



N2Africa Podcaster 2

November 2010

N2Africa Newsletter named the N2Africa Podcaster

In the last issue we announced a competition to name the N2Africa newsletter. We had more than 20 responses, but with some excellent suggestions. After careful deliberation we congratulate Professor Barbara Maasdorp, Department of Crop Science, University of Zimbabwe for the inspiring name and we duly christen the newsletter "N2Africa Podcaster".

Ken Giller

“Black medicine” in West Africa

A strong vote of thanks to all the partners who hosted our N2Africa team during late September/October when Ken Dashiell, Abdullahi Bala, Robert Abaidoo and I toured the field in northern Ghana and Nigeria. It was humbling to experience the importance attached to our visit by the farmer groups, NGO and government partners who were clearly not used to receiving guests. The enthusiastic interest of the farmers convinces me that we are in a prime position to make massive impact through our work in this region. In addition to their important role as grain for food, soyabean and cowpea are well-established as important cash crops in the farming systems. It was a pleasure to travel with Ken Dashiell who was responsible for development of many of the IITA soyabean varieties and to see that these varieties are now grown over hundreds of thousands of hectares in Nigeria and Ghana. When Ken Dashiell was in northern Ghana in the early 1990s, soyabean was virtually unknown. Now it is firmly established as an important smallholder crop.



N2Africa farmers showing the large white cowpea seed of the new varieties that are highly valued in northern Nigeria

Putting nitrogen fixation to work for smallholder farmers in Africa



Farmers are very responsive and keen to get hold of new legume varieties. They were often surprised to see the large growth responses to small applications of phosphorus fertilizer which were observed throughout the region. Responses to inoculation in soyabean were sometimes massive – more often about a 20% increase in biomass which is similar to what we have observed in East Africa. The low literacy level in rural areas of both Ghana and Nigeria provide challenges for learning and dissemination. In Ghana, farmers called the rhizobium inoculum “black medicine” – but were proud to dig up plants and explain that the inoculum led to formation of nodules that could capture nitrogen from the air. In some places farmers did not understand what inoculum was, and we need to give some careful attention to finding other means of communication.

In a small but significant proportion of the adaptive trials and demonstrations we saw poor growth in all plots irrespective of treatments, but sporadic plants that were growing well in small pockets of more fertile soil. These plots represent the ‘non-responsive soils’ that we have witnessed elsewhere in Africa that need urgent research attention in coming seasons to understand why crop growth is so poor. The key and complementary role of N2Africa is to develop packages of management (inoculum, fertilizer, agronomy) to accompany the new legume varieties that are available and in great demand by farmers. One lesson we learned – and that was reinforced by all farmer groups that we visited – is that we have to be better organised and arrive early with inputs and seed. This is particularly important for cowpea, where early sowing allows for two crops to be grown within the season.

With the rains just starting, our attention is now focused on getting fieldwork started in southern Africa, and we are well into the second season in East Africa – so all systems are ‘go’ across the three regions! More news on those activities in the next Podcaster!

Ken Giller

Training: advancing Technical Skills in Rhizobiology:

A two week training course was held at the College of Agriculture and Veterinary Sciences, University of Nairobi, Kenya (13-24 September, 2010) for laboratory technicians and N2Africa MSc. students. The workshop attracted 12 participants (50 % women) from: Democratic Republic of Congo, Kenya and Rwanda, The training sought to:

- equip key laboratory technicians with the knowledge and skills in basic rhizobiology, strain selection, inoculant production, quality control and field inoculation of grain legumes.
- the facilitators and trainees the opportunity to share lessons, experiences and perspectives and to critique the content, methods and tools.
- develop an action plan for project activities related to identification of superior rhizobia strains for enhanced BNF and developing inoculum production capacity in their respective countries.
- All participants agreed that the workshop achieved its stated objectives and returned home enthusiastic to put the skills learnt during the course to use straight away!



Plate 2: A Participant from ISAR-Rwanda, Uwizerwa Mathilde, practising culture transfer skills at the KEFRI biotechnology laboratory during a visit to the institute.



Plate 3: Participants being shown how to prepare inoculant carrier from peat by Stanley Kisamuli, a Senior Technologist at the Department of LARMAT, University of Nairobi.

Patrick Ngokho and Ken Dashiell

MSc and PhD Fellowships

Eleven students (6 female and 5 male) from DRC, Kenya, Rwanda, Malawi and Nigeria have been selected receive N2Africa MSc and PhD fellowships. Applications from Zimbabwe are being The students undertake research in rhizobiology, inoculant quality control, farming systems, intercropping and adoption studies. Applications are still being accepted from Ghana and Mozambique. If you are interested and qualified please contact the project leader (K.Dashiell@cgiar.org). We wish the students all the best in their studies and will update you of their progress once they have outlined their research topics.

