

TASK FORCE ON GLOBAL FOOD SECURITY

Changing Public Policy and Opinions on Global Security



FINAL REPORT

November 2011



PLANT PATOLOGIE
PLANT PATHOLOGY



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
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1. Rational

South Africa plays a leading role in the economic growth of Africa and the University of Pretoria (UP) has more recently become the preferred choice for postgraduate studies in agriculture on the continent. With rapidly changing Sanitary and Phytosanitary (SPS) requirements and multiplication of food safety and quality standards, developing countries find themselves in a difficult situation. Most African countries including South Africa, lack adequate human capacity and expertise in critical areas such as pest risk assessment, food safety, postharvest technology and quality standards. Capacity within this knowledge base is lacking and expertise is required to provide technical input into an effective phytosanitary regulatory framework in compliance with the Agreement on SPS Measures of the World Trade Organisation (WTO). Currently, South Africa and the rest of Africa are not training adequate numbers of plant pathologists and are not able to supply government or industry with appropriately trained young people to ensure the countries' relevance in international trade. Countries are therefore not able to address the challenges of new SPS measures and food security. At the core of this is a negative perception around agriculture in general, and a lack of public awareness of this unique opportunity and field of study that exist.

Plant Pathology is currently categorised in South Africa as a scarce skill and a once thriving Southern African Society for Plant Pathology (SASPP) has seen its membership dwindle. In addition, the SASPP annual conference is now only held every alternate year due to lower attendances of its members. Once prosperous in terms of undergraduate student numbers, departments teaching plant pathology in tertiary educational institutions has reported a major drop in student numbers. Although this trend can be regarded as a global phenomena, the impact of this in developing countries is critical, as agriculture and food exports are major driving forces in the economy and food security is a major challenge. Currently, only four Universities in South Africa offer fully fledged plant pathology degrees. In Africa, the number of Plant Pathologists trained at a postgraduate level is even more critical and requires substantial investment through bursaries and funding incentives.

One of the objectives of the ISPP (International Society for Plant Pathology) is to affect changes in public policy and opinions on global food security. The University of Pretoria was selected to address this objective by improving awareness of the impact and importance of plant disease. This was accomplished through a project that focused on spreading the message of food security and raising awareness about Plant Pathology in countries in Africa. The University of Pretoria was proposed due to its central position in terms of transport networks, academic standing and its number of students (being the biggest residential University in Africa and having the largest Agricultural School on the continent). The University of Pretoria also employs the largest number of plant pathologists in Africa. Funding was used to establish Plant Pathology on Wheels, a mobile lab for school and public awareness campaigns within sub Saharan Africa.

2. Objectives and Deliverables

The following proposed objectives were identified:

- 1) To develop marketing material such as brochures, banners videos etc, for the public awareness programme and to attract plant pathology students for both under and postgraduate training programmes.

Deliverable: A Plant Pathology marketing board game was re-designed and other marketing material was developed such as a flyer about “My future career” (refer to Fig 49)

- 2) Food Security / ISPP / Plant Pathology DVD made by professional videographer

Deliverable: A marketing DVD is being developed and will be released on Youtube end of 2011 (refer to Fig 45 and 46). A video of an Agricultural Career Fair in which UP’s Plant Pathology division features was also released.

- 3) To purchase a trailer and convert it into a Plant Pathology and Agricultural Science Information and demonstration mini laboratory.

Deliverable: A trailer was purchased and converted into a mini lab (refer to Fig 29 and 30).

- 4) Tour with undergraduate students (marketing plant pathology and food security)

Deliverable: A tour with undergraduate plant pathology students was undertaken to Mozambique, Swaziland and South Africa (refer to Fig 1 to 28).

- 5) To establish a Food Safety hub and Plant Pathology network first within SADC and later to role it out to other African countries.

Deliverable: A Theme Cluster on SPS within the new Institute of Food Security, Nutrition and Well-Being has been successfully established at the University of Pretoria. The **Food Safety, Biosecurity, Public Health and Regulatory Control** cluster provides an important base line supportive network and structure for safe food, biosecurity, free trade and market access. This Institutional Cluster will not only address the critical elements of food safety across disciplinary fields of environmental, plant-, animal- and human health, but also SPS related trade challenges that are essential for economic growth and global competitiveness. By strengthening capacity and innovation in the various complementary fields identified within this cluster, the Institute will be able to directly contribute to more effective regional governance and food control.

