certification capacity and creating awareness of market opportunities in the organic sector. See: http://www.koan.co.ke/index.php.

[54] The term 'province' is no longer used in Kenya ,but the geographical area that was covered by the former Central Province is considerably big, bringing together four Counties.

[55] See: http://www.organic-world.net/index/news-organic-world/article/179.html.

Kenya has a national standard for organically produced commodities, but without the corresponding national legislation. The country is currently drafting regulations and standards that are envisioned to be officially endorsed as organic by IFOAM-Organics International (Willer and Lernoud, 2018).[56] Clearly, the **cultivation, marketability and consumption of indigenous vegetables could strongly benefit from the growing domestic organic market as well as from the trade opportunities internationally**. According to KOAN's Strategic Plan (2010-2014), there is an especially high potential for 'wild harvests', that include indigenous vegetables, in parts of Eastern Kenya and the Rift Valley, where the Naivasha Basin in located. Generally, Kenya benefits from an increased scientific recognition of the role of organic agriculture in contributing to food security, environmental conservation, health, and so forth. There also seems to be a strong willingness of value chain operators to collaborate in developing the organic sector. These are crucial windows of opportunity, when setting up marketing support initiatives for organically produced, indigenous vegetables (KOAN, 2010). The VSS, landscape labeling and especially PGS, as discussed in the previous section, are all relevant in light of the organics market.

(3) Strengthen the policy, legal and institutional system in Kenya

The involvement of public authorities in all phases of value chain development of indigenous vegetables is a key factor, because they can facilitate the set-up of and compliance with market schemes. Concretely, policy-makers can undertake three key actions:

- They can set ground rules to ensure the credibility of market schemes and to embed them in national legislation. For instance, policymakers can legitimise indigenous vegetables through stricter legally binding measures, such as environmental control for the private sector (e.g. protection of agrobiodiversity);
- They can demand access to data about impact and other data gathered as part of the labeling or certification process. For example, the systematic evaluation of the costs and benefits of investing more in indigenous vegetables, especially vis-a-vis staples and export oriented crops, is critical to give farmers and other value chain actors the confidence to invest in indigenous vegetables; and
- They could facilitate the strategic implementation of market schemes through joint planning and financial support (Rudebjer, P. *et al*., 2014; Baldermann *et al.*, 2016; IISD, 2016). Concerning the latter, governments can provide subsidies as 'carrots' to encourage consumers to make decisions to buy more sustainable produce. These could include monetary grants, donations of goods and fiscal incentives in the form of tax reductions (OECD, 2008).[57]

An important, general lesson learned from the set-up of other labels is that having a sound legal and institutional system in place is a key condition. For instance, experience with setting up Geographical Indication (GI) labels shows that GI processes improve market efficiency by limiting unfair competition and by reducing asymmetric information to consumers through official logos and public campaigns, thanks to the enforcement of related legal provisions. A well working legal system for Intellectual Property Rights (IPR) protection is a key success factor. As protection of an IPR, the GI process improves market efficiency by limiting unfair competition and free-riding behaviour through the enforcement of GI legal provisions. However, **in places where the legal and institutional frameworks are recent, GI certification has faced problems**

[56] The Kenyan domestic organic market is facilitated by seven main commercial actors, including Kalimoni Greens Organic Shop and Masai Eco Farms. Organic products are also sold through the main supermarket chains, including Nakumatt and Uchumi. See: http://www.organic-world.net/index/news-organic-world/article/179.html.

[57] In general, subsidies and tax incentives only work if they close the price gap for more sustainable products or create significant tax rebates for their use. So, these instruments influence consumer behaviour by making sustainable choices less expensive (OECD, 2008: p. 17).

(Vandecandelaere *et al.*, 2018).[58] Therefore, when using market schemes for indigenous vegetables, the legal context will have to be scrutinised and continuously improved.[59]

5. Way forward

Increasing consumer awareness and improving demand for indigenous vegetables, through market-based schemes such as VSS, landscape labelling and PGS, are important steps towards value chain development of indigenous vegetables (See Fig. 1 and Table 1, step 4). However, even if market schemes would succeed in influencing demand, indigenous vegetables' production is still very scattered and limited, including in the Lake Naivaisha Basin. And, farmers may not be able to meet certification costs, to comply with appropriate product quality standards and to fully understand market requirements (e.g. demand, prices, ethical trade standards) to be able to meet an increased demand. Therefore, **efforts to influence consumer demand should run parallel with strengthening and organising the supply of indigenous vegetables, meeting quantity and quality requirements** (See Fig. 1 and Table 1, step 1, 2 and 3).

