

# N2Africa Podcaster no. 48

October and November 2017

## Introduction

I'm just back from the 50<sup>th</sup> anniversary celebrations at the International Institute for Tropical Agriculture (IITA) in Ibadan, Nigeria where I was honoured to give a talk. It was a great opportunity to profile the work of N2Africa and to meet many scientists and students – in particular the IITA N2Africa team. When I first visited the IITA HQ in Ibadan in 1990 I had the privilege to be shown around experiments on Alley Cropping by a young upcoming scientist – Dr Nteranya Sanginga (see photo). Little did know that I would visit over 25 years later with him as Director General of an institute that has grown from strength to strength under his leadership. The 50<sup>th</sup> Anniversary Conference was focused on *“Towards Food and Nutrition Security in the Next Half Century: Challenges, Opportunities and Strategies”*. In my talk on *“The Renaissance of Farming Systems Research in Africa”* I explained some of the lessons we have learned from our work in N2Africa (you can [watch on YouTube](#)). I think that farming systems analysis can really help us to tailor legume-based technologies to farms and farming systems - ensuring that a sufficiently broad range of technology options is available for farmers to choose from.

Last year we announced that we would hold the 18th African Association of Biological Nitrogen Fixation (AABNF) conference in Kigali, Rwanda in 2018. I'm afraid I have to tell you this cannot go ahead as planned. There was confusion about the planning and this conference will now take place in [Oran, Algeria in the New Beach Hotel, 22<sup>nd</sup>-24<sup>th</sup> of April](#). I had promised to many PhD students that we will run a training course in biological nitrogen fixation. We will go ahead with this in May 2018 associated with our N2Africa annual project meeting. Watch the future Podcasters in

## Dr Endalkachew Wolde-Meskel represented N2Africa at the ICLGG (International Conference on Legume Genetics and Genomics), 18 – 22 Sep. 2017, Siófok, Hungary

Endalkachew Wolde-meskel, country coordinator for Ethiopia, represented N2Africa and presented a keynote address under the topic “Sustainable intensification of grain legumes production with smallholders in Africa through nitrogen fixation: highlights from the N2Africa project” at the biennial meeting of ICLGG 2017 in Hungary last September.

In his speech, he emphasized the genetic and symbiotic diversity of rhizobial germplasms/isolates from African soils and their potential to improve nitrogen fixation, and reported the achievements of the project in getting the inoculant technology out at scale using the Private Public Partnership (PPP) approaches and the benefits to smallholder farmers ([Abstract](#)).



Dr Nteranya Sanginga showing me an alley cropping trial in September 1990 when the African Association of Biological Nitrogen Fixation conference was held at the IITA HQ in Ibadan

the New Year for more details once we have done more detailed planning.

In this Podcaster we report on presentations of N2Africa at international conferences – for example Dr Endalkachew Wolde-Meskel gave a keynote at the International Conference in Legume Genetics and Genomics in September in Hungary. We have an update on the Nodumax inoculant production in Nigeria, a report from an MSc student and a list of publications and theses. We look forward to receiving your contributions for future Podcasters and hope you enjoy reading this.

Ken Giller



Endalkachew responding to questions after presenting his keynote at the ICLGG, Siófok, Hungary

The meeting brought together scientists working on research aspects of legume biology, using genetic and genomic tools, with those working on applied aspects and breeding of crop and pasture species. The scientific program was structured around plenary talks from the world's leading legume scientists, and covered various topics including Legume genome structures and evolution; Growth, form, symbiosis and N<sub>2</sub>-fixation; Biotic and abiotic stress; Seed biology, Legume mega-projects and