3. Management structure

Patron:	ISPP Food Security Project
SA Group Project leader:	Prof Lise Korsten
Project organiser:	Willeke de Bruin
Building and maintenance specialist:	Amanda Redmond
Blog and facebook:	Willeke de Bruin and Catherine Savage
Popular articles for local journals:	Prof Lise Korsten
Marketing material:	Willeke de Bruin and Prof Lise Korsten
Photography:	Willeke de Bruin, Prof Lise Korsten and several students
Video footage of the tour:	Werner Rossouw
Video footage for professional DVD:	André du Plessis (University of Pretoria, Department of Telematics)

4. Deliverables

4.1 Tour

A group of plant pathology scientists and undergraduate students from the University of Pretoria (UP) went on a Southern African Development Community (SADC) tour to share a “**Basket full of knowledge**” of “**Food Security challenges in Africa**”. The group paid a visit to commercial farms,

informal markets and food enterprises as well as small scale farmers in South Africa, Swaziland and Mozambique. The group visited rural villages and schools to share knowledge on how to reduce postharvest losses, to discuss the importance of food safety and hygiene, to assess sustainable water resource management, crop production and - protection practices and other challenges.



Fig 1 Plant Pathology students going on the International Society for Plant Pathology Food Security tour

The overarching purpose of this tour was to share knowledge and experience at different levels and within several themes of the International Society for Plant Pathology's (ISPP) Food Security programme. Two vehicles travelled through SADC with a mobile laboratory that was used to illustrate to farmers, school children and local communities the concept of "*Microbes are everywhere; see them in action*". The lab was used to demonstrate simple water, plant and food tests that can be used by teachers and farmers to address food security challenges or to share knowledge.

The SADC food security and **knowledge sharing** project is part of a global initiative of the ISPP to educate young people, rural communities and small scale farmers about food security issues. The ISPP **Task Force on Global Food Security** has funded this project i.e. "*Changing Public Policy and Opinions on Global Food Security*". This tour formed part of this initiative "**Taking science to the community**" and represents one of the project deliverables.

Tour overview

The tour started on the 2nd of October 2011, departing from the University of Pretoria. Sixteen excited plant pathologists embarked on the journey of a life time. The first overnight stop was at a farm called "Laughing Waters" where the group stayed in a backpackers hut. Some of the first litchi trees in South Africa have been planted on this farm in 1912. Additional plantings in 1946 firmly established this as one of the biggest litchi farms in Africa. This farm has recently been handed over to government as part of the land reform system in South Africa.

The group entered Swaziland through the Jeppes Reef border and met Mr Similo Mavimbela and a group of representatives from the Swaziland's Ministry of Agriculture. They acted as tour guides and translators in Swaziland. The group visited two high schools: The first school i.e. Etimphisini Central High school was neat, organised and very well managed with well behaved and enthusiastic scholars. Clear leadership was evident and the head of the school showed the group their numerous sports trophies and awards. The plant pathology students set up the mini-lab and distributed information booklets, pens, writing pads and lab coats for the agricultural teachers and scholars at the school. After a warm welcome, the children were told about food safety, the job of an agricultural scientist, the importance of good soil and the exciting future career they could have in agriculture and particularly in plant pathology. They were shown *Penicillium* spp. on prepared glass slides under the microscope. Afterwards, the group set off to visit Mayiwane High School (in the pouring rain) and were greeted with as much enthusiasm and eagerness to learn. Similar material and knowledge were shared and a question from one of the school girls surprised everyone: "How would global warming impact on plant diseases?"

