**Report of the Visit to Forbes and Walker, Wanathaviluwa, Puttlam Plantation Site**

**By**

**Lanka Rain Water Harvesting Forum**

**April 2017**

A visit was made by Dr Tanuja Ariyananda, CEO, Lanka Rain Water Harvesting Forum ( [www.lankarainwater.org](http://www.lankarainwater.org)) on the 26th April 2017 to the Forbes and Walker, Wanathaviluwa, Puttlam plantation site at the invitation of Mr Lakshman Abeywickrama of Forbes and Walker. The objective of the visit was to assess the potential for run off rainwater harvesting collection for plantation needs at the site.

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| --- | --- | --- |
| A picture containing silhouette, sketch, creativity  Description automatically generated | **Location** | Wanathaviluwa, Puttlam |
|  | **Land area** | 25 acres |
|  | **Planted area** | 18.5 Acres for Asparagus, 5 Acres Mangoes and Cashew, 1.5 Acres Other plants |
| **Construction worker male outline** | **No. of workers** | 20 |
| **Watering Plant with solid fill** | **Daily water requirement for the Plants** | 300,000 liters (300 m3) for Asparagus, 16,000 liters for Melon. |
| **Handwashing with solid fill** | **Daily water requirement for workers** | 200 liters (10 liters each) |
| Leaky Tap with solid fill | **Present water source** | 4 Tube wells, which are 100 m deep |
| Database with solid fill | **Present Storage capacity** | 12 x 10,000 liter PE tanks |
| **Wilting Pot Plant with solid fill** | **Water shortage for crops** | 16,000 liters for 100 days for melon |

# Potential Rainwater Collection from Roof and Land

A group of blue water drops

Description automatically generated with low confidence

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| --- | --- | --- | --- | --- |
| **Type of  Catchment** | **Area  (Sqm)** | **Runoff  Coefficient** | **Area x Runoff Coefficient** | **Total RWH potential**  **(Liters)** |
| **Roof** | 167 | **0.85** | **141.95** | **213,237** |
| **Land** | 101,171 | **0.60** | **60,702.60** | **91,187,446** |

Table Potential Rainwater Collection from Roof and Land

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Months** | **Monthly Rainfall (mm)** | **Monthly potential rainfall (liters) Roof** | **Monthly potential rainfall (liters) Land** | **Total potential (Liters) from all the catchment area** | **Monthly Demand for workers ( Meter Cub) for 22 working days** | **Monthly Surplus/ (Deficit ) for workers need** | **Monthly Demand for Melon ( liters )** | **Monthly Surplus/ (Deficit ) for Melon**  **( liters )** |
| **JAN** | **14** | 2,030 | 868,047 | 870,077 | 2000 | 30 | 480,000 | 390,077 |
| **FEB** | **165** | 23,422 | 10,015,929 | 10,039,351 | 2000 | 21,220 | 480,000 | 9,559,351 |
| **MAR** | **34** | 4,855 | 2,076,029 | 2,080,884 | 2000 | 2,650 | 480,000 | 1,600,884 |
| **APR** | **52** | 7,495 | 3,205,097 | 3,212,592 | 2000 | 5,429 | 480,000 | 2,732,592 |
| **MAY** | **440** | 62,458 | 26,709,144 | 26,771,602 | 2000 | 60,458 | 480,000 | 26,291,602 |
| **JUN** | **528** | 74,950 | 32,050,973 | 32,125,922 | 2000 | 72,950 | 480,000 | 31,645,922 |
| **JUL** |  | - | - | - | 2000 | (2000) | 480,000 | (480,000) |
| **AUG** |  | - | - | - | 2000 | (2000) | 480,000 | (480,000) |
| **SEP** |  | - | - | - | 2000 | (2000) | 480,000 | (480,000) |
| **OCT** | **4** | 625 | 267,091 | 267,716 | 2000 | (1375) | 480,000 | (212,284) |
| **NOV** | **263** | 37,404 | 15,995,135 | 16,032,539 | 2000 | 35,404 | 480,000 | 15,552,539 |
| **DEC** | **NA** | - | - | - | 2000 | (2000) | 480,000 | (480,000) |
|  | 1,502 |  |  | 91,400,683 |  |  | 480,000 | 90,920,683 |

Note: Calculation were made on the rain fall figures provided by Forbes & Walker

# Recommendation

A group of blue water drops

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## Drinking Water for Workers

The roof area has the potential to provide drinking water need for the workers for 7 month of the year Feb.- June and Nov to December. Therefore, storage is needed for only 4 month from July to October. Roof Water harvesting system with storage tank of 8 m3 or 10 m3 would be adequate to supply 10 liters of water per worker, throughout the dry period.

## Water Requirement for Melon Plantation

For the Melon cultivation which require 16,000 liters per day for 100 days cultivation cycle (according to staff at Wanathavilluwa) which is 1,600,000 liters or 1600 m3 water/storage is needed. Since the potential run off from the land is 90,920, 683 liters, it can be met if adequate storage for the dry period is provided. Since a tank of 1600 m3 capacity is expensive to construction, the best option is to store water in natural or constructed pond.

**The Volume of the pond will have to be around = 1,920,000 liters (allowing 20% evaporation loss)**

**Therefore, Size of the pond will have to be: 80 ft wide x 85 ft length and 10 ft depth**

**Surface area of the pond: 6,800 ft2**

## Locating the ponds

There are two potential locations to construct the ponds, where run off water from the land was passing through. One is near the factory building where already some excavation had been done➊, other was further towards eastern side of the land ➋

|  |  |
| --- | --- |
|  | Water tanks |
|  | Buildings |
|  | Bore well |
|  | Asparagus planted area |
|  | Existing excavated area |
|  | Suggested location for 2nd pond |
|  | Roof water harvesting tank |

Slope

1

2

Slope

Figure Locating the ponds.

**Stage 1:**

1. Extend the existing excavated area near the factory building. Pond area of 20 ft length x 20 ft width 10 ft depth will hold a volume of 24, 920 gallons or 113, 200 liters. However, this volume of water can be used only for 7 days requirement of the melon plantation. The pond has to be lined up, since the soil is sandy and there would be high seepage of water into the ground. The length of pond liner needed is 41 ft width x 41 ft length. For purchase of pond liners please contact Hayleys Group Ltd. (contact name Mr Sumith Herath 0772308836/0112688960)
2. Collect the roof water from the factory roof in to a 10 m3 PE or Ferrocement tank with first flush system and filter ( fig. 1) . This can be used for daily drinking water requirement of workers. The over flow from the tank should be directed to the pond.

**Stage 2**

Construct the 2nd pond after observation of water collection and retention in the 1st pond.

The pond of this nature will have addition benefits where it can be used for rearing of freshwater fish.

There are points to be noted when constructing such retaining ponds.

* Place silt/sediment traps on the path of runoff water collecting into the pond (fig 2)
* Make the sides of the pond sloping rather than vertical.
* Ensure the pond area is free from sharp stones, place underlay (sand layer) on the base and sides of the excavation.
* Pond edging has to be properly anchored to the ground.
* Pond should be fenced where possible to prevent access to animal and people.
* Spillways/overflows should be constructed to minimize the risk of overtopping.
* Soil erosion in the catchment area should be checked with soil conservation measures.

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| Description: Related image | A picture containing building, outdoor, waste container, tree  Description automatically generated |
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Figure Different type of silt traps Figure Rain Water Harvesting system and its components.