

Increasing food sovereignty with urban agriculture in Cuba

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Abstract Urban agriculture in Cuba has played an important role for citizens' food supply since the collapse of the Eastern Block. Through the land reform of 2008 and the Lineamientos of 2011, the Cuban government has aimed to support agriculture in order to increase national food production and reduce imports. However, the implementation of the designed measures faced obstacles. Therefore, the research objective was to display how the government's measures aiming to support domestic food production influenced urban agriculture. The qualitative research comprised semi-structured interviews with 15 urban farmers in Havana and revealed the respondents' experiences with the land reform and the Lineamientos and the potential of the reforms to implement food sovereignty. Findings show that the land reform has facilitated access to land for newcomer and existing farmers. However, availability of agricultural inputs has been limited and they were often expensive. Thus, urban farmers frequently produced farm inputs at their plots and applied sustainable farming practices to minimize their dependence on external inputs. The reforms have generated private marketing opportunities and have stimulated urban

farmers to increase production. At the same time, subsidies have been reduced and consumers have faced increasing food prices. In conclusion, the land reform and the Lineamientos have created framework conditions for food sovereignty. However, the challenge is to increase the coherence of the theoretic aim and the practical implementation of the reforms.

Keywords Cuba · Policy reforms · Urban agriculture · Food sovereignty

Abbreviations

ALBA	Bolivian Alliance for the Peoples of Our America
ANAP	National Small Farmers Association
CCS	Credit and Service Cooperative
CREE	Centers for the Reproduction of Entomophages and Entomopathogens
CTA	Agricultural Support Stores
GNAU	National Group for Urban and Sub-urban Agriculture
INIFAT	National Institute for Fundamental Research in Tropical Agriculture
PCC	Cuban Communist Party

Introduction

Cities all over the world cover their resource needs like food, water or energy, through imports from rural areas (Deelstra and Girardet 2000). Because of the dependence on external resources, achieving supply security is often a challenge. Thus, city dwellers, in particular, are vulnerable to unpredictable changes like a national or global food crisis (Mougeot 2005). The food crisis during the years

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2007 and 2008 was triggered by rising food prices on international markets. This rise was due to increased production of agro fuel, crop failure and rising meat consumption. Speculation on food and rising energy prices aggravated the situation. Poor urban citizens spend up to 80 % of their income for food and therefore were the most affected by the crisis (Paasch 2010). Food production within a city reduces the dependency from external resources and contributes to increase self-sufficiency of urban dwellers (Murphy 1999). Thus, in the light of vulnerability, urban agriculture plays a crucial role for sustainable urban development of megacities and of small towns across the globe (Mougeot 2000). Types and scale of urban agriculture might vary greatly from a subsistence oriented micro scale to medium and large scale commercial enterprises (De Zeeuw et al. 2011).

Urban agriculture is an important strategy to improve food security (Deelstra and Girardet 2000). Furthermore, urban agriculture can provide employment and income opportunities for marginalized population groups (Redwood 2009). Participation and community building are other important benefits of urban agriculture (Müller 2011). However, one of the main challenges for urban food producers is the access to land (Redwood 2009). Other challenges are water availability and low soil fertility (De Bon et al. 2010). Furthermore, agricultural produce grown on polluted soils and in the vicinity of rail transport, roads and industrial areas can be contaminated with toxic heavy metal residues, especially lead, as well as with pesticides, sulfur and nitrate (Armar-Klemesu 2000).

Before the collapse of the Eastern Block, home gardens, rooftop gardens and urban horticulture plots in Cuban cities were rare. Urban food production was perceived backward but, with the economic and food crisis triggered by the collapse of the communist countries in 1989 urban food production began to increase (Murphy 1999). Urban agriculture was the logical response to the upcoming resource constraints (Hamilton et al. 2014). Agricultural productivity decreased all over the country due to the sudden absence of farm inputs and in addition, fuel was scarce to bring food to the city. Thus, the city population was especially affected by the crisis because of its dependence on food imports from adjoining provinces or even from abroad. Consequently, production and distribution of food was one of the main challenges during the years after the crisis (Kälber 2011). Due to the necessity to respond to the supply shortfall countless city dwellers began to produce vegetables and fruits on their own (Altieri et al. 1999). At the beginning of the movement novice farmers occupied unproductive state land for food production and used balconies, roof terraces and backyards for cultivation and livestock keeping (Murphy 1999). Local food production contributed to reduce the dependence on food supply from

the adjoining provinces and reduced transport and cooling costs for food products coming from rural areas (Gonzalez 2003).

The Cuban government soon realized the potential of urban food production and implemented measures to support the upcoming urban agriculture movement. Since then, urban and sub-urban agriculture has been strongly encouraged by the Cuban government (FAO 2014).