The day continued with a visit to a group of small scale farmers who are part of the Mkovo rice scheme, where they produce rice and other vegetable crops. The farmers were asked about the plant disease problems they face and it was found that tomato wilt and the drying out of rice tussels are their biggest challenges. They told the group that they have little knowledge of chemical control and the only practical control method they have is crop rotation. They were handed some books, hats, seeds, and chemical protective suits for personal use. To see their gratitude was a humbling experience and a great need for future collaboration was identified. It was mentioned by the farmers that they have a need for follow-up visits and this should be part of outreach activities. The group then visited a commercial citrus and banana farm, Ngonini Estate, producing for export. At the banana packhouse a few students tried slicing banana bunches of the main stalk - not as easy as it looks! Overnight camping in Hlane Royal National Park in Swaziland was wonderful, but wet, while Zavora lodge in Mozambique was exciting with a bon fire next to the sea and horse riding on the beach for the more energetic!

In Mozambique the group visited a school in Inhassune, run by a charity called “Sing with me happily” (www.singwithmehappily.com). The incredible community and outreach work with small children done by Rebecca (Becky) McLea is inspiring and we would like to encourage people to support this wonderful NGO. The mobile lab was set up and the school children were told what a fungus is and how it grows on a Petri dish. They were given books and with the help of a translator, active participation, singing and dancing with the locals took place. The group set up camp just behind the school in the rural village. The following day the group visited two local farmers and four small scale farms, producing maize, onion, cabbage, potato and tomato. This experience was extremely valuable since the farmers could share their biggest challenges regarding pests and diseases. The farmers demonstrated irrigation systems, discussed their pest control strategies and markets. Transport to the market is often in own vehicles or by carrying the produce. Lack of knowledge and technical support have resulted in years and years of incorrect spraying. Extreme levels of pesticide resistance was noted and in one case 100% losses was recorded in a cabbage field. Currently these farmers already spray more than twice a week. Later the group met Jon McLea, a University of Pretoria Alumni graduate in MSc Horticultural Sciences. The farm he works on is owned by an Italian fuel company that is looking into options for biofuel and grows jatropha plants. Meeting the local community, farmers and school children were one of the most humbling experiences! All participants of the tour are grateful to the people of Swaziland and Mozambique and most importantly to the ISPP for making this project possible!



Fig 2 Departing from the University of Pretoria



Fig 3 Entering Swaziland at the Jeppe's Reef border



Fig 4 Taking the food security and “plant pathology as a career” message to the schools in Swaziland (Etimphisini Central High School and Mayiwane High School)



Fig 5 Prof Korsten sharing a moment with one of the learners



Fig 6 Proud head master of Etimphisine Central High School



Fig 7 Addressing pupils of Mayiwane High School



Fig 8 -10 Discovering the magic of microorganisms



Fig 11 Headmaster of Mayiwane High School (left) with two representatives of the Swaziland Ministry of Agriculture



Fig 12 Addressing small scale farmers in Swaziland



Fig 13 and 14 Plant Pathologists in action in Swaziland - solving root disease problems



Fig 15 Handing out caps and booklets to the small scale farmers in Swaziland



Fig 16 and 17 Visiting a commercial farm in Swaziland, Ngonini Estate, and trying to cut bananas - "not so easy Catherine!" (Ms C. Savage), and packhouse workers enjoying the moment



Fig 18 and 19 Explaining what a fungus is to the scholars of Inhassune, Mozambique



Fig 20 and 21 Preparing the display in the mobile lab



Fig 22 and 23 The fungus up close and personal



Fig 24 to 26 Handing out seed packets to small scale farmers in Mozambique and sharing knowledge with the community



Fig 27 and 28 Reaching out to small scale farmers in Mozambique

4.2 Mobile lab

A second hand trailer was purchased and converted by Ms Amanda Redmond (technical assistant for Prof Korsten, and funded through the ISPP project) into a mini lab to demonstrate plant pathology activities and create food security awareness. The trailer was branded with the ISPP and UP's Plant Pathology logo's and reflected tag lines such as *"Food Security for Africa"*, *"Plant Pathologists feed the nation"* and *"Keeping your plants healthy"*.



Fig 29 and 30 The mobile lab set up in Inhassune, Mozambique - it attracted so much attention.