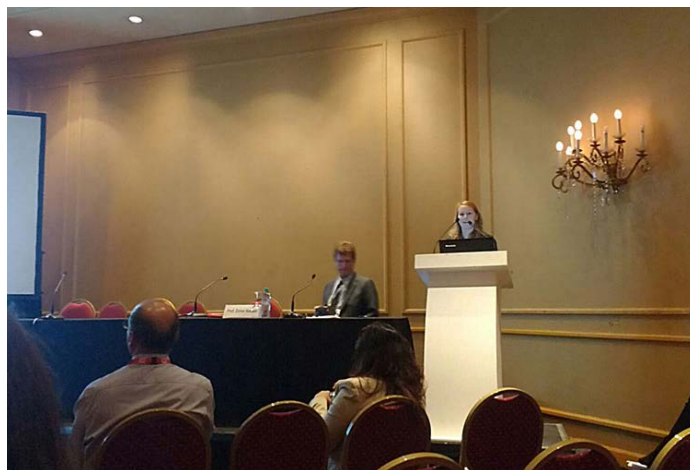
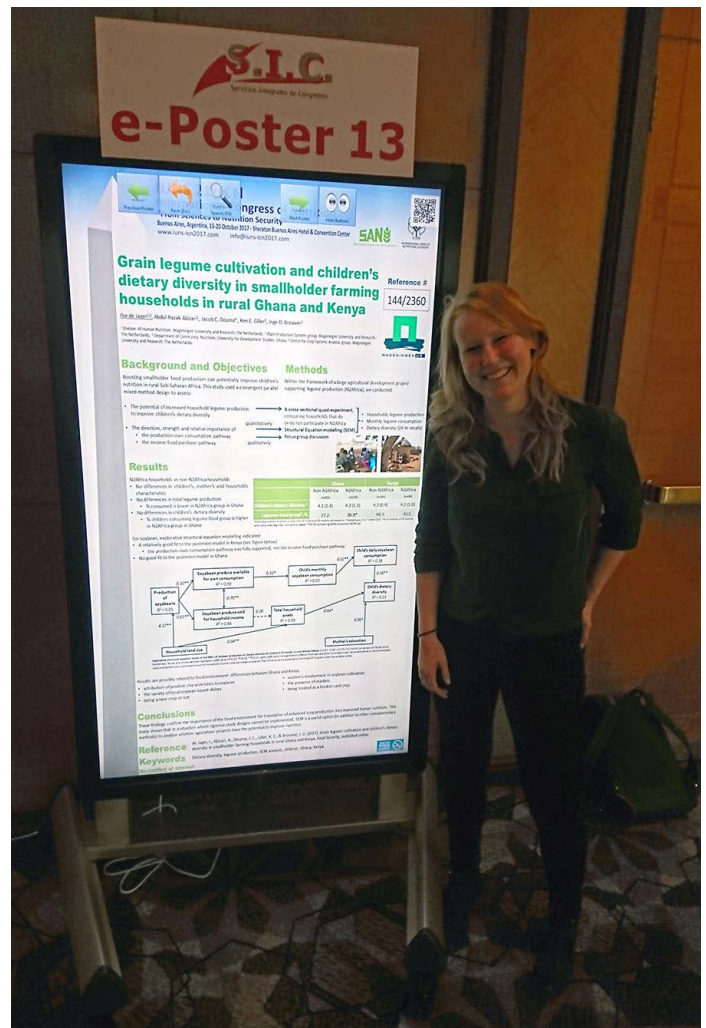
Legumes in the real world. Attended by 124 participants from 26 different countries, the conference aimed to creating opportunities to establish new partnerships among the academic, biotech, applied and commercial agriculture communities that will have positive effects on the future of the legume industry internationally.

Thanks to Endalkachew for increasing the international exposure of N2Africa!

### Presenting my nutrition research within N2Africa at the International Congress of Nutrition

In the previous Podcaster I shared some of my recent results of my PhD research with regard to our dietary gap assessment in Northern Ghana. I was offered the opportunity to also present these results at the International Congress of Nutrition which was held in Buenos Aires in Argentina from 15 to 20 October 2017. This large international congress is a four-yearly meeting that's been held since 1946 and this was the 21<sup>st</sup> edition. It addressed a wide range of topics related to human nutrition, including agriculture and human nutrition.

The title of my presentation was: *Does local food availability support implementation of food-based dietary recommendations in northern Ghana?* I shared the methods used and results on the existing food and nutrient gaps in Northern Ghana at household and district level, emphasizing the importance of food availability to improve diets of vulnerable populations. I showed that besides nutrition-specific interventions, also nutrition-sensitive interventions are needed such as increased productivity and production of specific crops as well as market interventions that improve access to adequate amounts of a diversity of food products. It was great to have the opportunity to share my results at this conference with other nutritionist researchers. Especially because it resulted in some interesting, in-depth discussions and because it showed the importance of the potential role of agriculture in achieving nutrition improvements.



Pictures of me presenting (and feeling stunted behind the catheter...) at the IUNS conference, Buenos Aires, Argentina

In addition, I presented my earlier case study research in Ghana and Kenya with use of a poster (see picture). Due to the scale of the conference and the short time reserved for showing posters (electronic screens were used and each poster was assigned one hour for presenting along with seven others), I unfortunately only shared these results with a very few people.

