CASE STUDY #5

(peri-)URBAN AGRICULTURE

The role of (peri-)urban agriculture for resilient local food systems under climate change

Western Cape Government
IT HAS BEEN ESTIMATED THAT ALMOST 100 000 TONNES OF FRESH PRODUCE ARE GROWN ANNUALLY IN THE PHILIPPI HORTICULTURAL AREA, WITH A LARGE PROPORTION OF THE PRODUCE ENTERING INTO CAPE TOWN’S FOOD SYSTEM.
SUMMARY

Peri-urban agriculture refers here to small- and large-scale agricultural production within city boundaries or in close proximity to a city or town. Globally, (peri-)urban agriculture’s contribution to climate change adaptation, mitigation and resilient food systems is increasingly recognised.

(Peri-)urban agriculture can contribute to climate change adaptation by diversifying food sources for urban (and rural) populations. Locally produced food can decrease exposure to spikes in prices of imported food, by balancing the supply of food brought in from elsewhere and reducing exposure to exchange rate fluctuations. This is particularly true where the marketing chain is kept short – i.e. when there are few middlemen. In the Western Cape, preserving food production areas that cover a diversity of agro-climatic regions and climate risks is an important risk avoidance strategy. In the face of possible climate-induced disruptions to rural food production, (peri-)urban agriculture can become a critical pillar of food security.

(Peri-)urban agriculture can also play an important role in reducing greenhouse gas emissions. Producing food close to urban markets reduces transport costs and associated greenhouse gas (GHG) emissions, particularly for high-weight (and high volume) low-value vegetables such as cabbage and cauliflower. GHG emissions are also reduced through the shortened cold chain, since fresh produce requires less time in cold storage. There is good potential for increasing the use of urban organic waste in (peri-)urban agriculture, providing an additional way of reducing GHG emissions.

Furthermore, (peri-)urban farms practising sustainable land and water management can contribute to enhanced rainwater infiltration, flood buffering and groundwater replenishment. Additional benefits of (peri-)urban agriculture include the flow of fresh nutritious produce into informal markets, the diversification of livelihood opportunities for urban residents, and the value of “place” for (peri-)urban farming communities with a rich heritage and relationship to the land.

(Peri-)urban agriculture in the Western Cape is under great pressure due to competition for land from urbanisation and urban sprawl. If (peri-)urban agriculture is to become part of a proactive climate change response, its value needs to be properly assessed by looking at local histories and the impacts of a changing climate across the province.

This case study uses the Philippi Horticultural Area (PHA) to encourage thinking and debate around the potential value of this highly productive farming area for the food system of greater Cape Town and the province, in the context of the changing climate. It also highlights how the non-climatic challenges and pressures under which farmers in (peri-)urban areas like the PHA operate could weaken their resilience to the additional problem of climate change.
IN AN URBANISING PROVINCE THE OPTIMAL USE OF HIGH POTENTIAL AGRICULTURAL LAND IN CLOSE PROXIMITY TO CITIES AND TOWNS IS CRITICAL TO THE RESILIENCE OF FOOD SYSTEMS UNDER CONDITIONS OF CLIMATE CHANGE.
TYPE OF CLIMATE CHANGE RESPONSE

Adaptation: Diversified food system with an important local food production component.
Mitigation: Reduces greenhouse gas emissions from the transport and cold storage of fresh produce.

COMMODITIES

Vegetables, fruits and intensive livestock

REGION

Urban and peri-urban areas of the Western Cape

CLIMATE RISKS

Reduced water supply and water quality, high temperatures and heat waves, heavy rainfall events and floods, rising sea level, changing rainfall seasonality.

FARMING SYSTEMS, PEOPLE AND BUSINESSES AFFECTED:

Commercial farmer | Smallholder
Agri-business, especially traders and retailers | Agricultural workers
THE ROLE OF THE PHILIPPI HORTICULTURAL AREA IN THE CAPE TOWN FOOD SYSTEM.

