

Reaping the Fruits from Road Water Harvesting

Major and Mrs. Mwanias story from Kenya



Is farming an activity for the poor? Can one invest on crop farming as their full time job especially in a very dry area like Emali in Makueni County and profit from it? If you think not, then maybe major Mwanias story will sway you otherwise. Major Mwanias farm in Welovea is 14 Km away from Emali. He started farming in 1982, and got involved full time in 1995 after resigning from Kenya Navy.

Mwanias and his wife Esther are now one of the model farmers in Makueni whose excellence in farming is nothing to go un-noticed. The amazing thing is that when I visited his farm on September, one of the driest months; he had plenty of ripe oranges, enough to sell a big batch to fruit companies. His farm is used for research purposes, learning purposes and training other farmers. Mwanias owes all this success to road run-off harvesting and proper soil conservation measures in his farm. He learnt about road water harvesting in 1999 from farmers who lived in Njoro, Nakuru County. In Njoro the farmers divert road water through canals into ponds that were situated close to the roads. It then dawned on him that he could do the same. With a little innovation from his side, he constructed long canals that directed water from the road to his farm. And distributed it by use of a series of channels that take water from the main canal to other terraces. Since then, Major Mwanias acknowledged that his farming has never been the same. He produces in and off season.

Road runoff design

Presently, the road runoff designs in Mwanias farm comprise of a canal that receives water from the side drain, which further separates into two channels where one takes water into the upper section of the farm and the other to the lower section of the farm. At the point where the canal connects to the side drain, it measures 6 feet wide and 2 feet deep and the structure lessens to measure 3 feet wide and two feet deep at the point where the channels enter the farm. Once in the farm, the channels release water to terraces and retention ditches, where water is retained and allowed to infiltrate. These structures ensure that the road water is well distributed to avoid the road runoff from concentrating flow and destroying/eroding the structures in the farm. The entire acreage that receives water from the road is close to 10 acres. The entire road catchment for the Mwanias stretches from Welovea market to their farm, a distance of about 500 metres. They are the only ones who intercept road water into their farms along this road stretch, hence plenty of water is diverted into their farm.



Figure 1: The road catchment towards Mwanias farm is steep and long (over half a kilometer) and therefore water flows very fast in the side drains

The Mwanias take farming as a business and invest much in it. Before each rainy season they first of all ensure that enough can be diverted from the side drains into their farm. They can never have enough water in their farm, therefore they also take water from the other side of the road. They place a barrier in order to guide the water across the road into the farm.



Figure 2: Intake from the side drain into the farm of the Mwanias



Figure 3: Diversion before the road runoff enters the farm

“Whenever it rains, even if it is 9pm in the night; we always go out and ensure all the structures are efficiently working. We also place a 210 liter tank on the side drain that is on the other side of our farm and stones to create a barrier that redirects water onto our side. Sometimes we as well construct a road bump when the rains are near so that all the road water is redirected into our farm”. On the farm they mainly grow oranges, each tree having its own micro-catchment so that it can allow water to infiltrate to the root zone of the trees.



Figure 4: Mwanias shows the micro-catchment at an orange tree

Costs and returns

Mwanias owns a total of 18 acres of land which is situated next to the main road of Emali to Kibwezi. Out the 18 acre piece of land, a total of 10 acres accesses and utilizes road water. He also owns other pieces of land in Emali. The costs Mwanias incurred to construct the road runoff harvesting structures is nothing close to the profit he makes per season. During the interview, Mrs Mwanias remarked that the profit/income that they make from only selling mangoes and oranges during their off season is enough to meet all the land preparation, tillage and planting costs. (I.e Buying certified seeds, buying fertilizer, meeting labor costs during land preparation and meeting labor costs during planting.)