An important step was the creation of a Department for Urban Agriculture at the Ministry of Agriculture in 1994. One of its main tasks was to facilitate the conversion from unproductive urban land to productive agricultural plots and to support interested citizens in finding land. Decentralization and increasing local autonomy in order to reduce bureaucracy were important strategies to facilitate access to land. In addition, a nationwide extension system was developed to provide agricultural advice for urban gardeners and farmers (Murphy 1999). The National Institute for Fundamental Research in Tropical Agriculture (INIFAT) was the main governmental institution responsible for the development and support of the urban agriculture movement in Cuba. The institute has hosted training programs for urban agriculture and has provided advisory service (Murphy 1999). In 1998, the National Group for Urban and Sub-urban Agriculture (GNAU) was founded with the aim to institutionalize the informal movement and to coordinate its development on a national scale. The GNAU is constituted by scientists affiliated with different institutions, by government officials and by producers. Local representatives of GNAU are responsible for organization, planning and regulation of the urban agriculture movement in a specific region (Companiononi et al. 2002).

The GNAU defines urban agriculture as intensive food production within an urban area. According to GNAU, a diversified agricultural production is based on the interrelationship of humans, plants and animals, on sustainable practices and recycling of nutrients and waste. Every year GNAU publishes general guidelines for urban and suburban agriculture which include the so-called subprograms. The subprograms aim at disseminating agroecological production principles and therefore include directives for the individual production of compost and seeds, local use of resources, organic plant protection and the integration of livestock and agriculture (GNAU 2012). Even though most urban dwellers chose food production due to necessity and not to a conscious intent (Nelson et al. 2009), Cuba became the leading country for urban agriculture on a global scale (Hamilton et al. 2014).

In 2012, around 382,000 farms or plots belonged to the urban agriculture movement as defined by the GNAU. On 50,000 ha the urban farmers produced around 70 % of the demand for fresh vegetables and fruits (Altieri and Funes-Monzote 2012). Most of the urban agriculture of Cuba is

said to be fully organic (Wright 2009). The use of agrochemicals is restricted and availability of agrochemicals on the free market is limited (FAO 2014).

The food crisis of 2007 and 2008 also had an impact on Cuba's agriculture and food system. Agricultural production decreased by 2.8 % from 2007 to 2010. In 2008, Cuba spent 2.5 billion dollars on food imports. In the same year, in order to increase domestic food production and reduce imports, the Cuban government under Raul Castro established a land reform with the Law Decree 259, for the distribution of idle land in usufruct (Nova González 2012). In 2011, the sixth party congress of the Cuban Communist Party (PCC) elaborated a reform package, the so-called Lineamientos, with 313 measures to bring the economic model up to date. Agriculture has been an important part of this reform package due to its economic scope for the whole society (VI Congreso del Partido Comunista de Cuba 2011). With regard to urban agriculture, the Lineamientos aim at increasing local agricultural production. They announce measures to create additional commercial possibilities, reinforce producers' organization in cooperatives, improve access to agricultural inputs, increase farmers' autonomy and provide loans, technical assistance and training courses. Furthermore, domestic food production was declared an issue of national security. Both, the land reform of 2008 and the Lineamientos of 2011, aim to increase the number of food producers and stimulate sustainable agricultural production (Nova González 2012).

The Law Decree 259 was introduced to facilitate access to land and regulate the distribution of land in usufruct (Nova González 2012). Individuals, state enterprises or cooperatives could apply for land on the condition of using the land for sustainable agricultural production. In 2009, the Cuban government registered 110,000 applications for land. 80,000 were approved and 690,000 ha of agricultural land were distributed (Simón Reardon and Alemán Pérez 2010). Nonetheless, land distribution has been criticized for its constraints which made applying less attractive (Espinosa Chepe 2011). The governments' reaction was the adoption of the Law Decree 300 in 2012, which included several improvements for applicants. Among others, the right to construct buildings on the land or the right to plant forests and fruit plantations made the application more attractive (Carrasco Martín 2012).

Urban agriculture played a crucial role within the reforms because 75 % of Cubans live in cities. Since the 1990s urban agriculture has been important for sustenance of city inhabitants and for agricultural productivity in Cuba (Altieri and Funes-Monzote 2012). Aware of the potential of urban agriculture, the Cuban government aimed to facilitate the development of urban food production by means of the Law Decree 259 and the Lineamientos (Ravsberg 2012). The agricultural reforms were Cuba's

response to the food crisis of 2008 with the objective to increase agricultural productivity and reduce import dependency. Thus, the reforms were proclaimed as approaches to achieve national food sovereignty (Simón Reardon and Alemán Pérez 2010).

The concept of food sovereignty has been developed by the global farmers' movement La Vía Campesina in the early 1990s, as a critical alternative to the neoliberal model for agriculture and trade. According to a commonly used definition provided by the International Planning Committee for Food Sovereignty in the year 2002, "Food Sovereignty is the Right of peoples, communities, and countries to define their own agricultural, labor, fishing, food and land policies, which are ecologically, socially, economically and culturally appropriate to their unique circumstances. It includes the true right to food and to produce food, which means that all people have the right to safe, nutritious and cultural appropriate food and to food-producing resources and the ability to sustain themselves and their societies" (Windfuhr and Jonsén 2005).