BACKGROUND

Located in the Cape Flats area within the City of Cape Town, the Philippi Horticultural Area (PHA) is a (peri-)urban area with a long history of food production dating back to the mid-1800's. The total area of the PHA comprises over 3000 hectares, of which 1200 hectares are suitable for food production. More than 50 different horticultural crops are produced by commercial and smallholder farmers within the PHA. The most important vegetable types grown here are cabbage, lettuces, cauliflower, broccoli, spinach, carrots, potatoes and onions. These play an important role in Cape Town’s food system as they are (usually) affordable staple food items contributing to a nutritious and diverse diet for most households. Many farmers are also active in intensive livestock production including poultry, pigs, goats and sheep. It has been estimated that almost 100 000 tonnes of fresh produce are grown annually in the PHA, with a large proportion of the produce entering into Cape Town’s food system. Farmers sell directly to the Cape Town Fresh Produce Market, major retailers, wholesalers, informal traders, and other buyers such as restaurants and speciality stores. Farmers are also actively involved in on-farm value addition. Other agricultural value chain participants that are active within the PHA are seed and seedling suppliers, fertilizer and agro-chemical companies, infrastructure (e.g. irrigation system) and equipment suppliers, wholesalers, packhouses, transportation suppliers, and suppliers of financial services and insurance. The PHA itself supports around 4000 jobs. Hence, the PHA is part of an integrated and mutually beneficial set of economic systems that add economic integrity to the area.
Map of agricultural areas within the City of Cape Town

Philippi Horticultural Area
THE PHA AND ITS CONTRIBUTION TO THE LOCAL FOOD SYSTEM AND TO URBAN FOOD SECURITY
Through the production of fresh produce in agricultural areas within and adjacent to the “urban edge”, traders and consumers in the larger Cape Town area can access food from different sources. Local production also increases the resilience of the city-wide food system. Previous studies focusing on the larger Cape Town area have provided evidence that a resilient local food system is able to respond to changing circumstances as well as various household and community needs. For example, if an extreme event were to destroy crops from the agricultural “hinterland” of the West Coast and Winelands areas, the City would be less vulnerable as it can obtain a certain proportion of fresh produce from its own urban production areas.

The PHA has strong linkages to Cape Town’s food system, including to the fresh produce market and fresh produce traders. Fresh produce street traders are important for urban consumers. They are distributed throughout the City and sell affordable fresh produce. In comparison to formal supermarkets, these traders tend to better accommodate the needs of poorer urban households, e.g. in terms of trading hours, non-bulk items and credit options.

The convergence of different beneficial climatic and hydrological attributes makes the PHA ideal for food production, and specifically for vegetables. These benefits include:

- A direct relationship between the PHA and the Cape Flats Aquifer which provides year-round water for irrigation;
- The well-drained sandy soils;
- The cooling sea breezes blowing from the south during the warm summer; and
- The mild year-round temperatures buffered by oceanic influences. Beyond Cape Town, the temperature increases significantly, so that only pockets of land beyond Cape Town are suitable for commercial vegetable production (e.g. parts of the Bokkeveld, Sandveld, Olifants River and Breede River irrigation areas, the southern Cape around George, and parts of the Little Karoo).

With temperatures expected to rise across the Western Cape under conditions of climate change, the PHA could increasingly become valuable for the food systems of Cape Town and the province. Of all the vegetable producing areas, the mildest temperature increases and heat stress problems are projected for Cape Town and the southern Cape.

(Peri-)urban agricultural areas such as the PHA, can also play a vital role in the protection of ecosystem functioning in urban areas. For example, the PHA is an integral part of the city-wide ‘green space’ and forms a major part of the regional ecological conservation areas and green corridors. Furthermore, good agricultural land use management practices in the PHA can play a valuable role in managing the Cape Flats Aquifer sustainably. A prerequisite for the PHA to fulfill the urban-nature linkage is that farmers operating in the PHA use sustainable land and water management practices.
The Cape Flats Aquifer (CFA) is the most important source of water for PHA farming. This Aquifer, covering about 630 square kilometers, has the potential to supply the City of Cape Town with an estimated 18 billion litres of fresh water per annum, representing more than two-thirds of the City’s basic water needs. Given the recent water shortages and projections of climate change impacts on water resources supplying the City, this reliable and sustainable water supply underneath the City will become immensely important to the burgeoning City and its food needs.