Ilse de Jager, Wageningen University & Research, The Netherlands



## Open access publishing through Chronos

### Open access publishing with Gates

Open access is of great importance to the Bill & Melinda Gates Foundation to allow for rapid and broad dissemination and for accelerating innovation. Accessible and open articles and underlying data are key for that. To ensure compliance with the BMGF's Open Access Publishing Policy and to reduce the administrative burden of the publication process, the BMGF has developed two online publication services: Chronos and Gates Open Research.

### Chronos

The BMGF developed Chronos, an online publication service which went into full effect this year. Gates-funded researchers can make use of this service to reduce the administrative burden of the publication process and to ensure compliance with the BMGF's Open Access Publishing Policy. In return for compliance, Chronos takes care of the publication fee payment.

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### NoduMax

The NoduMax factory continues to manufacture and market quality soyabean inoculant to Nigeria, West African neighbours and venturing into various other SSA region countries.

**Production.** With the present set-up, annual production capacity is 16 tons or 0.5 ton weekly. This can be increased by deploying more autoclaves, extending the production months and automating the present hand filling activity. To meet the demand foreseen in 2018 onwards, Just in Time Logistics and production planning will become increasingly important.

The main production bottle neck is working capital. Presently orders are produced months in advance while revenues have been subject to lengthy processes notably

on the requirements of that specific journal. The article is then registered in Chronos and followed to the journal publisher for their peer review process. Upon acceptance, Chronos takes full responsibility to (1) pay any publication fee required directly to the publisher, to (2) confirm that the article is published and that it is freely available under the correct license terms, to (3) overview submission of the article into PubMed Central, and to (4) share the publication with grant colleagues and the Gates Foundation staff responsible for supervising the grant.

### Open access

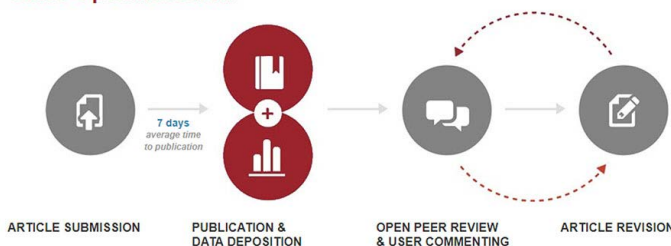
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### Gates Open Research



Eva Thuijsman, Wageningen University & Research, The Netherlands

the Anchor Borrower Program (ABP). When volumes will increase so will this cashflow problem, hence private investors require to come on board to enable production at scale.

**Sales.** During 2017 the factory production was about 11.6 tons of NoduMax (116,000 units). This is an increase of 76% over the similar interval in 2016 (6.6 tons). In 2015 only 3 tons was sold of which the majority was sold into projects of IITA. Of this 2017 production, about 7.2 tons was distributed to 45 customers. Some of this distributed product was carried over from the previous year. This could be done as the good quality of the produced product resulted a longer shelf life. There are pending orders of another 3 to 4 ton in 2017 for delivery in the early 2018 soyabean season. The latter are reserved for the ABP which will soon finalize contracts and release the loan facility for payments.

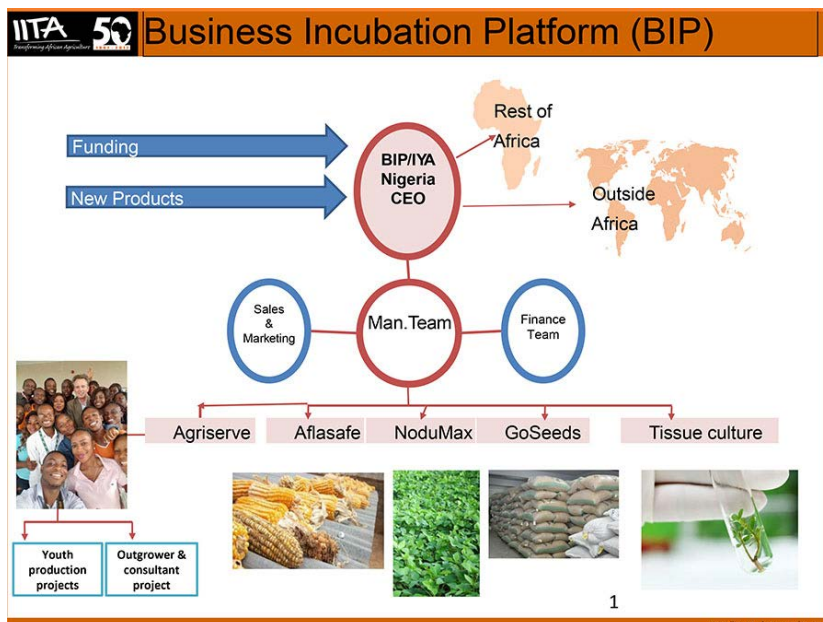
If all sales forecasted will be paid before 31 December 2017 the financial result will be a modest but first time annual net profit for Nodumax.

