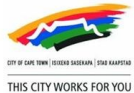



Rooftop Gardens

A green social development initiative

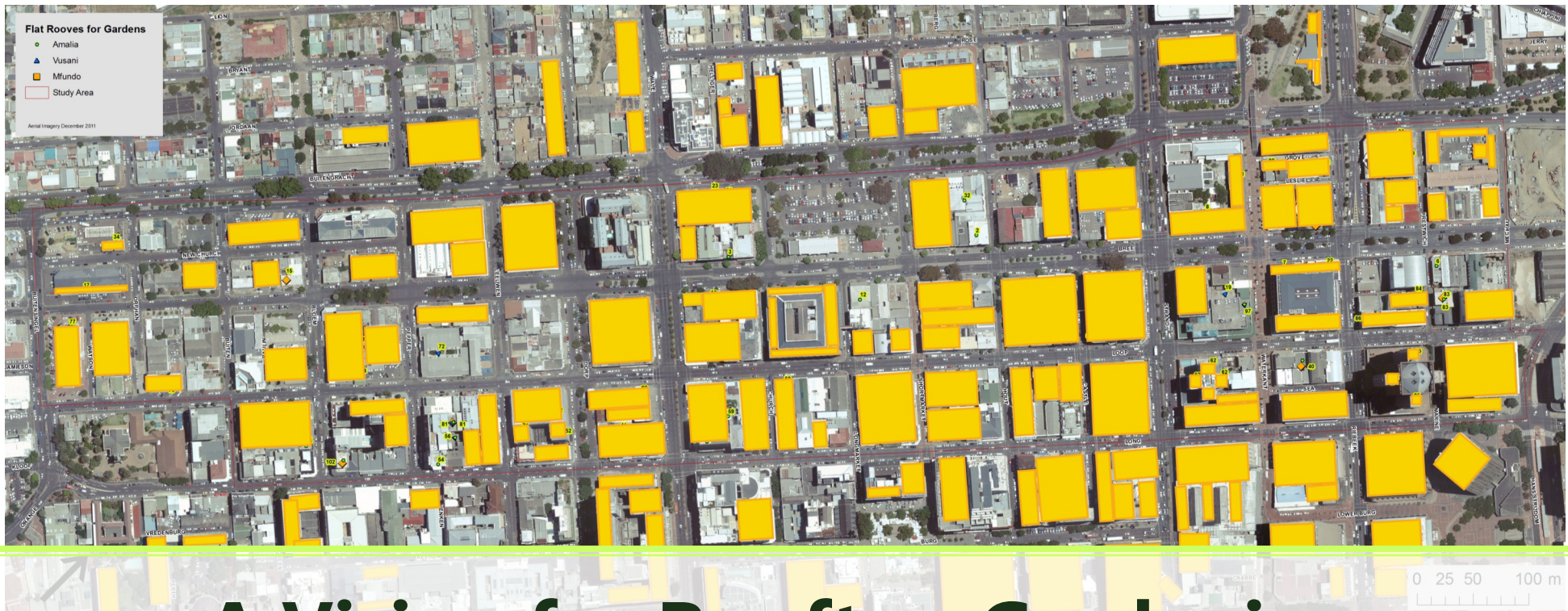


touching the earth lightly
people + conservation + design



“We are looking at trying to uncover the spaces in cities that are seen as forgotten and meaningless, and make them meaningful”

Stephen Lamb-Founder of Touching the Earth Lightly



A Vision for Rooftop Gardening

This proposal seeks funding to start-up 1 000 m² of rooftop gardening space in the Central Business District (CBD) of Cape Town within two years after funding is secured. The mission of this programme is to develop a job creation network of rooftop gardens producing oyster mushrooms and micro greens within the Central Business District. We are seeking funding for a programme at this scale in order to generate enough revenue to ensure adequate supervision, worker training, and programme administration. We anticipate that after two years the rooftop garden programme will be self-sustainable. We believe this programme has huge potential in Cape Town; within the Central Business District alone, there is 162 000 m² of flat rooftop space, allowing the programme ample opportunity to expand.

Rooftop gardens convert unutilised space into areas suitable for food production within the city. With careful management to assure quality control and reliable distribution of the produce, such gardens can create jobs for the unemployed while stimulating the economy and promoting environmentally friendly practices. The City's Office of Sustainable Livelihoods will appoint an NGO to implement the programme.

