

# **On climate change, job creation and sustainable food supplies**

**Presentation prepared for 38<sup>th</sup> Road Pavement Forum  
13 November 2019, Pretoria**

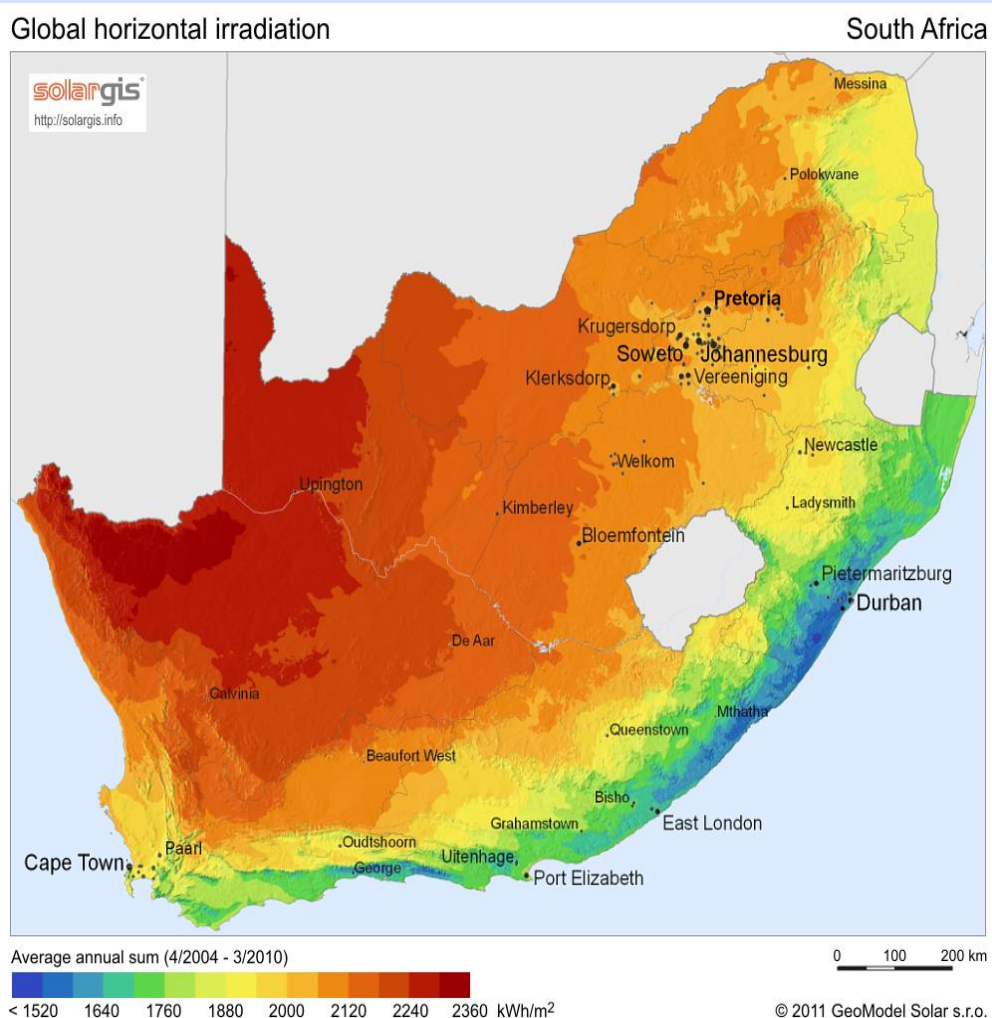
**Prof Alex Visser and Sally Hall**

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# **Current pressing needs – scope of presentation**