Sales in the SSA region comprised Mozambique (0.2 ton) Togo (0.1 ton) with ongoing discussion for Zambia. Benin took 200 kg in 2015 but awaiting payment fell out in 2016. Promising developments were recently seen in Ghana and in a follow-up the MoFA director will visit IITA to discuss the production & supply of breeder and foundation seeds by BIP-Go-Seed. This will open the door to significant Nodumax sales in Ghana as mentioned below.



**Way forward.** The marketing and dissemination of NoduMax needs to be further intensified Over the years and recently through a Public Private Partnership (PPP) with N2Africa and CABI-ASHC projects, the distributor Intrio Synergy Limited (ISL) developed radio campaigns, posters, flyers and videos to reach all major soyabean growing areas in 2018. This consortium and private sector distributor Green-Ef village

implemented similar campaigns in Ghana. Through demonstrations, trainings and media campaigns N2Africa and its partners reached near one million farmers in SSA and will continue to be in support of Nodumax in 2018.

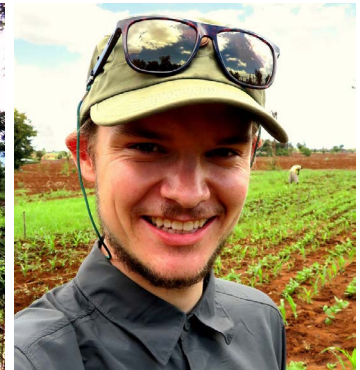


BIP Nigeria and Ghana distributors will aim to establish designated Nodumax sales depots complementing their agro-dealer networks as retail outlets. Important 2018 sales volumes are expected with the Central Bank of Nigeria (CBN) ABP that provides registered farmers input credit facilities. In Ghana negotiations are ongoing to include NoduMax in the 'Planting for Food and Jobs' MoFA lead subsidy program aiming at 25,000 soyabean farmers in 2018. For this there is an urgent need to have good quality seeds. Those are at present not in the right quantity available for the farmers in Ghana.

Frederick Schreurs, Chief Executive Officer - IITA-Business Incubation Platform (BIP), Ibadan, Nigeria



## In the shadow of Kilimanjaro; assessment of disease and pest in common bean & maize cropping systems in northern Tanzania



Nikolaj Meisner Vendelbo, BSc. Agrobi-ology with speciality in Plant Production at Aarhus University (DK, 2012-2015), MSc. Plant Sciences with speciality in Plant pathology and Entomology at Wageningen University & Research (NL, 2015-2017)

In the horizon behind my field site the snowy-white roof of Africa rises from a dry, khaki-colored landscape. Quite a view, just having left behind the cold weather of the Netherlands to conduct the final part of my MSc degree at Wageningen University: an internship project at N2Africa in the Northern Highlands of Tanzania (March to September, 2017). The objective of my project was to assess the effect of cropping system design on severity in two cultivars of common bean (*Phaseolus vulgaris*), local Mkanamna and improved Lyamungu, and maize (*Zea mays*) in Northern Tanzania.

My name is Nikolaj Meisner Vendelbo, BSc. Agrobi-ology and specialized in Plant Production at Aarhus University (DK, 2012-2015), MSc. Plant Sciences and specialized in Plant pathology and Entomology at Wageningen University & Research (NL, 2015-2017).

In the field pests and diseases were identified and the most important ones were scored for incidence and severity of



African bollworm (*Helicoverpa armigera*) feeding on Common bean (*Phaseolus vulgaris*) pod

their damage to beans and maize throughout the growth season in accordance to protocols obtained from literature. Moreover, plant phenological development – that is leaf setting (vegetative) and setting of reproductive organs – was tracked and the fraction of light intercepted by the crops was measured. At crop maturity, when biotic stresses to the crops declined, I travelled to Dar es Salaam to conduct a laboratory diagnosis. The objective was to verify the field diagnosis of diseases in particularly Common bean with focus on identifying the causative agent of observed root rot, and the distribution throughout the field.