Request

Calculations show that R3 112 608 will cover the capital and recurring costs of the programme for two years. This funding will generate ten full time gardening jobs for low income individuals in the start-up programme.

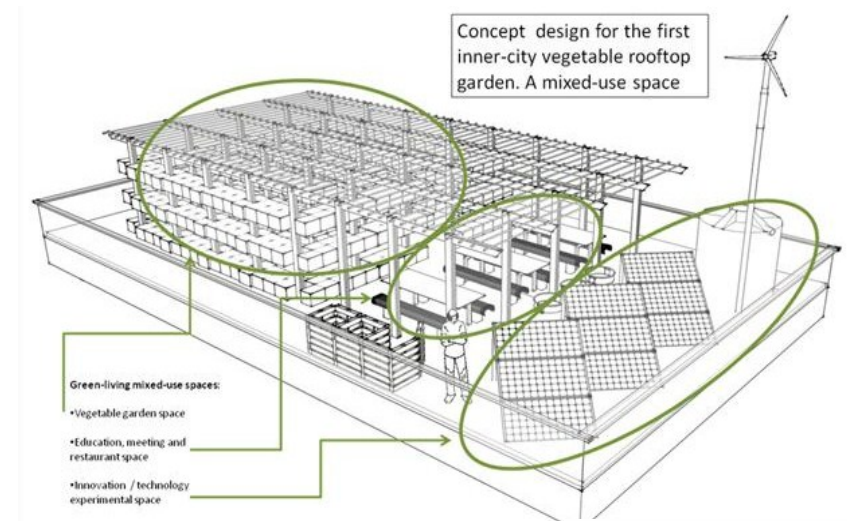
The Rooftop Gardens

Touching the Earth Lightly (TEL) is an NGO whose mission is to establish a sustainable relationship between humans and the environment. Stephen Lamb of TEL sparked the interest of the City in the concept of rooftop gardens and was appointed by the City to implement a rooftop garden on the 44 Wale Street building. TEL researched and selected the vegetables that will be produced by this programme which include high quality oyster mushrooms and micro greens, alfalfa sprouts, mung bean sprouts, brussel sprout micro greens, baby butter lettuce sprouts, and baby spinach sprouts. These products were chosen because they have a high market value and fast turnover.

The produce will be grown on a rotating crop schedule to ensure that there is a weekly yield. The micro greens can be harvested about every five days and the oyster mushrooms can be harvested every two months. Through researching the preferred environment of micro greens, the team found that brussel sprout micro

greens, baby butter lettuce sprouts, and baby spinach sprouts will grow best in the winter months while alfalfa sprouts and mung bean sprouts will grow best in the warmer months. There are various species of oyster mushrooms that grow in temperatures ranging from 2 to 32 degrees Celsius. Planting each species during their preferred season will eliminate the need for heating or cooling as long as the cabinets are properly insulated. If this proves to be inadequate, an air-conditioning/heating unit may need to be installed.

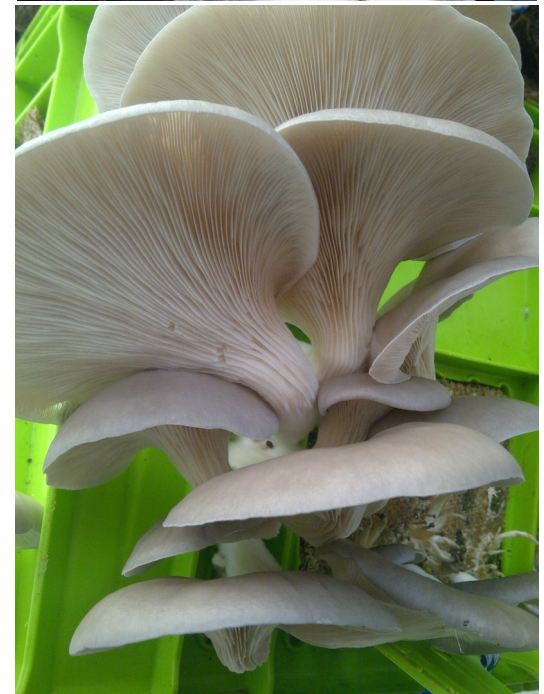
The gardens will be designed to optimize space for production while still allotting adequate space for construction and pathways. The micro greens will be grown in plastic crates and flat trays. The oyster mushrooms will be produced in growing bags in cabinets suitable for growing mushrooms year round. Coffee grounds from local coffee shops will be recycled and used in the growing medium for the mushrooms. The coffee ground wastes from one typical café can meet the needs of the start-up programme.