However, the CFA is under growing threat from pollution caused by human activities. The deterioration in water quality is due to a combination of pesticides and fertilisers from agricultural practices, waste-water treatment plants, waste disposal sites, informal settlements with lack of adequate sanitation, unlined or leaking canals, leaking sewerage pipes in some areas, storm-water runoff, and leakage of toxic industrial chemicals and petrol/diesel tanks. In the PHA this is still regarded as a low-to-medium threat, whereas in other areas of the aquifer, nodal sources of pollution (e.g. waste-water treatment works and waste disposal sites) have caused water quality to deteriorate to non-potable levels.

There is currently huge pressure to develop mixed-density housing across parts of the PHA. The implications for the future health of the aquifer would be considerable. Farming in this area can play a valuable role in managing the CFA sustainably, through practices which encourage recharge from the aboveground catchment area, together with efforts to reduce agro-chemical pollution. The PHA farmlands and wetlands – in the heart of the Cape Flats – are the last natural green space where rainfall can permeate freely into the aquifer. Thirty percent of the PHA floods during winter months, creating numerous seasonal wetlands. These wetlands are a habitat to 98 bird species, amongst other biodiversity, and play a vital function in recharging the aquifer.
CONFOUNDING NON-CLIMATIC PRESSURES

In light of rising urbanisation and associated land use competition - in particular housing development pressures - the value of the PHA and other agricultural production areas in the greater Cape Town area has been contested. In addition, farmers operating in the PHA or in similar areas are under the impression that there is a lack of government recognition and support provided to agricultural areas in or on the urban edge.

(Peri-)urban farmers are exposed to a variety of challenges that differ to those experienced by their rural counterparts. For example, municipal services such as streetlights and storm water infrastructure are often not adequately maintained or upgraded. In the event of climate-related disasters such as heavy rainfall and flooding, damages can be high and responses to help farmers slow or absent (responding to human needs in adjacent settlements is prioritised). Farmers are left to help themselves, and repeated short-term ‘fixes’ become unsustainable ecologically and financially.

Non-climatic pressures add to the difficulties which (peri-)urban farmers are confronted with. Due to the proximity of these farms to residential areas, theft of infrastructure and produce is a major challenge and adds huge costs for farmers. Rising costs lead to rising food prices. Because of the persistent uncertainties about the future, potential investors are reluctant to make long-term investments into farming in the area. Furthermore, provincial and national agricultural departments regard support to (peri-)urban farmers as outside their primary mandate, leaving this to the Metropolitan governments, which are not well resourced in this regard and do not prioritise the needs of (peri-)urban farmers within city-wide planning. As a consequence, farmers operating in or on the urban edge receive limited support from government in terms of training, extension and other services. They are also often not considered or consulted in interventions aimed at strengthening the agricultural sector or reducing the vulnerability of particular stakeholders in the agricultural sector.

Jointly, these factors significantly challenge the resilience of the PHA as a productive ‘bread basket’. While the PHA has a lot of potential in terms of strengthening the City’s (and Province’s) resilience to climate change, the PHA itself is also expected to face specific climate change impacts that will need to be addressed by farmers, government structures and the agri-food value chain in a collaborative and integrative manner.
PROJECTED FUTURE CLIMATE CHANGE IMPACTS AFFECTING THE PHA

Parts of the Cape Flats area have a very high water table. Following heavy winter rainfall, surface flooding is very common across 30% of the PHA area. The sandy soil and excellent drainage mean that the water does not stand for long once the rainfall diminishes in spring. Climate change is expected to increase the intensity of rainfall. More frequent, heavier rainfall could flood larger areas such as fields, and possibly in seasons not currently characterised by heavy rainfall and flooding, such as spring and early summer. This could disrupt planting, harvesting and cultural activities.

In addition, climate change is causing sea level rise. Within the next 30-40 years this is likely to cause increasing problems of flooding in low-lying areas of the Cape Peninsula. Fields not currently at risk of flooding could become flooded during the rainy season.