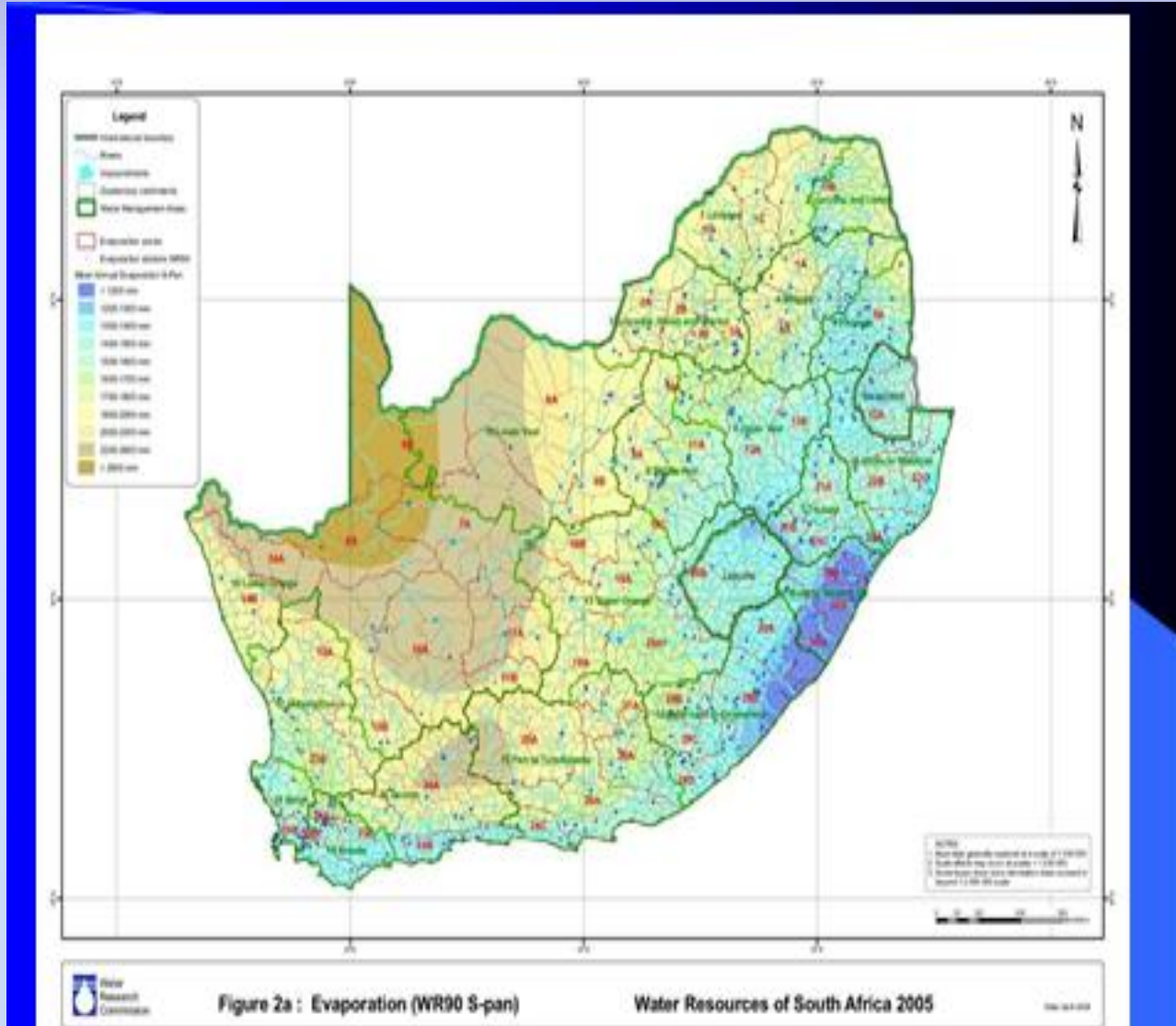
- **Handling severe climatic events (heat waves, flooding) as a result of climate change and the effect on infrastructure.**
- **Employment creation especially in rural areas.**
- **Food security, especially in rural areas with subsistence farming.**

# Lesotho is on “wrong side of escarpment” to red drought areas



- Red area is between 50 and 500 mm rain a year
- Evaporation in this red area is +2 metres per year
- We are depleting our aquifers of water laid down in the Ice Age
- Roads runoff to evaporation