*Designs on this page are property of

Growing Conditions				
Plant Type	Light	Relative Humidity	Temperature (°C)	Substrate pH
Oyster Mushrooms	No light	High humidity	2 – 32	8.0 – 8.5
--Pleurotus ostreatus var. columbinus	No light	High humidity	2 – 10 / 13 – 29	8.0 – 8.5
--Pleurotus ostreatus	No light	High humidity	2 – 10	8.0 – 8.5
--Phoenix pulmonarius	No light	High humidity	27 – 32	8.0 – 8.5
--Pleurotus citrinopileatus	No light	High humidity	24 – 32	8.0 – 8.5
--Pleurotus djamor	No light	High humidity	24 – 32	8.0 – 8.5
--Hypsizigus ulmarius	No light	High humidity	13 – 24	8.0 – 8.5
Alfalfa Sprout	Full sunlight	Low humidity	10 – 27	6.7 – 7.5
Mung Bean Sprout	Full sunlight	Low humidity	21 – 27	6.2 – 7.2
Brussel Sprout	Full sunlight	High humidity	0 – 21	6.5 – 7.5
Baby Butter Lettuce	Partial-full sunlight	High humidity	15-18	6.2-6.8
Baby Spinach	Partial-full sunlight	High humidity	10-23	6.5-7.5

Growing Seasons												
Plant Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Oyster Mushrooms												
--Pleurotus ostreatus var. columbinus												
--Pleurotus ostreatus												
--Phoenix pulmonarius												
--Pleurotus citrinopileatus												
--Pleurotus djamor												
--Hypsizigus ulmarius												
Alfalfa Sprout												
Mung Bean Sprout												
Brussel Sprout												
Baby Butter Lettuce												
Baby Spinach												



Staffing

Service Provider

The Office of Sustainable Livelihoods has been part of the planning and decision making regarding the beginning stages of this programme and will oversee the continuation of this programme. The management will be taken on by TEL as a service provider. Designing and constructing the rooftop garden at 44 Wale Street has given TEL the skills to effectively implement future rooftop gardens. In a previous project, Stephen Lamb organized the construction of hiking trails on Table Mountain. In this project, 350 low income workers were trained and managed by Stephen Lamb.

TEL will be responsible for coordinating all aspects of the programme and transferring all skills and knowledge to the supervisor. TEL must oversee worker selection, planning, construction, and training needs of each garden for at least the first six months. They will also be responsible for any liability issues. All normal legal requirements apply to this programme; TEL must take out liability insurance to cover any issues that may arise.

Supervisor

During the first six months, TEL will be transferring all managing skills to the supervisor to ensure that they can adequately oversee the programme without assistance. The supervisor will monitor the gardens, make sure the gardeners are producing at an acceptable level, market the programme, and keep the records.

The supervisor should demonstrate strong leadership skills and have an educational background with expertise in gardening, business, and marketing. To further their skills, the supervisor will be enrolled in a gardening management workshop. Since this person will have to visit several rooftop vegetable gardens and several markets, the person selected will not have any transportation restraints. A supervisor will manage a maximum of ten roofs.

Gardener

The programme will hire 10 unemployed persons who have worked as gardeners and have the entrepreneurial drive to make each garden successful. The team will look into workers that have experience in other governmental work programmes or a mayoral urban regeneration programme such as Voortrekker Corridor. Workers will be selected that have previously demonstrated a good work ethic and dependability. The service provider will select the gardeners through a formal application and interview process.