Concretely this means that for successful value chain development of indigenous vegetables, action is needed in the first three phases of the value chain, while continuously building capacity along the value chain and ensuring conservation of diversity, as explained above in section 2. The following gives a brief overview of interventions required in the pre-marketing stages of the value chain of indigenous vegetables, while pointing out to possible 'drivers of change' in the particular case of Naivasha:

1. **Provide high quality seed access**: participatory varietal selection of seeds has led to improved varieties of quinoa, cañahua and amaranth in the Andes with support from Bioversity International. Farmers in that region were also trained on production techniques for high quality seeds.[60] In Naivasha, it has been difficult for farmers to access indigenous vegetables' seeds, but Seed Savers Network, a non-profit grassroots farmer organisation, is working to improve seed access for farmers and conserve agro-biodiversity through indigenous seeds banks;
2. **Improve cultivation practices**: farmers should be trained on better cultivation practices, such as intercropping practices, and on how these could lead to higher economic return. Training on cultivation techniques for minor millets took place in South Asia, which strengthened their value chains.[61] In Naivasha, extension officers are already introducing enhanced cultivation practices. Also, farmer-to-farmer training can have a great impact in terms of behavioural change. An entrepreneurial farmer from the Ndabibi area close to Naivasha, for instance, has turned his farm into a self-sufficient, ecological farm, called 'Ndabibi Environmental Conservation Centre'. With great enthusiasm, he organises training courses for other local farmers on agroecological farming techniques.[62]
3. **Improve harvest and post-harvest processing**: various types of easy-to-operate processing technologies, such as threshing machines, should be provided to communities, as happened for indigenous vegetables in both cases in the Andes and South Asia, referred to above.[63] In Naivasha, the private sector could make investments in processing machinery for indigenous vegetables. MACE Foods is a private company that produces, dries and trades spices, herbs and traditional African vegetables. They use state-of-the-art harvest and post-harvest techniques that can decrease the cost of processing and that help in capacity building for farmers.

[58] For instance in Cameroon, the legal framework for certification is often not defined in the legislation, causing problems to set up a GI for Penja pepper (Vandecandelaere et al., 2018).
[59] See: kenyalaw.org.
[60] See: http://www.nuscommunity.org/research/projects/ifad-nus-i-ii/andean-grain-promotion/.
[61] See: http://www.nuscommunity.org/research/projects/ifad-nus-i-ii/minor-millet-promotion/.
[62] See: http://ndabibienvironment.wixsite.com/agriculturekenya/ndabibi-environmental-center-.
[63] See: http://www.nuscommunity.org/research/themes/value-chain-development/.

The 'Sustainable Agrifood Systems Strategies (SASS)' Programme, a multidisciplinary research and policy dialogue programme, involving ECDPM and four Italian Universities, is working to understand the sustainability implications of the promotion of indigenous vegetables in the Naivasha Basin and to support local 'drivers of change' like those mentioned above, in an effort to improve food system sustainability. Other think-tanks and research institutes are also putting effort towards more diverse diets and SFS. For instance, the International Institute for Environment and Development, together with Hivos, is working on 'Sustainable Diets for All'.[64] The International Food Policy Institute is looking into healthy food systems in low income countries.[65] And, Wageningen University has a research group on sustainable food systems.[66] Many initiatives have been triggered by the 10-year SFS Programme from the United Nations Environment Programme.[67] Though much more remains to be done, it seems that at last the thinking on sustainable food systems is finding the right entry points into both the research world, as well as in practical solutions on the ground through better policies, investments and markets.

64 See: https://www.iied.org/sustainable-diets-for-all.
65 See: https://www.ifpri.org/strategic-research-area/promoting-healthy-food-systems.
66 See: https://www.wur.nl/en/Research-Results/Chair-groups/Environmental-Sciences/Land-Use-Planning-Group/Research/Sustainable-food-systems.htm.
67 See: http://web.unep.org/10yfp/programmes/sustainable-food-systems-programme.

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