Together with Bolivia, Nicaragua and Venezuela, Cuba has spent 100 million US dollar on a multilateral cooperation for food sovereignty (Demeke et al. 2009). Since 2005 Cuba has formed part of the Bolivian Alliance for the Peoples of Our America (ALBA) with the consensus to put food sovereignty into practice. However, national policies show contradictions and implementation of the claims made by La Vía Campesina was still lacking (Paasch 2010).

The aim of this research was to assess the impact of the reforms from 2008 to 2011 on urban food producers, their agricultural activities and the potential of the policy measures to improve food sovereignty in Cuba. It was assumed that the Law Decree 259 facilitated access to land, and therefore improved the self-supply and income opportunities of the producers. Further hypotheses were that the Lineamientos would support urban agriculture by improving access to agricultural inputs, by establishing additional, also private, marketing channels, by providing education programs promoting organic farming and by reinforcing producers' organization in cooperatives. On the contrary, it was also assumed that bureaucratic hurdles and difficult conditions to get started, restricted the potential of the land reform and the supporting measures of the Lineamientos were delayed in their implementation.

Methods

Field research was conducted in Havana from December 2012 to March 2013, in cooperation with the Cuban institution INIFAT. Havana, the capital, was chosen as the research location because of its strong urban agriculture movement,

which contributes significantly to the food supply of Cuba's most populous city (González Novo et al. 2009).

Data collection comprised 15 problem-centered interviews, based on a semi-structured interview guide, with urban producers in Havana. Due to Cuban restrictions for foreign researchers regarding sample selection, interviewees were selected with a snowball sampling, after the staff members of INIFAT provided the initial contacts. Responses represent the particular opinion of the interviewee and therefore should be understood as a specific segment of the reality. The criterion for selecting the interviewees was that they had been granted farm land since the land reform of 2008. As the district *Boyeros* contains a lot of free land area because of its size and periphery location, most of Havana's land allocation in the context of the land reform happened in this district (Ministerio de la Agricultura and Grupo Nacional de Agricultura Urbana y Suburbana 2011). Therefore, 13 of the 15 interviews were conducted in this district. The interviews in Spanish lasted between 30 and 60 min, depending on the time availability of the respondents and their willingness to share information. The interviews were conducted at the farms of each respective interviewee, so that farm walks and direct observation were possible. Field notes were taken from farm walks and direct observation. Reflections on the research process were documented in a research diary. Photographic documentation complemented the research (Bernard 2006).

Although field research was primarily focused on farmer interviews to study their perception of the reforms' impact on urban agriculture, one expert interview was conducted with a representative of the Cuban National Group of Urban Agriculture (GNAU). The objective of the expert interview was to deepen the understanding of the political context by contrasting the farmers' view with the view of an official representative from the urban agriculture management (Schlehe 2003).

All interviews were recorded with a digital voice recorder and saved digitally. The interviews were transcribed with F4 software, coded and analyzed by using the software Dedoose. Interview data was revised according to a content analysis approach, based on a combination of deductive and inductive coding. Pre-defined codes, which were organized hierarchically in code families, were assigned to text passages of similar content in order to structure the texts in thematic categories. New codes, which emerged during the analysis according to the concept of 'grounded theory', were added to the code families and assigned to corresponding text passages (Flick 2011; Mayring 2010).

In addition to the semi-structured interviews, local newspaper and magazine articles, either from government-run as well as from independent media, and legislative

texts, such as the *Gaceta oficial* of the Law Decree 259 and 300 and the Lineamientos, were revised and analyzed if the articles were related to the topic of this research.

Results

Eleven out of the fifteen respondents applied for farm land after the land reform of 2008. Four had already applied for land before the reform. Ten out of the eleven respondents who received land after the reform extended their already existing farm land and one respondent was granted a plot to start with food production. To obtain official land use titles six out of the eleven respondents either took over agricultural land from relatives, from previous land users, from a state enterprise or from a cooperative. Four respondents received titles for idle land they had applied for and one respondent was granted legal land title for fallow land that he had already used for pasture.

To be able to apply for legal land titles, membership in a cooperative was obligatory. Thus, three applicants without a previous membership had to enter a Credit and Service Cooperative (CCS). Then the cooperative administration issued a document to be presented at the local agricultural administration office. The document had to confirm the suitability and reliability of the applicant. The agricultural administration office reviewed the application according to the availability of the desired land and the suitability of the land for the applied purpose. If application was granted the land was surveyed. There were critiques concerning the duration and high bureaucratic constraints for application to obtain legal land titles.

For all successful applicants, a central condition to use land was to work on the land according to the terms of use which included appropriate land management and contractually fixed delivery of products to the cooperative. Furthermore, land use in urban areas required sustainable production methods. In the case of non-fulfillment, usufruct rights were withdrawn within 6 months and the land was handed over to the cooperative.