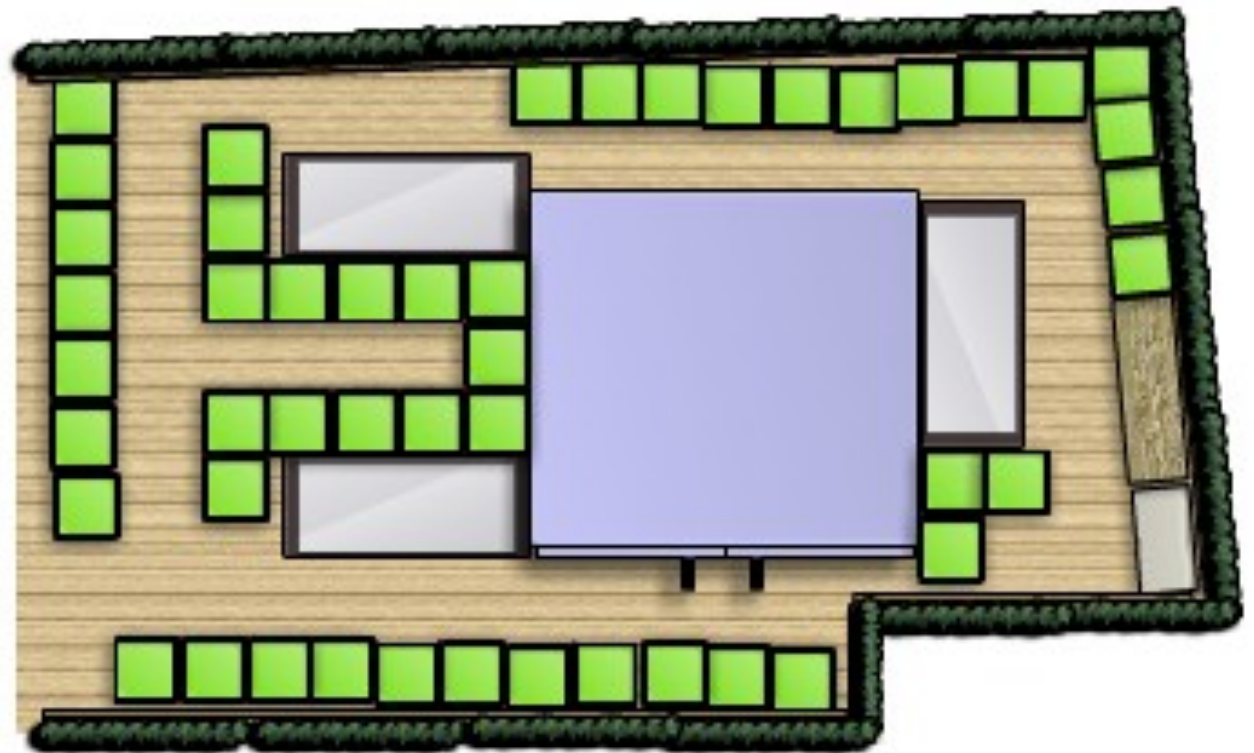
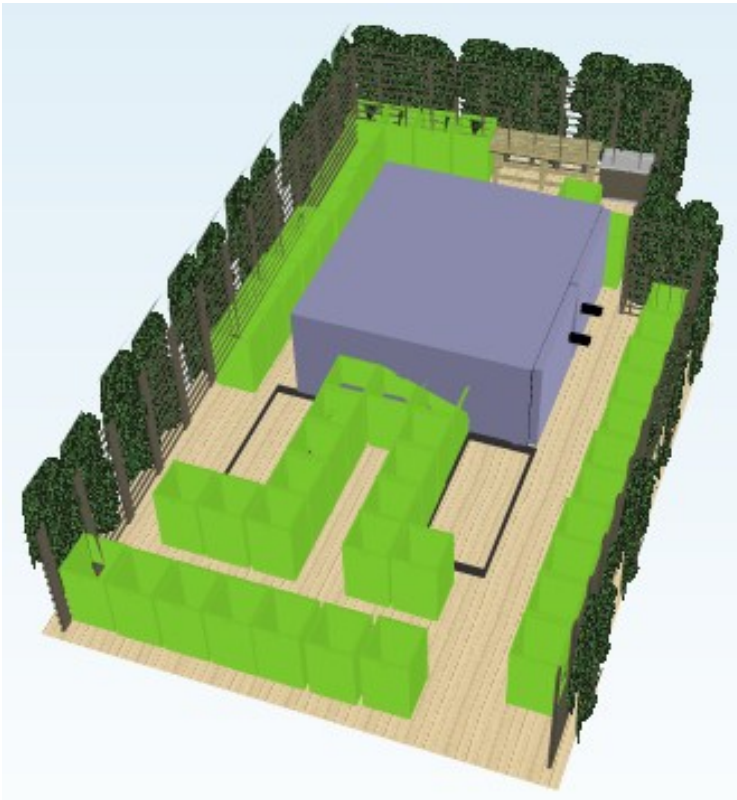
Since the rooftop gardens will not be growing a wide range of produce, intensive gardening training will not be necessary. TEL and the supervisor must be familiar with growing oyster mushrooms and micro greens, so they can provide all educational and training needs. TEL will be responsible for conducting hands on training for three weeks during which, the gardeners will be tending the gardens with supervision.

