**Sustainable Development Goals -   
your story of creating a food secure world**

**Collection of contributions received**

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# Topic note

The [2030 Agenda for Sustainable Development](http://www.fao.org/sustainable-development-goals/overview/en/) has been formulated to guide the actions of the international community over the 15 years period from 2016 to 2030. As a global framework for mutual accountability, the Agenda’s 17 [Sustainable Development Goals (SDGs)](http://www.fao.org/sustainable-development-goals/en/) cover all aspects of life and are the blueprint to achieve a better and more sustainable future for all.

All countries, poor, rich and middle-income are called upon to work toward achieving the SDGs. This means that all of us - both as citizens and as professionals - are responsible to make our work and our private lives conducive to the implementation of the 2030 Agenda.

While the 2030 Agenda should always be seen as a comprehensive and shared blueprint for peace and prosperity for people and the planet, focusing on food and agriculture, investing in rural people and transforming the rural sector can speed progress towards all 17 SDGs. With food and agriculture laying at the very heart of the 2030 Agenda, FAO has been made custodian UN agency for 21 indicators, across SDGs 2, 5, 6, 12, 14 and 15.

One of the aspects that distinguishes the SDGs from previous development frameworks is the strong focus given to monitoring the progress. At the global level, the 17 SDGs and 169 targets are being monitored and reviewed using a set of global indicators. Moreover, at country level, governments can use their own national indicators to assist the monitoring of the goals.

With the implementation phase now in full swing, we feel that learning about your first-hand experience on how the SDGs have changed your work and life and what impact they have had so far in your countries is very important.

In this particular online discussion we would like to focus on [SDG2 “Zero Hunger”](http://www.fao.org/sustainable-development-goals/goals/goal-2/en/) and invite you to share with us your “SDG2 story”.

1. How is your work helping to create a food secure and Zero Hunger world? Have you seen your work change after the adoption of the SDGs? If so, how?
2. Can you share any stories of how your work has successfully contributed towards the realization of SDG2 in your country?
3. What is your experience with monitoring and evaluating progress towards ending hunger, malnutrition and supporting sustainable agriculture in your country?

If there is another SDG that is more relevant to your work and for which you have a good story, we would be happy to hear about that as well. Please feel free to send us also your photos and videos showing how you, your community and your countries are living the SDGs.

Your stories will allow us to get a better picture on what has already been achieved and how. They will help others to learn from your experience, from the successes you celebrated and last but not least from any challenges you might have encountered.

We look forward to your participation!

*Your FSN Forum Team*

# Contributions received

## Pilar Teresa Garcia, FANUS Foro de la alimentacion, nutricion y salud Bolsa Cereales de Buenos Aires Argentina, Argentina

Original contribution in Spanish

El Foro de la Alimentacion, Nutricion y Salud (FANUS) de la Bolsa de Cereales de Buenos Aires Argentina realiza simposios, jornadas y seminarios tratando de establecer una comunicacion efectiva entre el sector de la produccion primaria y el sector de la salud y nutricion publica. Nuestras actividades pueden ser visualizadas en nuestra pagina  [www.fanus.com.ar](http://www.fanus.com.ar/). Proximamente editaremos una Revista digital  <http://www.fanus.com.ar/rfanus>. Cualquir difusion sobre nuestras actividades sera muy apreciada.

Cordialmente

Dra Pilar Teresa Garcia

Presidenta de FANUS

English translation

The Food, Nutrition and Health Forum (known in Spanish as FANUS) of the Buenos Aires Grain Exchange in Argentina organizes symposiums, conferences and seminars aimed at facilitating effective communication between the primary production sector and the public health and nutrition sector. All our activities can be found in our website: [www.fanus.com.ar](http://www.fanus.com.ar). We will soon publish a digital magazine at: <http://www.fanus.com.ar/rfanus>. We highly appreciate your help in spreading the word about our activities.