At the site I observed no less than 20 pests and 14 diseases, of which the most important included spottet stem borer, African bollworm, common rust and eyespot in maize and various foliage and pod feeders, *Alternaria* leaf spot and *Rhizoctonia* root rot in the common bean crop. These stresses, accompanied by ubiquitous symptoms of nutrient deficiencies, were observed to cause substantial yield losses on the site. In maize the yield gap was found to be 64 to 86 percent. Maize intercropped with the local common bean cultivar resulted in the highest achieved land equivalent ratio of 1.64: a yield that is 64% higher than that of the two crops cultivated separately. Overall, the maize-local common bean cropping system performed best for the assessed parameters. Initial statistical analysis did not reveal significant effects of cropping systems on occurrence of biotic stresses, and this is likely influenced by the small plot sizes (5 x 3.2m). As expected these findings underline the necessity of taking into account biotic stresses in N2Africa research and to disseminate knowledge to smallholder farmers about means to identify the most important biotic stresses mentioned above, and about the means to control them.

Nikolaj M. Vendelbo. [Click here](#) for the internship report.

## N2Africa publications

- Maize-grain legume intercropping for enhanced resource use efficiency and crop productivity in the Guinea savanna of northern Ghana. 2017. Kermah, M., Franke, A.C., Adjei-Nsiah, S., Ahiabor, B.D.K., Abaidoo, R.C., Giller, K.E. *Field Crops Research*;
- N<sub>2</sub>-fixation and N contribution by grain legumes under different soil fertility status and cropping systems in the Guinea savanna of northern Ghana. 2017. Kermah, M., Franke, A.C., Adjei-Nsiah, S., Ahiabor, B.D.K., Abaidoo, R.C., Giller K.E. *Agriculture, Ecosystems and Environment*;
- Benefits of inoculation, P fertilizer and manure on yields of common bean and soybean also increase yield of subsequent maize. 2017. Rurangwa, E., Vanlauwe, B., Giller, K.E. *Agriculture, Ecosystems and Environment*;
- Effectiveness of rhizobia strains isolated from South Kivu soils (Eastern D.R. Congo) on nodulation and growth of soybeans (*Glycine max*). 2017. Ndusha, B.N., Karanja, N.K., Woomer, P.L., Walangululu, J., Mushagalusa, G.N. and Sanginga, J.M. *Int. Scholars journals: African Journal of Soil Science*;
- Sustainable intensification through rotations with grain legumes in Sub-Saharan Africa: A review. 2017. Franke, A.C., Van den Brand, G. K., Vanlauwe, B., Giller, K. E. *Agriculture, Ecosystems and Environment*;
- Soyabean response to rhizobium inoculation across sub-Saharan Africa: Patterns of variation and the role of promiscuity. 2017. Heerwaarden, J. van, Bajjukya, F., Kyei-Boahen, S., Adjei-Nsiah, S., Ebanyat, P., Kamai, N., Wolde-Meskel, E., Kanampiu, F., Vanlauwe, B., Giller, K. E. *Agriculture, Ecosystems and Environment*;
- Understanding variability in the benefits of N<sub>2</sub>-fixation in soybean-maize rotations on smallholder farmers' fields in Malawi. 2017. Vugt, D. van, Franke, A. C., Giller, K. E. *Agriculture, Ecosystems and Environment*;
- PhD thesis *Characterization of rhizobia isolated from soybean in Mozambique and strategies to maximize the contribution of biological nitrogen fixation* by Amaral Machaculeha Chibeba;
- PhD thesis *Caracterização de rizóbios isolados de soja em Moçambique e estratégias visando incrementar a contribuição da fixação biológica de nitrogênio / Characterization of nitrogen-fixing bacteria from Phaseolus vulgaris L. in Kenya* by George Mwenda;
- PhD thesis (partly supported by N2Africa) *Citizen science and remote sensing for crop yield gap analysis* by Eskender Andualem Beza;
- DPhil. thesis *Impact Assessment of Improved Cowpea Varieties on Women Farmers in Southern Borno State, Nigeria* by Binta Ali Zongoma.