The gardeners will be responsible for prepping the soil, planting, tending, harvesting, washing and packaging the vegetables, and distributing. The daily tasks are dependent on the plant cycle and will vary. Since plants need to be cared for daily, each garden must be visited every day. The nature of this job prevents it from having set hours, but the gardeners will work about eight hours per day. The vegetables will be distributed by the gardeners. For efficiency purposes, only two gardeners of the ten full time positions in the programme will be distributing the products. These gardeners should work on large rooftops that have multiple gardeners so that there is still a gardener tending the plants on the days products are distributed.

Pilot Rooftop Garden

A pilot rooftop garden will be constructed to allow the team to investigate the intricacies of the programme before implementing it on a full scale. The Prestwich Memorial building has already granted permission for the use of their rooftop, designs for the space have been drafted, and construction will begin as soon as funding is acquired. This building was designed to have a rooftop

garden, but one was never installed. The rooftop is waterproof, has both water and electrical access, and is structurally able to support a rooftop garden. The pilot rooftop will be run for two years and may then be converted into part of the network of rooftop gardens.



Estimated Revenue

The potential revenues are significant from 1 000 m² of rooftop gardens. The estimated total revenue was generated by first assuming that about 500 m² of the total 1 000 m² area will be growing space. Production rates were found for each product and multiplied by the wholesale price of the product. The sum of these values for each of the six products gives the estimated total revenue, which was found as R3 619 181. However the team believed the revenue might be over-estimated, due to the limited production rate data found in the research, and uncertainties that cannot be accounted for, such as gardening mistakes, spoilage, plant disease, and weather damage. The team has taken 30% of the estimated total revenue as a conservative assumption for the revenue the programme can generate, which is R1 085 754.

Returns on Investment	Growing Space (m ²)	Production limitations (kg/yr)	Price per (Rand/kg)	Total Revenue (Rand/yr)	30% Revenue (Rand/yr)
Oyster Mushrooms	125	24 750	60	1 485 000	445 500
Alfalfa Sprouts	75	5 675	65	368 843	110 653
Mung Bean Sprouts	75	5 675	60	340 470	102 141
Brussel Sprouts	75	5 675	29	162 291	48 687
Baby Butter Lettuce Sprouts	75	5 675	85	482 333	144 700
Baby Spinach Sprouts	75	5 675	48	780 244	234 073
Total Revenue				3 619 181	1 085 754

Potential Market

Revenue will be generated through the sale of produce locally to some of the 99 restaurants the team identified in the Central Business District of Cape Town. We will be targeting restaurants of a very specific niche. Initial market research suggests strong interest in fresh, local, organic produce and supporting rooftop job creation through food purchases.



Cost

A spread sheet taking into account economies of scale has been developed that breaks down the start-up costs using only rooftop and production space sizes as inputs.

Start-up costs for the first 1000 m² of rooftop space will be approximately R3 112 608. Recurring costs for two years will be R1 773 400. The breakdown of the costs is included in the charts to the right.

The recurring costs were determined for the first two years, which is the estimated length of time it will take the programme to become sustainable. The recurring costs were given by Touching the Earth Lightly for a 100 m² roof. To get an estimate for the recurring cost of the initial programme, these values were multiplied by ten. The total cost for the start-up programme was determined by adding the capital and recurring costs.