Kind regards

Pilar Teresa García

President of FANUS

## Salome Begeladze, IUCN, United States of America

Infographic - relevant to SDG2 and SDG1. https://www.iucn.org/sites/dev/files/content/documents/forest\_landscape\_restoration\_pathways\_to\_achieving\_the\_sdgs.pdf

The 2030 Sustainable Development Agenda, with its 17 Sustainable Development Goals (SDGs) and 169 associated targets, is ambitious and far-reaching in its scope. Importantly, environmental sustainability is recognized as underpinning any effort to achieve the SDGs. Recognizing close linkages between environmental sustainability and SDGs, Forest Landscape Restoration (FLR) is a nature based solution to halt degradation and deforestation while contributing to economic growth, poverty reduction, climate gains, food, water and energy security that are targets of many SDGs. FLR has been implemented around the world in places where challenges and opportunities call for simultaneously increasing food production, improving livelihoods, and protecting biodiversity and ecosystem services.

Full achievement of the Sustainable Development Goals (SDGs) is only possible through urgent, concerted and effective action to avoid and reduce land degradation and promote restoration, bringing positive impacts across all dimensions of development.

A healthy landscape is the foundation of economic growth, food security, energy, and human wellbeing. Reversing land degradation and halting deforestation through restoration is possible.

The SDGs envision the transformation needed to secure the rights and future of people across the world and emphasise that healthy, stable ecosystems are a critical part of this effort. As shown in the infographic, the landscape-scale restoration of degraded lands and forests is intrinsically interlinked with many SDGs.

FLR can be an innovative approach for countries to boost the impact of sustainable land and forest management as a pillar of their sustainable development agendas.

## Emile Houngbo, National University of Agriculture, Benin (UNA), Benin

Original contribution in French

Pour ma part, je pense que l’élimination de la faim sous toutes ses formes d’ici à 2030 que porte l’ODD2, dépend principalement des dispositions qui seront prises pour réduire substantiellement les pertes et gaspillages alimentaires. C’est le phénomène principal qui handicape la plupart des pays pauvres aux plans alimentaire et nutritionnel. Or, cet aspect a été malheureusement occulté dans les 14 indicateurs définis pour l’ODD2. Surtout dans les pays comme le Bénin, en Afrique de l’Ouest, où l’agro-industrie est très peu développée, la réflexion doit aller beaucoup plus sur comment réduire - pour ne pas dire éliminer- les pertes et gaspillages alimentaires.

Au Bénin, apparemment, on ne fait pas grand-chose pour résoudre ce problème. En effet, les cultures vivrières de grande importance, qui se produisent en grande quantité chaque année, avec peu d’effort, du fait de leur grande adaptation aux zones agro-écologiques du pays, continuent d’être perdues et gaspillées comme par passé. Les quantités de ces produits qui sont perdues et gaspillées sont énormes. C’est le cas de la mangue, de la tomate et de l’orange au Bénin. Or, éliminer les pertes et gaspillages serait évidemment source de nourritures supplémentaires, de revenus pour les acteurs et même d’emploi.

Même le manioc est aussi gaspillé. Cette culture fait aujourd'hui l’objet d’un découragement de la part des producteurs et conduit de fait à des pertes, voire des abandons des champs qui la porte, du fait de l’inexistence d’un marché intéressant, capable de rentabiliser la production. Le prix du marché est tellement bas qu’il se retrouve dans certains cas en-dessous du coût de production quand le producteur met tous les soins nécessaires. A cette allure, il y a grand risque que la faim ne soit pas éliminée à l’horizon 2030 au Bénin par exemple, tel que c’est souhaité.

English translation

Personally, I think that the elimination of hunger in all its forms by 2030, as provided for in ODD2, depends mainly on the measures that will be taken to substantially reduce food losses and waste. This is the main phenomenon that hampers most poor countries in terms of food and nutrition. However, this aspect has sadly been overlooked in the 14 indicators defined for ODD2. Especially in countries such as Benin, in West Africa, where agro-industry is poorly developed, much more thought needs to be given to how to reduce - if not eliminate - food losses and waste.

In Benin, apparently, not much is being done to solve this problem. Indeed, major food crops, which are grown in large quantities each year, with little effort, because of their great adaptation to the country's agro-ecological zones, continue to be lost and wasted as in the past. Huge quantities of these products are lost and wasted. This is the case for mango, tomato and orange in Benin. However, the elimination of losses and waste would obviously be a source of additional food, income for the actors and even employment.