4.3 Marketing material and exposure on the tour

The message of the tour was based around the concept of a *"A Basket full of knowledge"*, which covered several themes:

Theme 1: Clean water: *"Good nutritious food starts with adequate, safe, quality water"*

"Globally there is water enough to produce food for everybody to 2050, but regional differences divide the world into three groups: 1/3 water surplus countries able to export; 1/3 deficit countries able to import; and 1/3 dry deficit countries, still too poor to be able to pay for the import needed."

"One fundamental challenge for growing enough food for tomorrow's world population will be to explore the hidden water in the soil and improve the productivity of that water." (Quoted from the ISPP website, Food Security project)

- Activity:** *“Protecting our water for healthy, happy people and safe food”*
- Action:** The mobile lab was equipped with a water testing apparatus to sample agricultural water sources.
- Research project:** Currently the Water Research Commission (WRC) is funding a research Project K5/1875/4: *An investigation into the link between water quality and microbiological safety of fruit and vegetables from the farming to the processing stages of production and marketing.*
- Hand out material:** The Gauteng Department of Agriculture and Rural Development (GDARD) supplied foundation level learner’s books on water, which the group handed out to school children throughout the tour. The book focused on *“The wonder of water”* and guidelines on keeping it clean.

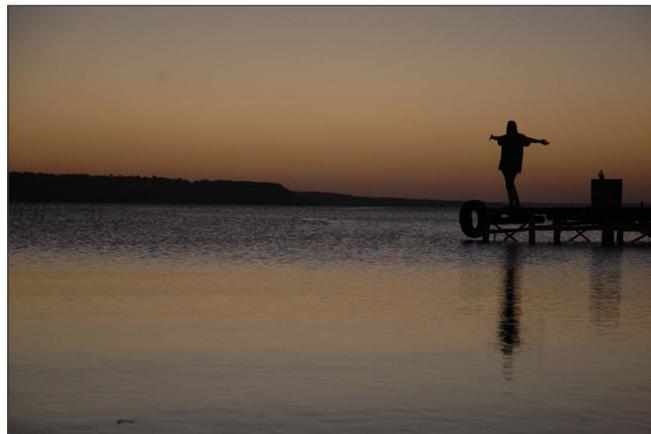


Fig 31 and 32 Water providing relief after a hot day



Fig 33 and 34 Agricultural water testing in the bush in Swaziland done by Willeke de Bruin

Theme 2: Soil Health “Healthy soils give healthy nutritious food”

“Soil is the most basic of all natural resources. Its quality, properties and processes which affect all terrestrial life, determine the health of plants, animals and people who depend on it. Consequently, decline in its quality, because of land misuse and soil mismanagement, reduces ecosystem services such as production of food.” (Quoted from the ISPP website)

- Activity:** *“Protecting our soils and keeping it healthy”*
- Action:** Students explored the soils of Africa.



Fig 35 and 36 Looking at soil and investigating root diseases in new *Jatropha* plantings in Mozambique

Theme 3: Food security: *The essential “Food Basket” for a healthy nutritious life style*

“The fragility of the world’s food supply and the lack of access to an adequate nutritious diet by around 1 billion people should be the concern of all. We need to devote far more resources to agricultural production and secure the crop postharvestly to ensure availability of healthy safe food for adequate diets and general well-being.” (Quoted from the ISPP website)

Activity: “Grow your own veggies”

Action: Pamphlets were handed out to show people how to grow your own essential crops. This pamphlet was obtained from the Food Gardens Foundation (www.foodgardensfoundation.org.za) and translations were handed out in English, Zulu and Portuguese. Vegetable seed packets were distributed to small scale farmers and the community in Mozambique and Swaziland. These seed packets were provided by the local seed distribution companies Sakata and Agricol.

Learner’s Books on “Food” and “Air”, donated by GDARD, were distributed to people from the local communities and school children.



Fig 37 and 38 Handing out books to eager learners

Theme 4: Crop Protection, Postharvest Quality and Food Safety

“Food insecurity is a major cause of human suffering, lack of economic growth and instability.

In spite of international agreements to reduce by half the number of food insecure people, the number is still increasing.” (Quoted from the ISPP website)

South African expert: Prof Lise Korsten. Department of Microbiology and Plant Pathology, University of Pretoria, lise.korsten@up.ac.za, Tel: +27 12 420 3295; Fax +27 12 420 4588. Expertise: Postharvest Pathology, Food Safety.