Climate change also brings increasing risks of very high daily maximum temperatures, and an increasing frequency and intensity of heat waves. Some crops grown in the PHA are resilient to high temperatures if they are well-watered, but others are more sensitive, particularly at specific times in their development e.g. germination, fertilisation, and ripening. Extreme heat and heat waves cause reductions in yield and negatively affect the quality of produce. For example, many vegetables can develop sunburn.

Increases in temperature, changes in rainfall amounts and seasonality, and higher humidity at critical times could all intensify the frequency and intensity of pests, diseases and weeds, leading to crop losses. High rainfall during spring and early summer could have a pronounced effect on the invasion of weeds, and pests and diseases could increase more quickly in this period. In addition, some pests and diseases can expand their range to areas where they do not currently occur.

Furthermore, warmer and more humid conditions caused by climate change could cause freshly harvested produce to rot more quickly. Postharvest cold storage and the maintenance of a cold chain for perishable produce will therefore become more important.
The Western Cape Province makes up 10.6% of the country’s land surface area and accommodates 11.2% of the national population. Despite a strong agricultural focus, the Western Cape is one of the most urbanised provinces within South Africa. According to the Census in 2011, 81% of the population lives in formal residential areas, 7% in informal residential areas, and 8% on farms. Most of the population is concentrated in the Cape Metro region (approximately 4.3 million) and coastal towns.

The population growth rate for the province is relatively stable (2.5%), yet in-migration accounts for about one third of the population growth. The West Coast District records the fastest growth rate at 3.3% per annum, the City of Cape Town stands at 2.5% per annum, and the Central Karoo has the lowest growth rate at 1.9% per annum.

The following urban-rural migration patterns can be observed in the province:
- From rural areas within Western Cape to urban areas
- In-migration:
  - From other provinces (e.g. Eastern Cape, Gauteng)
  - From outside South Africa

Drivers of urbanisation:
- Deteriorating socio-economic conditions in most rural areas (failure of land reform policies, displacement from farms, declining livelihood opportunities, etc.);
- The search for income and employment, especially by the youth;
- The perception of a better quality of life, especially in the coastal towns and the City of Cape Town; and
- Better infrastructure and service provision (health facilities, transport, schools) in urban areas compared to most rural areas.

Urbanisation in the Western Cape goes hand in hand with increasing urban sprawl across all socio-economic strata. This refers to the uncoordinated, low-density expansion of urban settlements into the outskirts of cities and towns. While urban sprawl partly results from poor spatial planning (within the historical context) and land use decision-making, it is also driven in the Western Cape by rapid population growth into urban areas, and smaller household
sizes leading to more households. A consequence of urban sprawl is the sub-optimal utilisation of resources, particularly where this sprawl is subsuming productive agricultural land on the city boundaries.

Urban sprawl and rapid urbanisation is not just a challenge for the City of Cape Town but also for many medium-sized and small towns in the Western Cape. Urban development pressures are most acute along the coastal belt, in particular the Cape Metro, Paarl and Stellenbosch, Saldanha Bay, and the main centres in the Southern Cape, such as George. As a consequence of these pressures, valuable agricultural land as well as natural land critical for the protection of ecosystems and ecosystem services (e.g. provision of clean water to downstream communities and urban economies) are being fragmented and transformed in order to accommodate urbanisation within the province.

When these trends are considered together with climate change projections, a very concerning picture emerges. The “best scenario” climate change projections for the province – i.e. moderate warming due to the buffering provided by ocean currents – are expected along the coastal belt from Cape Town eastwards. This coastal belt is where the ‘bread baskets’ (or specifically the fruit, vegetable, dairy and intensive livestock ‘baskets’) of the province are likely to concentrate in future, in terms of agro-climatic suitability. Harsher climates in the interior and the early stages of climate change (e.g. recent droughts) are arguably already contributing to the urbanisation of the coastal towns. Where these two trends meet will be a rapid increase in pressure on land, sharp increases in the value of land (thus encouraging shifts from agriculture to other land uses), and significant increases in competition for water. If high potential agricultural land in urban and peri-urban areas (and the immediate ‘hinterland’) and associated water sources are not fiercely protected, the food security of the province will come under significant pressure.