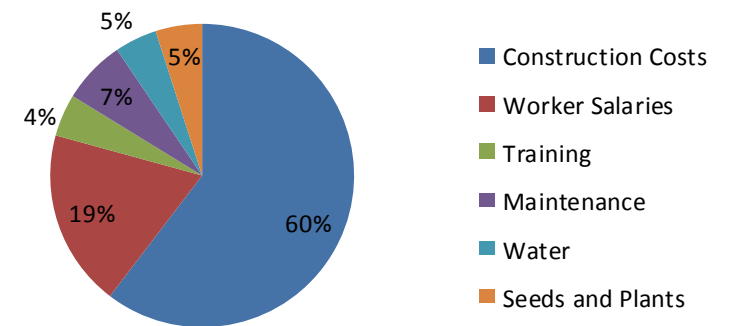
Capital Costs

Cost Factors	Price (Rand)
Decking	500 000
Bolts and Fixings	291 667
Crates	62 500
Plants	13 858
Soils	55 491
Mushroom Cabinets	267 000
Construction Labour	148 692
Total	1 339 208

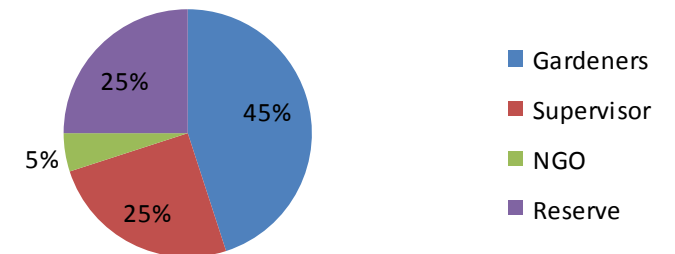
Recurring Costs

Cost Factors	Annual Projection (Rand)
Training	100 000
Maintenance	150 000
Water	100 000
Seeds and Plants	110 000
Mushroom Growing Medium	7 700
Salaries for Gardeners and Supervisor	419 000
Total (1 Year)	886 700
Total (2 Years)	1 773 400
Total Start-up Costs	3 112 608

How Funding is Spent



Profit Distribution After 2nd Year



Income

For the first two years, the gardeners and supervisor will be paid a salary provided by the funding while the service provider will be paid based on percentage of profit. We plan for the gardeners to make the Cape Town minimum wage of R8.95 per hour and for the supervisor to make the average Cape Town salary for a manager in sales, which is R13 000 per month. Since these incomes are provided by funding, salaries for two years at these rates have been incorporated in the funding request. 95% of any generated revenue during the first two years will go into the programme reserve while the remaining 5% will go to TEL.

After the first two years, the rooftop gardens should be sustainable and the income of the gardener and supervisor positions will be profit based. To establish the profit breakdown, we first calculated 30% percent of our revenue that was projected assuming a perfect harvest which accounts for complications such as gardening mistakes, spoilage, plant disease, and weather damage. The adjusted revenue this generates is R108 754. We subtracted the projected maintenance cost of R450 000, leaving a profit of R635 754. We determined that to match the incomes the workers received during the first two years, 45% of the adjusted profit will be divided amongst the gardeners and 25% will go to the supervisor for. TEL will get 5% of the profit leaving 25% for the reserve. The table s below show the comparison of the incomes of the gardeners and supervisor for the first two years and for the years to follow. The incomes are nearly identical which will provide a smooth transition when incomes switch from salary to profit based.

First 2 Years Income (Salary Based)

Position	Salary (Rand)
10 Full Time Gardening Positions	263 000
1 Supervisor	156 000

Potential Revenue = R108 5754

Projected Amount of Cost = R450 000

Profit = R635 754

After First 2 Years Income (Percentage of Profit)

Position	Profit % Allotted	Yearly Income (Rand)
10 Full Time Gardening Positions	45	286 089
1 Supervisor	25	158 939

The background is a collage of four images. Top-left: A wooden frame structure on a rooftop. Top-right: A view of Table Mountain and a residential area in Cape Town. Bottom-left: A close-up of blue plastic crates stacked on a rooftop. Bottom-right: A close-up of green leafy vegetables growing in a black plastic crate on a rooftop.

“Building rooftop vegetable gardens in Cape Town will change the lives of our City’s poor and those who buy and eat the fresh,

Rooftop Gardens for Sustainable Livelihoods

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