Activity: *“Retain the postharvest quality of your fresh produce and ensure its safety ”*

Action: Fresh fruit and vegetables were collected from the local market and assessed for quality. People from the community were shown decay symptoms and what pathogens look like under the stereo microscope.

Bayer donated books to illustrate good spraying practices and to explain the storage and disposal thereof. The use of protective clothing (donated by DuPont) was demonstrated and suits were donated to the community and small scale farmers.



Fig 39
Prof Korsten demonstrating the use of protective chemical clothing



Fig 40 Fresh produce road side sales in Mozambique and Swaziland

Theme 5: Sharing our knowledge

“Food security is deeply connected to important global concerns such as climate change, energy security, human health, and sustainable development. We welcome the launch of this new journal as a forum for interdisciplinary discussion of food security matters.” (Quoted from the ISPP website)

Communications network: Link into ISPP Food Security. Pamphlets on common plant diseases, the importance of studying Plant Pathology and the booklets mentioned earlier, were handed out throughout the tour, thereby sharing the knowledge obtained by the group and that of the sponsors.

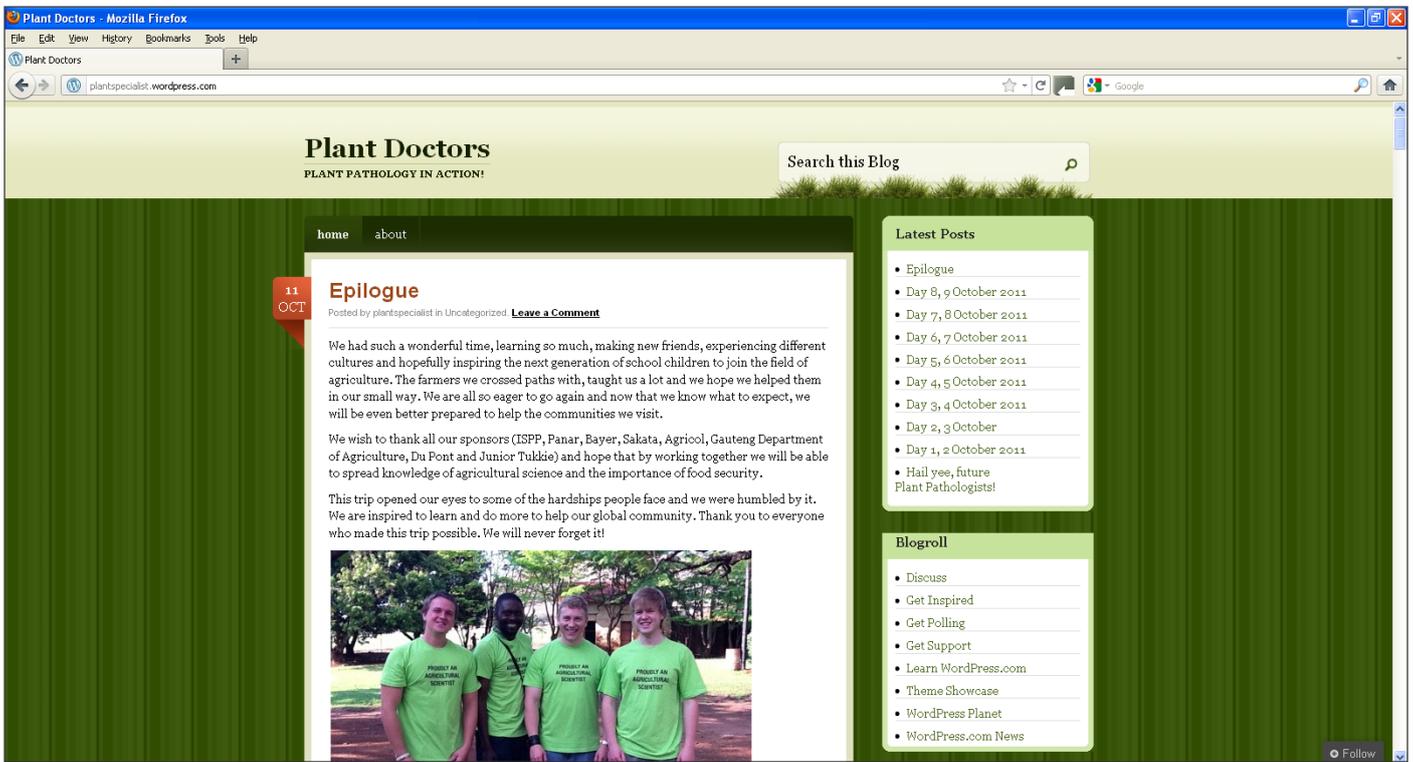


Fig 41 Tour progress updated on the blog



Fig 42 Facebook page created for marketing Plant Pathology

The tour progress was documented on a blog that was created specifically for marketing purposes (www.plantspecialist.wordpress.com) and a facebook page ([plant pathology at UP](http://plantpathologyatup)) was created to raise awareness with regards to plant pathology issues and to link up with the blog.

In addition the group celebrated two important World Days:

October 16th 2011: World Food Day to commemorate the founding of the United Nations' (UN) Food and Agriculture Organization (FAO). World Food Day is a global observance day to achieve the following:

- Food security in a sustainable manner;
- Global awareness of the importance of agricultural food production and international trade;
- Heightened public awareness regarding food safety, hygiene and water security;
- Technology transfer and knowledge sharing on issues relating to postharvest technology and crop protection;
- Addressing the knowledge gap and critical skills shortage in a regional context with a focus on agricultural specialisation fields i.e.: plant pathology, soil science, horticultural science.

October 15th 2011: Celebrating the **UN International Day of Rural Women** to honour the role of rural women and to recognize their importance in enhancing agriculture and rural development worldwide.