Before starting with agricultural production eleven respondents first had to clear the land from bushes like marabu (*Dichrostachys cinerea*) or other weeds. In one case, land had even been used as dumping ground. Occasionally respondents could draw on machinery to ease the workload. Respondents estimated an average of 5 months to clear the land depending on the size of the area and the degree of shrub encroachment or pollution.

Once the urban farmers made the land ready for food production they examined the soil quality and the suitability for either livestock keeping or crop cultivation. Four respondents used the allocated land for livestock keeping but also cultivated forage crops like king grass (*Pennisetum*

purpureum), vegetables, legumes, root crops, and fruits. Crop production was mainly dedicated to household consumption but surplus was also sold. The remaining interviewees used the land for crop cultivation only, producing vegetables, legumes, fruits and root crops.

Using only official distribution channels was hardly enough to earn a proper income. Thus, some respondents mentioned that selling products, in particular dairy products and meat, on the black market was a strategy to sustain family livelihood. One respondent claimed that he improved his financial situation by increasing self-sufficiency and thereby reducing the costs for food purchase. Respondents working in horticultural production systems (*organopónicos*) covered their own vegetable and spice requirements with the cultivated crops. Sometimes available free space was used for plantain cultivation for household consumption among farmers and farm workers. One respondent produced vinegar and used it also for the conservation of vegetables. On urban farms respondents produced vegetables, legumes and fruits as well as root crops such as yucca (*Manihot esculenta*), malanga (*Xanthosoma sagittifolium*) or sweet potato (*Ipomoea batatas*). The farms with livestock keeping also met their demand for meat. Nevertheless, all respondents had to buy certain products to satisfy the family needs. The first choice for obtaining basic food products was the state owned food ration shop (*Bodega*). Other products such as meat or fruits were mostly bought at farmers markets. Bartering food products was also important to extend a household's food option. Respondents identified availability and access to inputs as key elements for agriculture. Nevertheless, resource scarcity was an ever-present constraint for food production in Cuba. Even if respondents had the money to buy inputs, availability could not be guaranteed.

An important input for agricultural production was water, which respondents obtained either from a well, the tap or rain water. Respondents who used water from a well needed a pump. Although, finding spare parts was still a challenge. In addition, fuel was expensive and not always available.

Seeds and seedlings were partly provided by the state. Respondents had to inform the cooperative administration about the required variety and the quantity. Purchase and distribution were arranged by the cooperative. However, respondents claimed that they sometimes faced supply shortage. Thus, they avoided counting exclusively on official distribution channels. Furthermore, respondents often doubted the quality of the seeds. Hence, in addition to the official channels, all respondents produced their own seeds. Interviewees claimed that producing the seeds themselves was somehow a hedging strategy to avoid financial losses and to reduce dependency on the state seed

distribution system. Another way to obtain seeds and seedlings was to exchange them within the peer network.

Other relevant inputs for food production were tools, equipment, machinery, materials such as wire for fences and working cloths. Respondents obtained these inputs either through the cooperative or had to buy them at the Agricultural Support Stores (CTA). Cooperatives received such inputs from the National Enterprise for Agricultural Supplies, a governmental enterprise affiliated with the Ministry of Agriculture. Though, all respondents claimed that availability of inputs was often limited, high prices complicated purchase and they sometimes had to worry about low quality of tools and specific farm equipment. Thus, improvising was an important strategy to overcome resource constraints. Experimenting with tools or equipment helped the respondents to improve agricultural production.

Machinery such as tractors or pumps, was either cooperative property and usage had to be organized collectively or was owned by individuals. One interviewee claimed that collective usage caused dependency on other cooperative members and in addition availability of fuel could not be guaranteed. To reduce the dependency on fuel two respondents built a biogas plant. Another strategy was to work with oxen. The advantage was to save costs for fuel and to be able to work on small plots, too. A disadvantage was the risk of theft. Thus, protecting the oxen required time and work efforts.

Officials promoted organic farming methods in urban agriculture. Therefore, interviewees mostly used organic fertilizers and organic pesticides for food production. But still, they complemented organic practices with synthetic fertilizers and pesticides, if considered necessary. Reasons for using synthetic inputs were high efficiency and little work effort. Most respondents produced their own worm compost and organic pesticides on their farms. At Centers for the Reproduction of Entomophagous and Entomopathogens (CREE) urban farmers could purchase organic fungicides and insecticides such as *Bacillus thuringiensis* or *Neem* products.

However, constant availability of organic fertilizers and organic pesticides was hardly guaranteed and availability of synthetic inputs was even more limited. That scarcity of resources and farm inputs triggered experiments with organic pest control methods. It was also possible to buy farming inputs like synthetic pesticides on the black market, though at high prices and often of lower quality. In case of pest infestations respondents could ask a consultant hired by the cooperative for advice. The consultants were specialized in organic farming practices.