Ken Dashiell and Koala Saidou



EMBRAPA, Brazil to support N2Africa

In May 2010, Ken Giller and Dr Mariangela Hungria, of EMBRAPA-Soja and member of the N2Africa Steering Committee travelled to Brasilia where they met with Dr Pedro Arraes Pereira, the President of EMBRAPA, to agree on collaboration between EMBRAPA and N2Africa. Dr Pereira worked on breeding for nitrogen fixation in beans earlier in his career and was pleased to learn more about N2Africa. EMBRAPA will provide Brazilian soyabean genotypes and strains of rhizobia for testing and use in Africa, and above all contribute the vast expertise of Mariangela to advise N2Africa.



From left to right: Murilo de Arruda, EMBRAPA-Cerrados, Maja Slingerland, Wageningen University, Dr Pedro Arraes Pereira, President of EMBRAPA, Dr Mariangela Hungria, EMBRAPA-Soja; Ken Giller

Ken Giller

Rust resistant varieties of soyabean bred by Seed Co in Zimbabwe

During a visit to the Rattray Arnold Research Station of Seed Co Ltd, Harare we saw the most recent released and pre-release varieties of soyabean. The breeders, Jacob Tichagwa and Hapson Mushoriwa have achieved a degree of rust resistance/tolerance that results in *no yield loss!!*

We understand the key to the success has been to switch from an early approach of breeding for lack of visual symptoms of lesions on the leaves, to selecting through the use of paired plots with or without fungicide. The selection criterion is to look for the least difference in yield between fungicide-treated and untreated plots – i.e. the least yield loss due to rust.

As rust causes damage through inhibiting pod fill and seed formation, at Seed Co they select for rust resistance on the basis of 100 seed weight rather than on yield. This is because 100 seed weight can be measured much more accurately than yield due to inevitable variability in plant growth in field plots. This is an elegant way of speeding up the selection process.

Dr Tichagwa has been collaborating with breeders in Brazil to assist them with selection of rust resistant varieties, and received an award February 2007 from the Research Council of Zimbabwe for his contribution to agriculture in Zimbabwe.

Putting nitrogen fixation to work for smallholder farmers in Africa



SC Santa – susceptible variety shows large differences in defoliation and yield between unsprayed and sprayed plots



SC Saga – resistant/tolerant variety shows little difference in defoliation between unsprayed and sprayed plots (from left to right: Hapson Mushoriwa, Ken Dashiell and Jacob Tichagwa)



SQ Squire – resistant/tolerant variety shows little difference in defoliation between unsprayed and sprayed plots

Ken Giller and Ken Dashiell

Training of Trainers in Zimbabwe

Following an intensive one-week training in Kisumu, West Kenya, Joram Tapfuma and Tarwireyi Kahiya recently trained a total of 240 lead-farmers and agricultural extension workers from the government and participating NGOs in eight districts in Zimbabwe from the 27th of September up to the 7th of October.





In each of the eight districts an intensive one-day training was conducted covering amongst others the objectives of the N2Africa project, legume-based cropping systems, the role of nitrogen and rhizobia, inoculation, and the lay-out of demonstration plots.

Farmers responded enthusiastically and are ready to train their fellow farmers. Each lead-farmer will train a group of 15 to 25 farmers around him or her with technical backstopping from the agricultural extension workers and the trainers Joram and Tarwireyi. The N2Africa project will then supply all the inputs required for the demonstration plots hosted by the lead-farmers as well as to the participating farmers to plant different varieties of soya beans, groundnuts, common beans and cowpeas with different fertilizer and inoculants treatments. In this way, farmers will be able to assess for themselves what works best for them.



Judith de Wolf

Training of Trainers (ToT) in Malawi

N2Africa Malawi conducted ToT covering 39 Agricultural Extension Development Officers (AEDOs) 7 (women) and 71 Lead Farmers (22 women) from 5 (Salima, Dedza, Ntcheu, Lilongwe and Mchinji) of the 6 implementing districts. The ToT program was conducted for AEDOs and lead farmers that will be implementing N2Africa's technology dissemination and extension activities. The training topics included:

1. Objectives and expectations of N2Africa
2. Legumes, nitrogen and rhizobia
3. Increasing legume productivity in cereal-legume cropping systems
4. Inoculants and inoculation (handling and use)
5. Practical demonstration of inoculation (handling and use)
6. Demonstration plot layouts and data collection (practical)
7. Expectation from farmer groups and lead farmers
8. Mid season and end of season evaluations
9. Marketing and processing of soybean, cowpea and bean

The main resource persons were N2Africa Staff, and the 4 Senior Technicians trained by N2Africa in Kisumu, Kenya and the IITA agronomist in Malawi.