Fig 43 and 44 Celebrating World Food Day and wearing green bandanas for cancer victims

Other sponsors for the Food Security Project:

Company	Item sponsored	Person/Institution benefitted
Agricol	White grain maize seed	Small scale farmers in Mozambique and Swaziland, rural people from Inhassune
Bayer	Caps, Notepads, pens, "Responsible use of Pesticide "booklets	Rural people from Inhassune, small scale farmers in Swaziland, school children in Inhassune, students on tour
Du Pont	Coverall pesticide protective garment	Small scale farmers in Mozambique and Swaziland, rural people from Inhassune
GDARD (Gauteng Department of Agriculture and Rural Development)	Booklets on food, air, water, annual report	Primary school children in Inhassune, high school children in Swaziland, small scale farmers in Swaziland
Junior Tukkier, UP	Caps, shirts, mini flash lights, mini-booklets on maize diseases	Students on tour, small scale farmers from Mozambique
Pannar	Caps, shirts, mini flash lights, mini-booklets on maize diseases	Students on tour, small scale farmers from Mozambique
Sakata	Various vegetable seeds	Rural community and farmers from Mozambique
Plant pathology lab, UP	Lab necessities, marketing material, lab coats, T shirts, pens	Small scale farmers in Mozambique and Swaziland, rural people and primary school children from Inhassune, students on tour, teachers at schools in Swaziland and Mozambique

Feedback on the tour

What the tour meant to the students:



“If anything, the tour made me realize the importance of our lives, the difference that one can make being amongst friends, colleagues and fulfilling a dream, together. I may have gained a tiny bit of knowledge on some plant diseases, processes involved in farming etc., but the most important for me is the experience that I have gained, about life, living life and making a difference in the lives of the people around me. To me that is more valuable than anything at this stage, as it is something that I will take with me on my life’s journey.”

- Werner Rossouw

“Our tour might have started as a type of outreach to the people in Africa and to show the kids what they can achieve in life, but it turned out the people of Africa had more to show and teach us than what we could ever show them...They taught us the true meaning of Hope...

We got a chance to really experience life the way the small scale farmers live every day and I’m extremely humbled by it. I believe that all of us that went on the tour finally appreciate the gifts we receive in life and not expect it as a birth right anymore.”

- Melissa Grobler



“Visiting the small-scale farmers struck a nerve. I felt something move inside me. I witnessed the rebirth of my passion for plant pathology and agriculture in general....