## Reports and other output uploaded on the N2Africa website

- MSc. thesis *Analysis of Preference for Adoption of Legume Technology Packages: the Case of Chickpea and Common bean Producing Smallholder Farmers in Boricha and Damot Gale Districts, Southern Region* by Dagmawit Getachew from Ethiopia;
- MSc. thesis *Determinants of Inputs Demand and Adoption of Grain Legumes and Associated Technologies of N2Africa in Kano-Nigeria* by Muhammad Halliru;
- MPhil. thesis *Effect of genotype and plant population on growth, nitrogen fixation and yield of soybean [*Glycine max* (L.) merrill] in the Sudan savanna agro-ecological zone of Ghana* by Wuni Mawiya;
- MSc. thesis *Effect of genotype and plant population on growth, nitrogen fixation and yield of soybean (*Glycine max*. L. Merrill) in Guinea savanna agro-ecological zone of Ghana* by Gifty Kuma;
- MPhil. thesis *Influence of P sources and rhizobium inoculation on growth, nodulation, N & P uptake and yield of three soybean genotypes in Tanchera soil series of the northern Guinea savannah zone of Ghana* by Florence Jessica Kumah;
- MPhil. thesis *Symbiotic effectiveness and saprophytic competence of selected indigenous rhizobia isolates for groundnut inoculation in northern Ghana* by Godfre Wilson;
- MSc. thesis *Exploring the current state of ruminant value chains in northern Ghana, and the role of grain legume residues as a livestock feed resource* by Suzanne Roelen;
- Internship report *Implementation of N2Africa Project in Ghana: Putting nitrogen fixation to work for smallholder farmers in Ghana* by Gregeory Mensah;
- MSc. thesis *Symbiotic and phenotypic characteristics of indigenous rhizobia nodulating faba bean (*Vicia faba* L.) growing in some parts of Wello, Northern Ethiopia* by Getahun Negash Takele;
- MSc. thesis *Optimization of Biological Nitrogen Fixation and Yield of Groundnut (*Arachis hypogaea* L.) in a Savanna Alfisol through Fertilizer Application and Soil Amendment* by Muhammed Mustapha Ibrahim from Nigeria;
- MPhil. thesis *Response of soybean to rhizobial inoculation and nitrogen management options in the Southern Guinea savannah zone of Ghana* by Kennedy Ahlijah;
- MSc. thesis *Isolation, authentication and evaluation of symbiotic effectiveness of elite indigenous rhizobia nodulating *Phaseolus vulgaris* L. in Hai District, northern Tanzania* by Yusuph Namkeleja;
- Internship report *Analysis and revision of the N2Africa focal adaptation trial survey, a tool for monitoring technology performance and untangling yield variability* by Susana Prieto Bravo;
- MSc. thesis *Symbiotic effectiveness of rhizobia from*





chickpea (*Cicer arietinum* L.) and phenotypic characteristics of faba bean (*Vicia faba* L.) nodulating rhizobia by Tadele Ereso.

- And some theses still from Phase I
- MSc. thesis [Assessment of The Abundance and Effectiveness of Cowpea \[\*Vigna unguiculata\* \(L\) Walp\] Rhizo-](#)

[bia in Soils from Different Fields in Chiwosya Extension Planning Area, Mchinji District](#) by Esmart Nyirende Yohane from Malawi;

- MSc. thesis [Determining nutrients limiting factors on grain yield and yield components to common beans \(\*Phaseolus vulgaris\* L.\) under drought and non-drought conditions](#) by Mõnea Lina Adelino Mucavêa from from Malawi.

### Related newsletters

- ASHC blog: [Farmers to embrace use of NoduMax to boost soybean productivity in new campaign in Nigeria](#);
- GALA blog: [ASHC putting three more countries on its map](#);
- SAWBO animation: [Improved bean production in English](#);
- Forages for the future: [Newsletter #5](#);
- FAO news article: [The number of people suffering from chronic undernourishment in sub-Saharan Africa has increased](#);
- ICRISAT news: [Farmers in Dawakin, Nigeria, celebrate introduction of improved cowpea varieties](#);
- ICRISAT news: [FAO workshop highlights Tropical Legumes III seed system initiatives in Africa](#);
- ICRISAT news: [Expanding the groundnut seed business in Tanzania](#);
- ICRISAT news: [A seed revolving fund is driving Malawi's groundnut revival](#);
- [IITA newsletter 2406](#) presents several stories, new and old, in which N2Africa played an important role;

### Announcement

The [Matasa Fellows Network](#) announced a call for young African researchers to apply to become a fellow. See the announcement [here](#).

Applications from young African researchers who are interested in addressing the challenges of young people and employment in Africa are being accepted until 7 December 2017.

The Matasa Fellows Network is a joint initiative of the [MasterCard Foundation](#) and the [Institute of Development Studies](#).

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The Podcaster is published six to eight times per year – we look forward to receiving news and contributions – particularly from partners. Please send in contributions well in time. Contact address for this newsletter is: [N2Africa.office@wur.nl](mailto:N2Africa.office@wur.nl)

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