# Rain fall evaporation run off WRC maps (non Drought years)



## **Solution: Road/drain to control runoff**

**Water collected on 1km long road**

**1 sq m = 1 mm rain = 1 litre water**

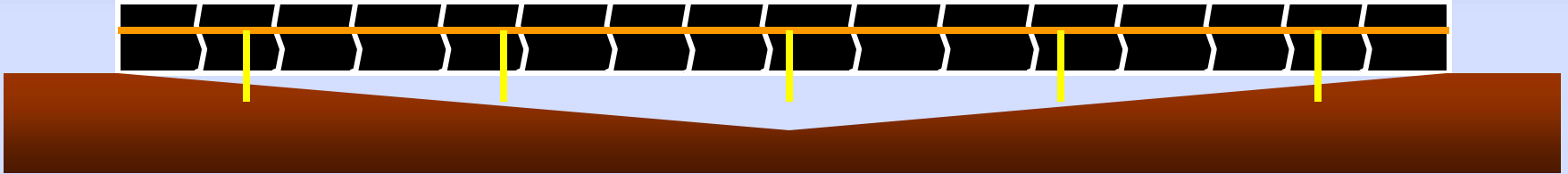
**100 mm rain per year**

- Rural roads constructed in the Transkei by SANRAL 6 metre wide by 1 km gives 600 m<sup>3</sup> water per annum per 100 mm of rainfall**

# **Help solve South Africa's water problems**

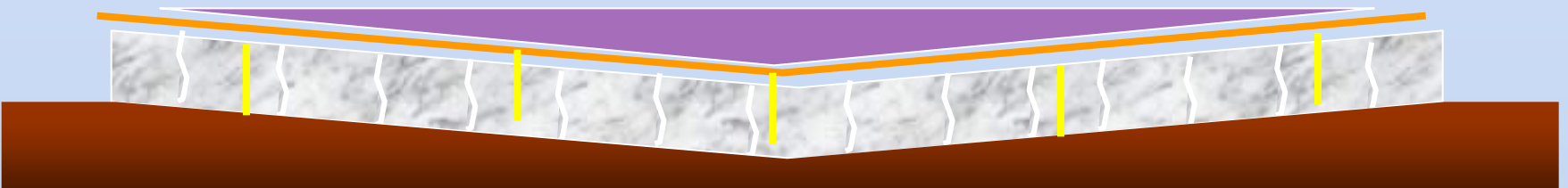
- **Put in a dam and filter at bottom of each Hyson 3 D Bubblelock road/drain and take the water out with trucks or pipes**
- **This is the best way of collect water that would normally run off the shoulders and erode the edges and just evaporate**
- **We help all the communities and use ladies as SME to install road/drains according to proven designs.**
- **Forecasts expect further droughts so this will be the roads department helping the rural areas with water for DWA**

# Double rigging follows any contours



The rigging allows the cell mat to be pegged so as to hug profiles.

Without the rigging there is a danger of bridging and a concrete slab forms under the cell mat. Or a river of water under the cells.