Even cassava is also wasted. This crop is now suffering from discouragement from producers and is leading to losses or even abandonment of the fields on which it is grown, because of the lack of an interesting market capable of making production profitable. The market price is so low that in some cases it is under the cost of production when the producer takes all the necessary care. At this pace, there is a great risk that hunger will not be eliminated by 2030 in Benin, for example, as desired.

## Sheilla Sibanda, Chinhoyi university of Technology, Zimbabwe

I have embarked on 2 projects that sought to utilise underutilized legumes locally available in the sub sahara. One of the projects involved the incorporation of cowpea flour in the production of chicken sausage. I had in mind the incidence of malnutrition of children due to lack of protein adequate for diet as recommended by WHO. Children often suffer from kwashiorkor amongst other malnutrition diseases thus development of such products is was Paramount to the provision of a balanced diet.

The 2nd project was on a low fat diet to cater for diseases such as hypertension,obesity patients. I used fish in the production of burger patties. Fish being lean meat is suitable for the health and protein availability needed by the body. Although highly perishable the product didnt do well in microbial quality.

## Isidore Djontso, AgricLearn Cameroun, Cameroon

Original contribution in French

Heureux de prendre part à cette discussion

Je suis porteur de deux projets :

L'un porte sur la création d'une ferme porcine et l'autre sur la création d'un rucher dans mon village.

La ferme porcine naisseur-engraisseur permettra de vulgariser les races à fort rendement carcasse et de reproduction qui rivalisent largement nos races locales. Les éleveurs de ma localité pourront alors booster la quantité de protéine animale qu'ils mettent sur le marché en utilisant les porcelets de race améliorée. L'insuffisance des protéines animales de bonne qualité pourrait être résolus.

Le second projet portant sur la création et la gestion d'un rucher permettra aux paysans de varier leurs productions et d'accroître leur revenu par l'adoption de cet élevage qui de pratique peu.

Pour l'instant les activités de mes projets sont en pauses par manque de moyens.

Par rapport à l'impact des ODD2 dans ma localité RAS. Rien n'a changé, par rapport depuis l'adoption des ODD2.

Merci pour votre attention.

English translation

Happy to take part in this discussion

I work on two projects:

One relates to the creation of a pig farm and the other to the creation of an apiary in my village.

The hog-fattening pig farm will popularize breeds with high carcass yield and reproduction that largely compete with our local breeds. Breeders in my community can then boost the amount of animal protein they put on the market using improved breed piglets. The insufficiency of animal protein of good quality could thereby be solved.

The second project on the creation and management of an apiary will allow farmers to vary their productions and increase their income by adopting this breeding which takes relatively little practice.

For the moment the activities of my projects are on hold for lack of means.

In relation to the impact of the SDGs2 in my locality RAS. Nothing has changed since the adoption of the SDGs2.

Thank you for your attention.

## Rabiu Auwalu Yakasai, Food and Nutrition Vocational Center, Nigeria

Culinary Lesson for Women – CL4W

Little effort by FNVC with significant promise to control food waste and make more food go round in the household

Lack of functional knowledge and skills on food and nutrition among housewives is responsible for their careless attitude to hygiene in food handling; excessive food loss and waste especially during kitchen preparation, and their inability to prepare and serve balanced nutrition meal to household members despite abundant food items around. All family members are affected but critically affected are new born and weaning babies, school-age children, pregnant and lactating women, the sick and elderly. This is the prevalent situation in most sub-Sahara countries that pose great concern towards achieving the SDG2 by the year 2030 (only 11 years a head). For some countries, communities and even families, culinary knowledge and skill is paramount priority now to contain hunger and malnutrition challenges within tolerable SDG2 levels where the remaining years to achieving the desired goal appears just impossible. In a community that is bedeviled with poverty, corruption and poorly enlightened yet naturally with vast food resources, vocational culinary lesson becomes most feasible option particularly for core actors (women) in the household food value chain to empower them for efficient and effective handling of food and nutrition issues in the family. It is on this premise that Food and Nutrition Vocational Center (FNVC) which is an adult education NGO provides short intensive weekend vocational training on food and nutrition for housewives in a densely local government area of Kano metropolitan in northern Nigeria. Three hours per day in borrowed classroom from local primary school within the housewives’ close surrounding area. Training focused on food hygiene and safety; household food loss and waste control, recipe innovation and homebound food business management. It is free training that lasts ten weekends and turned out 20-30 housewives every quarter (three months). An immediate opportunity that availed to the trained women is school meal business, preparing high quality safe and affordable meal to primary school pupils during morning break period. Been highly concerned caregivers to school-age children the trained women were quick to relate acquired knowledge with emerging opportunity in the ongoing official school feeding program and they are making tangible impact.