All respondents were aware of the health and environmental risks of synthetic pesticide use in agriculture. Thus, they worked according to organic principles and tried to

use locally available resources. Application of green manure, crop rotation, intercropping, planting hedges and measures to increase soil fertility and biodiversity were common organic farming practices. Thereby they reduced the need to purchase external inputs and contributed to close on-farm energy cycles. Repellent plants such as common thyme (*Thymus vulgaris*), basil (*Ocimum basilicum*), marigold (*Tagetes erecta*), maize (*Zea mays*), or ruddles (*Calendula officinalis*) were often planted at the edges of the plots to reduce pest infestation or to attract beneficial insects.

Governmental education programs also promoted sustainable farming practices. Most Cuban agricultural institutions organized workshops and training programs for farmers. Nevertheless, respondents stated that they derived most of their farming knowledge from books or magazines. An important information source for them was the monthly magazine of the National Small Farmers Association (ANAP) which emphasized sustainable agriculture and agroecology in their articles. Respondents who grew up on a farm in a rural area also claimed to have traditional knowledge, derived from elders or childhood experiences. In addition, respondents mentioned practical working experience, learning-by-doing, experimenting and learning from their own mistakes as valuable sources of knowledge. Furthermore, interviewees pointed out that knowledge exchange with colleagues, consultants or extension agents were important sources of information.

Respondents stressed the advantage of being associated with a cooperative in terms of political participation and representatively. The monthly meeting of all cooperative members was used as a platform for knowledge exchange with colleagues and technicians. Topics addressed during these meetings ranged from presenting and discussing the yield and prices, to access to resources, as well as the financial situation of the cooperative. In addition, participants presented their own ideas for farm development and used the meetings also for expressing grievances. The president of the cooperative had the responsibility of forwarding concerns to the local representatives of the Ministry of Agriculture or to the ANAP. Respondents claimed to decide autonomously on the crops planted, on the production methods used for cultivation, on the work distribution on the farm and how to commercialize the surplus. Yet, the production plan determined the scope for decision-making.

Commercialization was organized with a so-called production plan which included the type and the amount of products that a farmer has to deliver per year. The cooperative paid fixed prices, which are not subject to bargaining. The production plan was adapted to the size and capacity of the farm and also considered personal circumstances of the farmer, such as health issues. For all

respondents, compliance of the production plan had highest priority. The advantage of selling the products through the cooperative was a small effort for pick up and transport, fixed prices and guaranteed purchase of the produce. Part of the products that was sold through the cooperative was dedicated to social consumption which included e.g. hospitals, schools, preschools or military facilities. Horticultural production systems (*organopónicos*) especially maintained their own stalls close to the plots where part of their production was sold. Sometimes, cooperatives had a collective stall for all members.

After compliance of the stipulated share to be commercialized through the cooperative, farmers could keep the surplus for self-consumption or sell it through the farmers' free market. At these markets prices followed the rules of supply and demand. Another possibility was to sell the products through state markets where the prices were state set. Surplus could also be sold to the cooperative. Occasionally farmers sold their products at the farm gate. The Lineamientos from 2011 made direct sales to private citizens or private intermediaries possible and thus, widened the sales potential. With a proper license farmers or intermediaries were allowed to sell farm products on the street with mobile stalls. Prices were set according to supply and demand. Furthermore, respondents stated that with the reform it became possible to directly arrange contracts with hotels and restaurants. However, only one of the cooperatives of this survey had such a contract. Due to high prices for agricultural inputs and the general cost of living, selling the surplus was important for the respondents to increase their income.

With the Lineamientos from 2011 respondents hoped for progress and economic improvement. One respondent established a workshop for repairing tools and offered the service to non-cooperative members. According to the respondents the supply chains became more efficient and new sales channels developed. Therefore, they claimed to be motivated to produce more. Respondents mentioned that the agrarian reforms contributed to increase the land under cultivation and, hence, to increase agricultural production and reduce food imports. Respondents claimed that more beginners became engaged in farming activities due to the reforms. In addition to beginners building up their own farm businesses, farmers who were already active enlarged their production areas.

In speaking about food sovereignty, respondents associated the concept with self-sufficiency and national autonomy. Furthermore, conditions for production, consumption, trade and transport were mentioned when speaking about food sovereignty. On the one hand, interviewees defined food sovereignty as the capacity of a whole country as being self-sufficient and independent. On the other hand, from an individual point of view, food

sovereignty was seen as the capacity of individuals to achieve self-sufficiency and to reduce the dependency on governmental food distribution. Moreover, food sovereignty was perceived as the possibility to increase the autonomy for production decisions. Food production should be economically viable but also environmentally safe and should take place on a local scale. Freedom to trade agricultural products was also mentioned as an important aspect of food sovereignty. Other respondents stressed the importance of consumers' access to sufficient and high quality food. According to the respondents, access to and availability of resources was the principal barrier to achieving food sovereignty in Cuba. Education and training for farmers were also mentioned as key elements of food sovereignty.