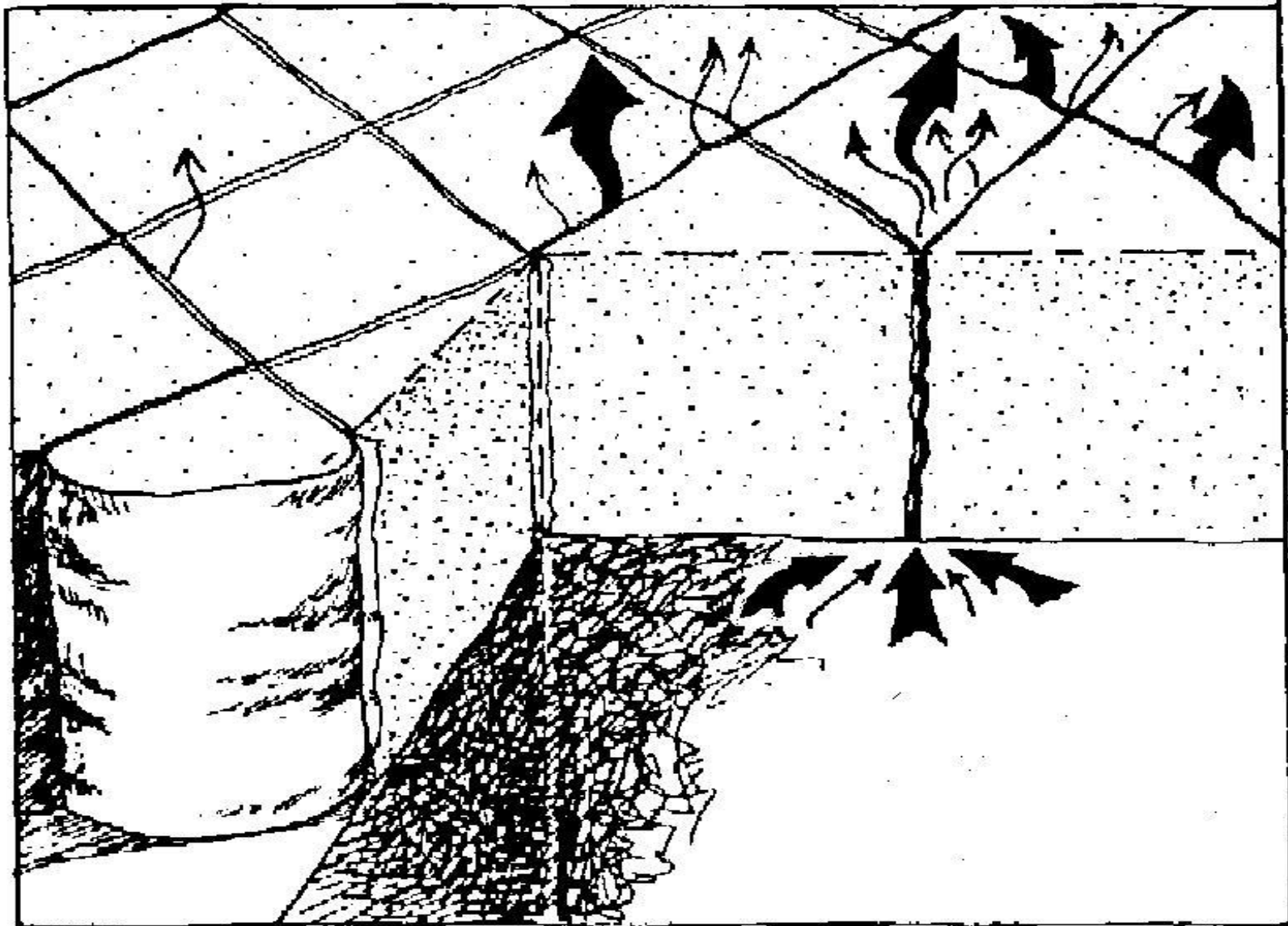


# 3D BUBBLELOCK ON EACH WALL





# Hydrostatic pressure release



# **Lowest point of each road put in a small dam**

- The dam can be steep on 3 sides from the road and shallow on one side to allow humans and animals to collect water. Install filter to remove silts and rubbish**
- Stops water on edge of road with all the associated problems**
- Use dam for aquaculture – job creation for fish farming and food security.**
- Use dam for small scale hydro-electric power generation.**

**If necessary the dam can be lined with geocell system. 32 ton Bell trucks 24 degrees are used to desilt Steelpoort reservoirs**





# Road and drain combined









# **SME from local ladies groups**

- **Only small equipment required so that “Ladies “ can do 90% of the work**
- **The new SME made from teams who are trained on site allow for them to run site as the ladies normally run the stokvel and funeral moneys and are known to be honest.**
- **The authority after training only have to measure up every week and pay the teams for work completed.**
- **After each team is formed they can all bring in one youth and the mother pays them**
- **These local teams will do the construction, maintenance (if needed), and do the farming – conventional and aquaculture. Also plant trees such as in Sahara and Atacama deserts for carbon credits (R120 per ton, 10% annual increase).**