The technical training used local memory aids like folk culture comparisons and associations to help participants easily remember some of the technical knowledge being learned. Farmers testified that they had gained tangible understanding of technologies such as inoculation and nitrogen fixation. They explained that since they understood the more fundamental aspects of nitrogen fixation they could explain this to farmers and that more adoption of inoculant technologies would be achieved.

During the soybean processing and marketing section of the training the participants explained that the main constraint to soybean processing technologies introduced earlier was affordability since most equipment is expensive and they can only manage to procure it if they work in farmer groups. They said the farmer group approach achieves high productivity for the whole group but the individual gains are much lower hence most prefer individual home-based value addition which can increase individual incomes. The N2Africa Southern hub Coordinator informed the farmers that N2Africa had partnered with the Department of Agric Extension Services to train farmers in new recipes of cowpea and soybean in the 6 participating districts.

The farmers were highly motivated and the project has triggered much enthusiasm. With just one more mandate District to go; the ToT has been a successful and informative experience.

Hakeem Ajeigbe

Farmer to farmer learning

Doricas Akeyo, a master farmer (left), and Florence Imbokha (right), a follower farmer evaluating the effect of soybean inoculation at Butere village- Western Kenya. Florence had learned from Doricas that the black powder they put on the seed just before planting was going to make the soybean have more nodules on their roots and that these nodules would help the plants grow larger and have a higher grain yield. Doricas explained that these nodules are like very small factories making nitrogen fertilizer. The inoculated soybean plot on this farm is clearly darker green and more prolific than the uninoculated plot. More than 900 farmers in Western Kenya have evaluated the effect of soybean inoculum on their own farms during 2010. Grain yields will be reported in an forthcoming issue of N2Africa Podcaster.



Ken Dashiell.

Detailed farm analyses for ex-ante impact assessment of N2Africa technologies have started

People working with legumes produced by smallholder farmers in Africa know one thing very well: legumes have a great potential to improve soil fertility, productivity and resilience of African arable farming systems and to contribute to livelihoods of rural families. However, whether this potential is realised, depends on agro-ecological, socio-economic and cultural conditions. These conditions tend to be highly variable within farms and between farmers and regions. Understanding which legume types and varieties and which associated technologies, such as inoculation and fertiliser application, have an impact under which conditions can improve the effectiveness of research and development efforts in N2Africa and other projects with legumes in African farming systems. Therefore, the N2Africa team has initiated ex-ante impact analyses of N2Africa technologies.

Detailed farm characterisations are conducted to gather information on the availability and allocation of resources (land, crops, livestock, capital, labour, etc.), farmers' perception of legumes, and their access to input and output markets. Moreover, biophysical data on soil characteristics, biological nitrogen fixation and legume yields are collected. Such detailed farm studies are currently conducted in Rwanda and Malawi by two students from Wageningen University. Similar studies will be conducted in the coming year in other countries where N2Africa works. Results from these studies are complemented by a broad socio-economic household survey (baseline survey) carried out in the eight African countries where N2Africa works. In addition, maps of the mandate areas provide information on important drivers of adoption of legumes (length of the growing season, market access, population density, etc.) (Figure below). Statistical and modelling techniques are used to integrate data and predict impact of N2Africa activities on crop productivity and the livelihood of farmers and their families.

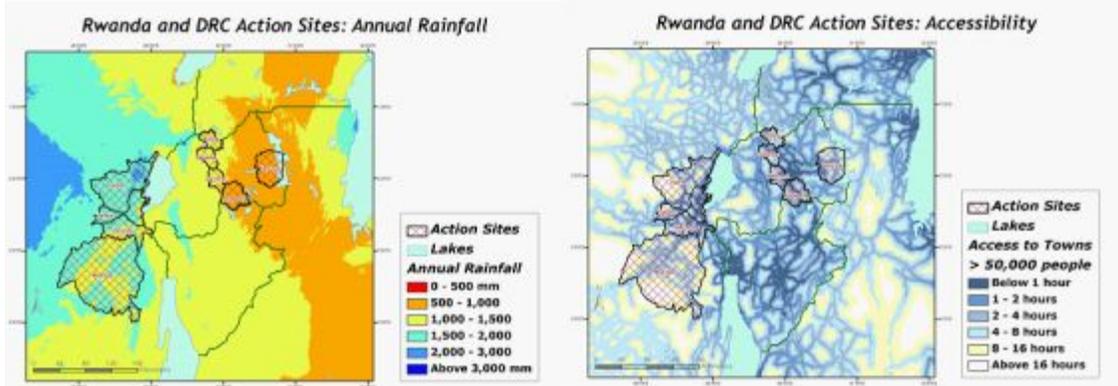


Figure: Annual rainfall and access to major urban centres in the mandate areas in Rwanda and DRC. Both are important drivers determining the adoption rate of legumes and help to predict the impact of legume technologies promoted by N2Africa.