Discussion

The land reform of 2008 and the Lineamientos from 2011 represented governmental strategies that aimed to stimulate domestic agricultural development. A crucial element of the policy reforms included extending the area under cultivation by facilitating the access to land and other resources, facilitating credits, decentralization and diversification of sales channels. Furthermore, the Lineamientos tried to facilitate education and training for producers. Due to the reforms respondents could increase their production area and hence also increase the yield but monetary farm income only increased slightly. Respondents stated that producing for home consumption was important due to high food prices at official markets. Thus, instead of earning more money through higher production and commercialization, they instead saved money by avoiding food purchases at markets. González (2011) also stated that farmers achieved more autonomy by reducing the need to purchase food. However, one respondent, who received land and started to farm, claimed that the area for agricultural production was too small to earn enough money for the whole family and also to be fully self-sufficient.

Our results show that the Law Decree 259 facilitated the access to land. Farmers who were already engaged in agriculture were able to expand their productive surface and beginners could receive land in usufruct to start with agricultural production. Nevertheless, the expected increase in agricultural production was lacking. Nova González (2012) explains that the low production volumes are related to the slow implementation of measures supporting agricultural production. In particular he criticizes the slow allocation of land due to high bureaucracy. Some respondents confirmed the slow and bureaucratic procedures to obtain land and further emphasized the efforts necessary to clean the land. Newspapers also published

readers' letters from farmers complaining about the bureaucracy that affects gaining access to land (Ravsberg 2011). Thus, simply implementing agricultural reforms were not enough to solve Cuban food problems. The reforms must be accompanied by training, credits, secure tenure, market incentives, storage infrastructure, distribution and marketing support and input subsidies (Chan and Freyre Roach 2012; Simón Reardon and Alemán Pérez 2010).

A crucial challenge was to gain access to agricultural inputs. Respondents complained about the contradiction between the government's attempt to increase domestic food production and limited access to agricultural inputs. Without tools and machinery, respondents were not able to clean the land. Farmers, who had extended their land and therefore already owned certain tools, were at an advantage over the newcomers. Respondents avoided taking out a loan to invest in their farm business due to uncertain success of agricultural production and the risk of not being able to pay it back. With the reforms, the Cuban government aimed to facilitate the access to agricultural inputs and services (Altieri and Funes-Monzote 2012). However, respondents stated that the measures were not yet implemented properly and input availability was insufficient. Thus, agricultural production was challenging due to the lack of resources when they were needed and due to overpriced inputs. The lack of inputs such as tools and high prices were also mentioned by Nova González (2012). In addition, Chan and Freyre Roach (2012) claimed that availability of agricultural inputs was limited. Respondents tried to overcome resource scarcity and unaffordable prices by producing the required inputs on-farm, if possible. Thus, respondents often experimented with seed propagation, the elaboration of organic fertilizer and organic pesticides using locally available resources or with self-made tools. Cuban farmers' experiments and innovations are part of the daily working routine and contribute to improve farm management, productivity and to increase their local knowledge (Leitgeb et al. 2011, 2014).

Furthermore, respondents also purchased agricultural inputs on the black market. Chan and Freyre Roach (2012) confirmed that the black market played an important role for input acquirement. Food production was occasionally only possible with inputs from the black market, even if these inputs were possibly contraband from state enterprises. The government's response was to increase the subsidies for agricultural production with the aim to provide money for purchasing farm inputs. In addition, input costs were reduced (Espinoza Chepe 2011).

Due to the Lineamientos of 2011, respondents were able to decide autonomously how to commercialize their surplus. The government enabled diversification of marketing channels and producers were allowed to privately

commercialize their surplus, either directly to consumers or to private intermediaries. Cooperatives were allowed to sign contracts with hotels and restaurants. These measures alleviated the risk of post-harvest food loss and, thus, income loss. Freedom of decision to commercialize the production increased and as a consequence the motivation to produce increased as well. The number of mobile stands (*carretillos*) selling fresh farm produce rose sharply once they became authorized. In 2011 over 16,000 mobile stands were registered; 3 200 in Havana alone. The sale volumes of state markets decreased about 16.4 % and for farmers' markets about 4.5 %. In contrast, sales volumes of mobile stands increased. Owners of mobile stands usually faced tax advantages compared to salespersons at markets (Nova González 2012). Respondents stated that they hardly had the time to sell the products directly on the street, thus, they preferred selling to mobile stand owners. However, unofficial sales were still common practice to improve family income due to low prices for selling their own products and high costs for inputs.

In 2008, the Ministry of Agriculture announced that they would provide improved technical advice for newcomer farmers (Altieri and Funes-Monzote 2012). Yet, respondents claimed that consultancy was still lacking. Nova González (2012) criticized that advice was often provided too late. Thus, cooperative members mostly received advice from the employed consultant. The government's response was the Law Decree 300 to guarantee advice for newcomer farmers upon entering a cooperative (Ministerio de Justicia 2012). Cooperative membership allowed for participation at workshops and agricultural training. Furthermore, farmers gained access to specific advice provided by state research entities (Leitgeb et al. 2011).