Urbanisation is an inevitable trend seen across the world. To some extent, the speed of urbanisation in South Africa can be reduced by providing people in rural areas with adequate livelihood opportunities and public services, as well as by working together to build a productive and resilient agricultural sector in the face of climate change. Nevertheless, urbanisation is expected to continue and must be managed. Urban sprawl can be contained through good spatial planning, enforcement of laws and regulations aimed at protecting agricultural land, and better integration and densification of urban areas. Instead of seeing (peri-)urban agricultural areas as open spaces for middle class housing sprawl they need to be protected as assets for current and future food security.
THE WAY FORWARD

RECOMMENDATIONS FOR GOVERNMENT

• Use spatial planning and land use planning processes to clearly define the urban edge, taking climate change scenarios and future agro-climatic conditions into consideration;
• Protect and retain high potential agricultural land in and around cities and towns for current and future food production;
• Assess the role that specific (peri-)urban agricultural areas play in their respective regions and the extent to which these areas are suitable for strengthening food security under conditions of climate change (this should include an assessment of existing and future climate risks within the food system);
• Engage with (peri-)urban farmers in order to identify appropriate land use regulations and to jointly address spatial and other constraints;
• Ensure the protection and long-term sustainable management of freshwater resources used for (peri-)urban agriculture (e.g. Cape Flats Aquifer) and of urban/(peri-)urban wetland areas which are critical for re-charge, and address the problems of water pollution;
• Provide adequate climate smart support and training to (peri-)urban farmers;
• Strengthen the consideration of (peri-)urban agricultural areas into city-wide economic and development planning, and the role they can play in city-wide climate change adaptation and mitigation strategies;
• Investigate and enable suitable linkages to the green economy as well as climate smart agri-processing possibilities, particularly for smallholder farmers, in (peri-)urban areas.
• Promoting access to local produce through new marketing channels and new outlets for (peri)-urban produce
• Creation of value-adding opportunities and marketing for (peri-)urban agriculture
Crop-specific
• Maintain a permanent organic soil cover using either cover crops or mulch to reduce soil water losses;
• Repair and maintain boreholes and irrigation systems to save water and prevent wastage;
• Use manure or organic waste for composting to increase soil fertility
• Increase water use efficiency through careful monitoring coupled with precision irrigation hardware and scheduling;
• Establish and maintain effective drainage systems and protect infrastructure (e.g. pumps) from flooding;
• Practice Integrated Pest Management to deal with possible increases in pests, diseases and weeds. Any new species should be discussed with extension officers and other support organisations;
• Investigate the appropriateness and feasibility of shade netting.

Livestock-specific
• Identify and use breeds which exhibit resilience to drought, heat, diseases and parasites;
• Ensure that environmental control systems in animal housing are able to reliably function even during heat waves;
• Provide additional shade to animals that are kept outdoors;
• Optimise feed and nutrition management to minimise animal stress;
• Use pro-active animal health management approaches and have a clear risk management plan ready for instances of disease outbreak. Maintain excellent relationships with veterinarians and follow their advice.
• Have a responsible and compliant water and waste management plan which re-uses water and waste as much as possible and minimises the risks associated with contamination. Consider installing waste-to-energy systems.
• Do not position poultry and pig houses in flood prone or damp areas.

General (farmers):
• Become a member of a farmer association to receive important information and support;
• Take advantage of existing training opportunities provided by WCDoA;
• Take advantage of the Green Agri Portal and its information services;
• Diversify farming activities and, where possible, complement with non-farming activities (e.g. agri-processing).
URBAN CONSUMERS:

- Insist on transparent processes (with a rational and future-oriented discourse on trade-offs) leading to well-considered decisions by local government around the future of productive and viable (peri-)urban agricultural areas such as the PHA;
- Lobby for the protection and sustainable management of fresh water resources needed for (peri-)urban production areas e.g. Cape Flats Aquifer;
- Take advantage of the educational and recreational value of (peri-)urban agricultural areas

FURTHER INFORMATION:

WESTERN CAPE DEPARTMENT OF AGRICULTURE WEBSITE: www.elsenburg.com

ACKNOWLEDGEMENTS:

Gareth Haysom
Anton Cartwright
Scott Drimie

Photos provided by Nadine Methner