



Installation of the SunCulture solar pump at Shadrack Nzioka's farm

# SOLAR WATER PUMP (SWP) RETURN ON INVESTMENT

## CASE STUDY: MACHAKOS COUNTY, KENYA

Winrock International's USAID-funded Kenya Smallholder Solar Irrigation (KSSI) project is working to accelerate commercial sales of SWPs to smallholder farmers. Through collaboration with USAID's Kenya Agricultural Value Chains Enterprises (KAVES) project, KSSI staff met Mr. Shadrack Nzioka, who has farmed since 2006 in Muuani Village, Machakos County. He was using a diesel pump to transfer water to a pond, from which he irrigated 0.25 acre of onions with a treadle pump. In August 2015 Mr. Nzioka invested KES 267,000 in a 27 meter borehole, a water tank, and land clearing.\* He purchased a KES 250,000 SunCulture SWP and drip kit through a KES 200,000 loan from Equity Bank at 18% interest; he will make a monthly loan payment of KES 10,000 for 2 years. Now the SWP automatically fills a water tank connected to drip irrigation. During the first season after purchasing the SWP Mr. Nzioka irrigated 0.25 acres of onions. During the second season after purchasing the SWP, Mr. Nzioka irrigated 0.25 acre of onions, 0.5 acre of passion fruit, and 0.125 acre of tomatoes.

### Benefits of SWP

Mr. Nzioka has increased his irrigated acreage from 0.25 to 0.75 acre, no longer has diesel fuel costs, and is growing two crops per year instead of one. His gross profit is projected to increase by 235% after he pays off the loan.

\*Exchange rate: KES 100 = US \$1

# Return on Investment Analysis

## FARM OF SHADRACK NZIOKA

	Year 1 Actual		Year 2 Actual	Year 3 Projected
	Season 1 (Pre-SWP)	Season 2 (Post-SWP)	Season 2	Season 2 (Post Loan)
<b>Farmer Profit and Loss Statement</b>				
Acreage Planted	Onions 0.25	Onions 0.25	Onions 0.25; PF 0.50; Tomatoes 0.125	Onions 0.25; PF 0.50; Tomatoes 0.25
Total Yield (kg)	3,125	3,500	5,500	8,500
Yield change, %		12%	57%	55%
<b>Total Revenues</b>	<b>312,500</b>	<b>350,000</b>	<b>475,000</b>	<b>720,000</b>
Revenue growth, %		12%	36%	52%

<b>Operating Costs</b>	77,100	83,600	158,450	195,150
Diesel Pump Fuel and Transport	11,000	-	-	-
Pump maintenance	2,000	500	600	1,040
<b>Total Operating Costs</b>	<b>90,100</b>	<b>84,100</b>	<b>159,050</b>	<b>196,190</b>
<b>Gross Profit</b>	<b>222,400</b>	<b>265,900</b>	<b>315,950</b>	<b>523,810</b>
Gross Profit Margin, %	71%	76%	67%	73%
Loan + interest payment (6 months)	-	60,000	60,000	-
<b>Earnings Before Taxes (EBIT)</b>	<b>222,400</b>	<b>205,900</b>	<b>255,950</b>	<b>523,810</b>

<b>Debt Coverage and Investment Returns</b>			
SWP Total Upfront Investment	480,500	5 Yr Return on Investment (ROI)	3.61
Financed by own savings	280,500	5 Yr Internal Rate of Return (IRR)	36%
Financed by Bank Loan (18%, 2 yrs)	200,000	Incremental Gross Profit/Initial Investment	3.91x

Loan Principal and Interest due in 2yrs	240,000	Cash Flow/Total Debt Coverage	3.72x
vs Cash flows generated in 2 years	892,560		