Respondents complained about unfavorable conditions for farmers who received land in usufruct, such as the interdiction to build a residential house on that land. The government adapted the regulations with the Law Decree 300 and thereby motivated farmers and newcomer farmers to improve agricultural production (Batista Valdés 2013). Autonomy in running a farm was still limited for usufruct farmers. The lack of property rights for the productive land and for livestock was a constraint for autonomous decision making and lowered the flexibility to respond to current market requirements (Nova González 2012).

Respondents showed awareness of the benefits of sustainable agriculture and agroecology and applied various practices known in organic farming to their farms and used dung for biogas plants. Due to completely or nearly closed circuits and the sustainable production methods, urban agriculture contributed to the development of sustainable cities (Deelstra and Girardet 2000). In addition, the importance of organic production methods for urban agriculture is institutionally anchored. National regulations,

established by the National Group of Urban Agriculture (GNAU), built the legal framework for food production within and around the cities (Companiononi et al. 2002). According to the interviewees, cooperative consultants played an important role in implementing sustainable agriculture and agroecology. Furthermore, every year urban farmers received a visit from the GNAU to assess farm performance. Respondents received awards and farm inputs for successful implementation of sustainable practices. Rosset et al. (2011) stated that these incentives motivated farmers to carry out sustainable food production. However, interviews revealed that despite their ecological awareness, respondents occasionally used synthetic fertilizers and pesticides because of high efficiency and to avoid economic losses. Maximizing the production often had priority over ecological consciousness (Nelson et al. 2009). The Lineamientos from 2011 were accompanied by a cutting back of subsidies. Thus, respondents stressed the importance of being more dependent on successful production to earn a living than before.

Agroecological, organic or sustainable farming practices are implemented often within conventional farming practices. Depending on the farming conditions, agroecology and related concepts should be seen as a dynamic continuum shaped by a diversity of factors, such as, for example, the presence of pests and availability of inputs. According to Nelson et al. (2009), awareness of the problems related to synthetic fertilizer and pesticide use and an ecological consciousness about the benefits of agroecology, organic and sustainable farming cannot be taken for granted. Wright (2009) even mentioned a "widespread desire to use more agrochemicals, especially fertilizers" when availability improves. That statement contradicts the perception of Cuba as the prime example of agroecology. During the last two decades many authors highlighted Cuba's advances in agroecology (e.g., Rosset and Medea 1994; Altieri et al. 1999; Levins 2005; Simón Reardon and Alemán Pérez 2010; Rosset et al. 2011; Febles-González et al. 2011) but reliable statistical data on foreign trade or agrochemical use are sparse and often difficult to interpret (Pérez-López 2008).

Although urban agriculture in Cuba is one of the most highlighted examples of urban food production and distribution worldwide, there are considerable drawbacks to be mentioned. Apart from the importance of the black market for agricultural inputs, bureaucratic obstacles constraining access to land and farmers' autonomy and the contradictions about agrochemical usage and advances in agroecology, there are also bottlenecks in transportation and industrial food processing (Koont 2009).

The Cuban government has called for increasing domestic food production to reduce dependency on food imports and, at the same time, enhance food sovereignty

(González 2011). For the Cuban government, food sovereignty is directly linked to the reduction of food imports to increase the state's independence from other countries. Fostering the use of local resources and thereby reducing imported inputs was perceived as a key factor for local food production. Though, for the producers, food sovereignty also implied independence from the state food distribution system; for example, by increasing self-sufficiency.

Access to land is a major challenge for urban food production (Redwood 2009). The Law Decree 259 and 300 provide access to land by guaranteeing usufruct but no property rights for the land necessary for food production. This meets the guideline of the Nyéléni declaration for food sovereignty of 2007 to decline the privatization of natural resources. However, usufruct rights contain certain terms of use that limit producers' autonomous decision making.

Through granting access to land in urban and suburban areas food production increased up to 30,000 t in 2013 compared to the previous year (González Martínez 2013). Access to food improved due to the new distribution channels and urban citizens had more possibilities to buy food. Yet, supply within state regulated markets decreased and the food prices rose. Thus, getting access to affordable food became more difficult (Fernández et al. 2012). Access to external farm inputs was hardly guaranteed but the governmental institutions provided information to elaborate local and organic farm inputs. Although respondents experimented with seed propagation, state production of hybrid seeds increased during the last few years, mostly with the aim to guarantee national independence from the international seed market (Kälber 2011). However, as farmers were not able to use hybrid seeds for their own propagation, farmers' seed sovereignty was inhibited. Another inconsistency, opposing Cuba's success in agroecology, was the availability of chemical fertilizers and pesticides coming from Venezuela (Rosset 2009).