**Picture showing Sahel wall in Sahara desert**



# **Deaths by blow outs of tyres is bankrupting the RAF**

**Providing tuck-ins and reduce shoulder drop-off – source of many vehicle accidents. Part of the maintenance programme.**

- The result will be that taxis and insurance companies will not have such a drain on their accounts.**
- People will not be maimed or killed due to accidents of tyres blow outs**
- Stops animals going to side of road for green grass in an area where fences have been stolen**



# Road/drain lanes run offs allow land scape gardeners design forests



# Finish and riding surface

## Widening an existing road:

- **Place a 10 mm board in the cut while working the 3D Bubblelock up to the level of the existing road and board with a special high slump high strength mixture mixed by volume in wheelbarrows on site**
- **After initial set, remove the board**
- **Fill slot twice with anionic bitumen to make a seal between old and new surfaces which is level with the existing road**



**Join between old road and new widening.  
Plank to keep edge straight**



# **Sparkling rain water falls from dams into the rivers**

- **Flows all year round in some areas**
- **No smells**
- **White sound**
- **Only pollution is old trees**
- **Rock cascades in front of water falls**
- **Small dam behind water fall**
- **Attracts animals and people to get water**





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# **A consortium is available to build road/drain systems and maintain for 10 years**

- **Lafarge ready mix special pumpable grout**
- **Hyson 3D Bubblelock**
- **In-house design**
- **Teichmann earth works to support SME's**
- **Marsh PI Insurance**
- **Local Ladies teams**

**BBE and training kits to employ 20 people  
To date HC trained 6500 teams and more than  
94 500 people received two weeks training**

- Kit made up of : Trailers and lockable lid.**
- 200 and 100 litre drums with big mouths inside each other with lockable lids**
- Tool box = 4 lb hammer, = hack saw & blades = hose pipe = hand pump = straight edge**
- Shovels = pick axes = Rake = bull float = house broom = garden broom. Reed brush**

# Supplied with every project

- **Slump cone tester and base = flat cubes that fold up into cubes**
- **Plastic cubes leave in cube and test at 7, 14, 28 days**
- **Effect of Calcium chloride for quick set**
- **Scaffolding planks or corrugated iron**
- **Sponges for good end to pour & Superplasticiser**

# Hyson trained people all over the world

- **South Africa all provinces**
- **Namibia –Botswana – Zambia - Mozambique – Mauritius-  
Angola –Congo**
- **Chile – Uruguay – Australia – Kiribati - Egypt – Ghana-**

# **Problems with training people for jobs is that work does not last long enough to get going**

- Workers pay UIF but do not get anything back as job is too short if under 6 months**
- If you want one person to manage 20 jobs the project should last at least 3 years and then they will flock and you will get the job at a reasonable costs. Middle aged ladies are hard working and run Stokvel and Funeral societies**
- These people get a short term payment but no long term development of skills to be come contractors**



# **Training Team leader to become a business person**

- **How do basic book keeping and marketing**
- **How to cost a job**
- **How to tender**
- **Staff Contracts use department of labour contracts**
- **UIF forms**
- **WC forms**
- **PAYE Forms**
- **VAT**

# **Most important for cash flow that they get paid weekly for the Sq m installed**

- **Ensuring that they get paid weekly of sq metres completed**
- **Get a reputable bookkeeper to make sure that the CO-OP is making a profit and staff are paid by the square metre to a set standard**
- **5 members of CO-OP**

# **SME work systems**

- **The main contractor distributes the sand, cement and water along the site at 10 metre intervals and enough scaffolding planks to run the project Hyson Cells 3D BubbleLock with stays**
- **Earth works done by main contractor and only 5 mm sand blinding layer done by sub contractor**
- **Sub Contractor CO- OP does the filling of the Hyson Cells**



# **Other items that team can learn to do when contract is finished**

- **Make concrete blocks and bricks**
- **Stepping stones**
- **Pavers mock rock**
- **Flower pots concrete painted**
- **Make fire rings instead of Eskom or burning trees**
- **Hot stoves and ovens**
- **Garden furniture**
- **Polished concrete basins with shiny finishes**

# Contact Hyson Cells 3D Bubblelock

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