The costs incurred to construct the RRH structures on their entire farm are shown below:

Activity	Cost
Construction of canals/ditches	4,800
Terraces	200,000
Cost of paying the tractor driver to plough the entire farm (They own a tractor)	2,500
Manure (cost of buying manure for the entire farm)	24,500
Labor to apply manure on the entire farm	5,400
Chemicals to remove/kill weeds	15,000
Labour to spray the chemicals	5,000
Chemicals to prevent crop diseases	20,000
Labor to apply the chemicals	5,000
Labor costs for harvesting	6,000
Total	288,200

Crops for sell	Sales (KSH)
Mangoes	350,000
Oranges	1,200,000
Passion fruits	100,000
Mangoes off season	20,000
Oranges off season	100,000
Total	1,770,000



Figure 5: Here Mrs. Mwania explains how they intend to construct a cross culvert on the road to get more water into their farm

Profit

From sale of last season's harvest, Mwania made 350,000 Ksh from sale of Mangoes. Sale of mangoes alone is enough to meet all expenses incurred in his farming and still leave him with 61,800 Ksh as profit. Oranges which are his main income earner fetched him 1.2 million from sale of last season's produce. Earnings from passion fruits totaled to 100,000 Ksh for last season. During the off season, Mwania earned 20,000 Ksh from mangoes and 100,000 Ksh from oranges.

From the harvest of March 2017, Mwania harvested 6 bags of maize, 1 bag of beans and 1 bag of cowpeas. He did not sell any of the cereals but stored them for household consumption. The Mwania's also sell about 10 liters of milk per day whereby a one liter bottle goes for 60 Ksh.

Overall, for a period of less than 8 months, Mwania's total farm earnings exceed 1.77 million shillings which translates to an income of over 200,000 Ksh per month. Mwania sells his fruits to a factory that is based in Mombasa, Kenya. With the County government of Makueni initiating plans of constructing a fruit factory, Mwania now wants to increase his fruit production to make it enough to supply to this new factory as well. To achieve this,

Mwania has requested the County government of Makueni to allow him to put a cross culvert which will allow him to access water from both sides of the road. He is even willing to contribute financially, while this is normally the responsibility of the Kenyan Rural Road Authority. Having already seen the positive benefit of road runoff harvesting, he intends to utilize more of road water to increase his productivity.

Impact

Mrs. Mwania expressed "The only thing we buy from the shops is oil, salt and sugar. Everything else that we consume in this household comes from our farming". This statement summarizes the positive impact that the Mwania's are enjoying from road runoff harvesting. Before when they only did soil conservation measures, like terraces their harvest was only good in-season, when the rains were there. During the dry season there was nothing on the farm. Now that they combine soil conservation with road water harvesting, their harvests increased in-season, plus they got good harvests off-season.

Fruit production has benefited maximally from road water harvesting. The fruit trees produce in and off season. Most produce is in-season, they can harvest



Figure 6: Mwanika smiles as he picks oranges from his farm. Amazingly, the trees produce a lot of fruits even on September which is one of the driest months in Makueni region due to Road water harvesting

three times from the orange trees in one season. Farm portions that access road water also look very different from those portions that don't, it is greener with more mature trees. Mrs Mwanika commented that road runoff harvesting has tripled up her production and she intends to harvest more water from the roads into her farm. Her farm fence acts as a sediment trap allowing water to flow through but silt, soil and other materials are trapped. Each rain season, the Mwanika's also invest 15,000 Ksh for de-silting the road runoff harvesting structures.



Figure 7: Esther showing the trenches guiding the water towards the fruit trees

Livestock also benefits from road water. On the topside of the terraces, Mwanika has planted grass which he harvests and uses to feed their livestock. Also, one of the canals passes through a portion of land where they grow pasture for livestock. Mwanika has as well planted 150 hardwood trees like blue gum which he sells. 900 orange trees of Pixie, Mineola, Washington and Tangerine species; 850

mango trees of Apple, Ngowe and Vadike species; 50 pawpaw trees, 10 lemon trees and 15 avocado trees. He has 5 hybrid cows and 4 bulls. Road water benefits crops, livestock, pasture, hardwood trees and fruit trees. The overall effect is that the family has increased all types of farm production, is more food secure and has increased income from farm sales. Some of the challenges Mwanika faces in their farming include; high labor costs, droughts causing water scarcity, poor market prices (mangoes mainly) and costs of de-silting sediments from road runoff. However, the benefit of road runoff harvesting far much outweighs the challenges and is very profitable. Their story shows that it is possible to do farming and get an income which rewards you for your investment of time, energy and money. The Mwanika's earn over 200,000Ksh from his farm per month and enjoy everything that comes from their farm. Other farmers can learn from Mwanika and improve their productivity.