Linus Franke

Sad news

We are sad to pass on the news that Herman Potgieter of Soygro (Pty) Ltd, Potchefstroom, South Africa passed away in a car accident on 1st of September. We have lost a key colleague who was committed to the promotion of rhizobial inoculants in Africa. Our heartfelt condolences go to all of his family and friends.

Ken Giller

N2Africa featured in New Agriculturalist

In the latest issue of the New Agriculturalist which has a special focus on soils there is a feature highlighting N2Africa. See: [Helping legumes become Africa's nitrogen factories](#)

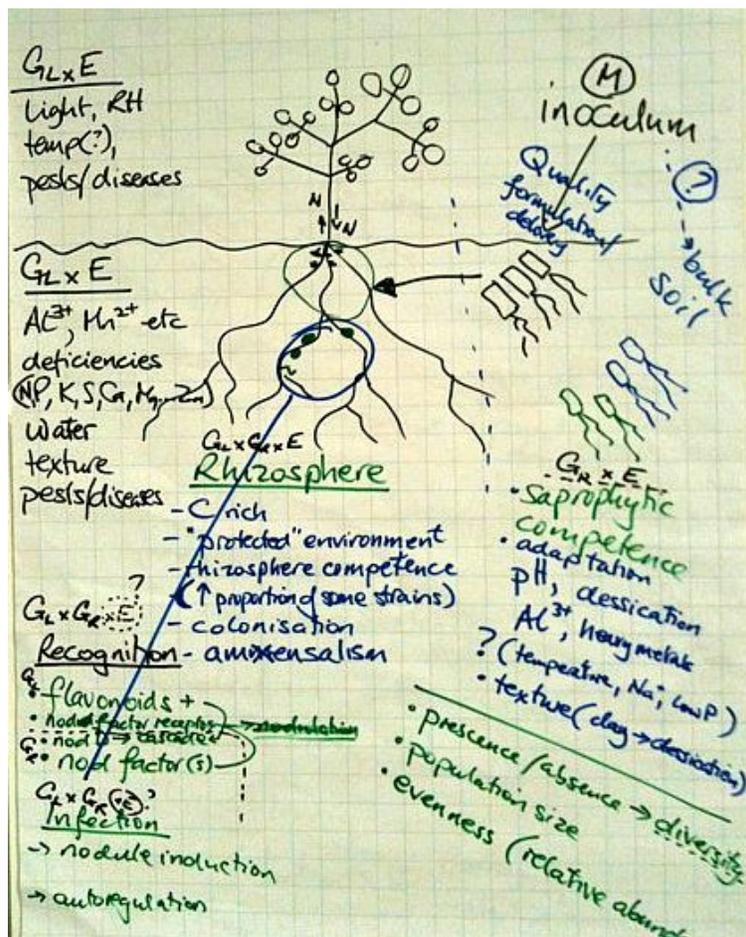
Ken Giller

Advanced Course on Nitrogen Fixation held together with Wageningen University Graduate Schools

A PhD-level course entitled "The legume-rhizobium symbiosis: From molecules to farmers' fields" was held in Wageningen, The Netherlands, 18 - 22 October 2010. The course was attended by 25 PhD students and postgraduate researchers, including most of the N2Africa core staff and two colleagues from the SIMLESA (Sustainable Intensification Of Maize-Legume Cropping Systems For Food Security In Eastern And Southern Africa) project. The course was organised by Wageningen University Graduate Schools, Production Ecology & Resource Conservation and Experimental Plant Sciences and was led by Ken Giller and Rene Geurts, with Jean-Jacques Drevon, Graham O'Hara, Bruce Knight, Paul Mapfumo, Janet Sprent and Ron Yates as resource people. The course explored possibilities of unpacking the (GL x GR) x E x M interaction, and of linking up molecular biology studies with plant physiology and



agronomy and application at field and farm scale. The course was well-received and will be repeated in 2012 - perhaps somewhere in Africa!



Group report on competition for nodulation

Ken Giller

Contact address for this newsletter is: n2africa.office@wur.nl

Putting nitrogen fixation to work for smallholder farmers in Africa