I realised that food security is not going to be achieved by supporting commercial farmers alone. We, as agricultural scientists should start with the small-scale farmers. Farmers who still depend solely on the soil and the natural elements, whose crops are meticulously planted and harvested by hand. Because if we can help these farmers, we can feed a community and if all the communities in Africa are fed, then we have achieved food security.”

- Brigitte van Dyk



“On this tour we discovered a lot about our future career and what it entails. It was a very educational tour and we know now that the true meaning of plant pathology means working towards a better tomorrow (not only for us, but for everybody). Thank you for the amazing opportunity!

‘Plant pathologist’ to us stands for:

P = Producing diseases free food, L = Loving the earth, A = Assisting farmers, N = New experiences, T = Teaching the community,

P = Pest control, A = Agricultural scientists, T = Teamwork, H = Hard working, O = Organizational skills, L = Leading the way to a better tomorrow, O = Organic production of food, G = GMO production, I = Integration, S = Soil is life, T = Time of our lives!!”

- Lizindi van der Kolff and Micala van der Watt



Identified needs:

Throughout the entire tour, a few issues stood out. One of these was the lack of knowledge regarding the application of pesticides. Many of the small scale farmers are not exposed to chemical company representatives that provide them with advise and products. Education on safe and responsible pesticide usage was a common need identified by farmers in Swaziland and Mozambique. It was found that due to lack of knowledge and support, the farmers were spraying their crops far too often, leading to pesticide resistance (eg. Chlorpyrifos applied on cabbage twice a week).

These small scale farmers also did not have access to proper protective clothing or training on handling chemicals safely. Additionally, often they cannot afford to purchase proper protective clothing, thereby exposing themselves and those around them to hazardous chemicals. The fresh produce delivered onto the local market is also not tested for pesticide residues and one may only wonder what the long term impact is on the local population.

There was a great need, especially amongst the small scale farmers of Swaziland, to get exposure to more information and marketing opportunities in order for them to sell their produce to bigger markets.

Additionally a lack of follow up and sustainability of NGO support was identified as a major concern for locals. They would like to see that people return and follow up to ensure sustainability of the system.

4.4 Video / DVD

A professional video is specifically being developed to market plant pathology and food security and will be completed in December 2011. The video is specifically targeting school children and young adults who still need to make a career choice. The video will be released on Youtube by the end of 2011.



Fig 45 Making the plant pathology/food security video with Noncy Gomba (PhD Plant Pathology student) doing a citrus postharvest trial at the University of Pretoria, South Africa.



Fig 46 In field shots

4.5 Agricultural Career Fair

The Faculty of Natural and Agricultural Sciences at the University of Pretoria (UP) in conjunction with the Produce Marketing Association (PMA) Foundation for Industry Talent launched a Horticultural/

Agricultural Career and Bursary Fair. This was an initiative of the PMA in South Africa as their mission is to attract, develop and retain talent for the fresh produce and broader agricultural industry.

The Department of Microbiology and Plant Pathology was one of the participant exhibitors in UP's Faculty of Natural and Agricultural Sciences and set up a lovely exhibition stand where marketing material was handed out to passers by and where Plant Pathology in action was demonstrated.

The Fair with the theme "Sustainable Food for Life" was held on Thursday 22 September 2011 at the UP Conference Centre. The target group was mainly first-year BSc students (there are more than 1200 of these students), many of whom have not yet decided on an area of specialisation from their second year onwards. However, agricultural students currently registered at both the undergraduate and post graduate level also attended this Fair, and a limited number of scholars that have a specific interest in agriculture were also invited. Companies and organisations had the opportunity to showcase their products, services, career opportunities including internships, and bursary schemes to a very receptive audience.



Fig 47 and 48 Marketing Plant Pathology/food security at the Agricultural Career Fair and encouraging young people to study agriculture on National Television (on a daily programme called Agri-TV)



Fig 49 Marketing Plant Pathology through a board game

5. Conclusion

Our gratitude goes to the ISPP for making this project possible and for giving us the opportunity to be proud ambassadors of agriculture! We are excited about continuing our contribution to food security for Africa through promoting the world-wide development of plant pathology.