In contrary to many other countries where urban agriculture might be considered backward, the Cuban government provides appropriate governance mechanisms and active institutional support for the development of urban agriculture (Hamilton et al. 2014). Hierarchical governance structures definitely contributed to the constant institutionalization of urban agriculture and therefore to its steady growth. But having a Democracy Index of just 3.52 (Economist Intelligence Unit Limited 2013) seems to contradict the governments' commitment to food sovereignty, which includes "putting control locally" as a basic principle of the movement (Patel 2009). Though, the Democracy Index does not consider participatory and democratic structures of decision making within cooperative production units. The agroecological concept,

underlying sustainable production methods in urban agriculture, promotes participation of farm workers in local decision-making (Febles-González et al. 2011).

The agricultural sector is one of the most affected by the US trade embargo. Imports of agricultural inputs are still restricted and Cuba does not have access to the US market (Ceballos 2014). Nevertheless, the United States has been one of the most important suppliers of food since 2002 (USDA 2008). The groundbreaking news of December 17th, when Barack Obama announced far reaching changes in the US-Cuban relationship (Bassets 2014), will certainly have an impact on agricultural policy in Cuba. Up to the present time, Cuba's internal agricultural policy was not directly influenced by US interests. That might change with the new situation. What will be the results of the thawing relations remains to be seen in the near future.

Conclusion

The recent reforms show parallels with the austerity measures from the 1990s that aimed to increase inland food production by supporting the urban agriculture movement (Murphy 1999). The land reform with the Law Decree 259 of 2008, the Law Decree 300 of 2012, and the Lineamientos of 2011 engendered considerable changes for the Cuban society and also had an impact on urban agriculture, especially through the simplifications in granting access to land and the new, private marketing opportunities. The reforms created incentives to increase urban agricultural production. At the same time, the government reduced subsidized food rations which, in turn, favored domestic food production.

Fernández et al. (2012) pointed out the trend towards private commercialization, which created financial incentives to increase agricultural production. However, this trend limited the population's access to food because of high prices. As long as the demand for food surpassed the supply, food prices remained high.

Chan and Freyre Roach (2012) identified resource scarcity as one of the main constraints for agricultural production and described the access to farming inputs as the "Achilles heel" of Cuban agriculture. Although the Lineamientos of 2011 included measures of improving the availability and the access to inputs, overcoming resource scarcity still represented the most recognized challenge in urban agriculture. The Lineamientos of 2011 theoretically comprised measures which complemented the land reform of 2008 and which the government perceived as necessary to ensure that the distributed land could be cultivated.

Supporting urban agriculture was one of the government's measures to achieve food sovereignty (González 2011). Nevertheless, the concept of food sovereignty has a

different meaning for the Cuban government than for urban producers. The government interpreted food sovereignty as the measures necessary to increase domestic agricultural production and to reduce food imports. Independence from transnational enterprises and foreign capital was seen as a promising strategy to guarantee national sovereignty (Chan and Freyre Roach 2012). For the urban farmers, food sovereignty included strategies to reduce dependence on state-run supply and to deal with resource scarcity. Therefore, respondents tried to minimize the need for off-farm inputs by producing agricultural inputs themselves and by applying resource-conserving farming methods. The implementation of food sovereignty in Cuba depends strongly on how to overcome ubiquitous resource scarcity. Thus, local production of farm inputs has to be improved. The production of organic pesticides and in situ seeds propagation in particular has to be developed further. As a consequence, the import of farm inputs and food could be reduced.

The current situation of increased food prices in the world market represents an opportunity to stay on the track of food sovereignty and sustainable agriculture (Rosset 2009). The measures enacted by the government to promote agricultural production, such as the land reform and the Lineamientos, have the potential to create framework conditions for achieving food sovereignty. However, the implementation of complementary measures needs to succeed in time. The political challenge is to increase the coherence of the theoretic content and the practical implementation of the reforms. More political participation of farmers could contribute to increase the coherence between the theory and implementation of the reforms.

In debates on self-sufficiency, Cuba is mentioned quite often as excellent example for supporting urban agriculture. We doubt that Cuban experiences with urban agriculture can be transferred easily to other countries, due to Cuba's very specific political and economic circumstances. Depending on other country's circumstances, access to land might be more difficult in other countries. Whereas, commercialization of produce or purchase of farm inputs might be more easily organized somewhere else. Nevertheless, an explicit national and governmental support to food supply from urban gardens and farms may be a lesson learned from Cuba. A national legal framework supporting urban gardening and farming, support to specific research and advisory on that topic as well as a nationwide discourse on local food supply are achievements that might be a fruitful experience for other countries, too.

To overcome agricultural and food crisis, some governments implemented a strategic shift towards more national self-sufficiency (Demekke et al. 2009). Yet, the required changes towards self-sufficiency are difficult to apply in the light of international free trade agreements

(Paasch 2010). Nevertheless, the agrarian reforms of the Cuban government prove that political measures can contribute to food sovereignty on a national scale.

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