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/CL4W%20training%20session.pdf>

Rabiu Auwalu Yakasai

Founder/Director

FNVC

## Olutosin Otekunrin, Federal University of Agriculture, Abeokuta, Nigera

Name of Contributor: Olutosin A. Otekunrin

Institution Affiliation: Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta (FUNAAB), Nigeria

Submitted date: 5 June, 2019

Contribution to the Global Forum on Food Security and Nutrition (FSN Forum), an online discussion in Starting from 30 May to 20 June, 2019 with title “Sustainable Development Goals- your story of creating a food secure world” with special focus on SDG2 Zero Hunger.

Sustainable Development Goals - your story of creating a food secure world

Sustainable Development Goals - [SDG2 “Zero Hunger”](http://newsletters.fao.org/c/1yjFZQOpTVTChg9jWNssH9qK)

The Nigerian Story- Prospects and Challenges. This contribution is attached here.

Thank you

Attachment: <http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/FSN%205%20june%202019%20sbmission.docx>

## Max Blanck, FAO, Italy

Dear Colleagues,

First of all, let me thank you for the very interesting stories you shared over the past few days.

They paint a very interesting picture on how the realization of SDG2 is being tackled in your countries and of the challenges that remain. Your first-hand experience touches on many different issues with land degradation, intersectoral cooperation, funding, food loos & waste, nutrition, education and animal husbandry all being mentioned as important elements. This multitude of aspects reflect the very essence of the SDG and their comprehensive and cross-cutting nature. They also showcase the complexity of our fight against hunger and the efforts that are necessary to move towards a Zero Hunger world.

I would like to encourage you to keep sharing your stories, allowing fellow practitioners to learn from your experience of what worked – or didn’t – and how you overcame the challenges.

Looking forward to your stories!

Max

## Audrey Pomier Flobinus, Humanity For The World (HFTW), France

« **Do not look away, do not hesitate. Recognize that the world is hungry for acts, not words. Act with courage and vision**». Are words that have been spoken by Mr Nelson MANDELA and have touched my soul.

Driven by a universal unconditional love for humanity, guided by hope for a better future for humanity, in 2017, I began the creation of the first international NGO of speculative and operative aspirations based in the Caribbean in the territory. French ([https://www.humanityfortheworld.org](https://www.humanityfortheworld.org/)).

Indeed, **Humanity For The World (HFTW)**, the first humanitarian lobby in the Caribbean, is a non-governmental, non-religious, non-religious, non-profit, humanitarian and professional non-governmental organization specializing in the reduction of suffering in all its forms and in all its forms. defending the fundamental rights of all people in distress around the world and working in the world through the prism of the 17 Sustainable Development Goals (SDGs). In an island context, such as that offered by Martinique, such an enterprise remains marginal. Without funding to date, relying solely on the will of its members, the organization based in Martinique, enjoying a reputation in several countries (India, Indonesia, Haiti, Togo, Ghana, Senegal, Cote d ivoire, France (Martinique, Paris)), nevertheless manages to have a lasting impact on the world by participating in the setting up of the 17 Sustainable Development Goals (SDGs), we invite you to consult our achievements online (https: // [www.humanityfortheworld.org/our-realizations](http://www.humanityfortheworld.org/our-realizations)) and our Activity Report (2017-2018) online (<https://www.humanityfortheworld.org/business-reports>).

Even so, it has been demonstrated in 2018 that hunger has globally declined worldwide from 1 billion to 800 million individuals, According to a UN report, published in September 2018 world hunger continues to rise , 821 million people are now suffering from hunger and more than 150 million children are stunted, threatening the Zero Hunger goal.

Hunger in the world is an abnormal situation due to the unequal distribution of wealth on earth. These plural and multilevel inequalities are maintained by unjust world economic systems of predation favoring the domination of the strong over the weakest. Despite the efforts deployed by the United Nations to federate the States around the question of Humanity, the lure of gain, the profit at any price takes over the reason of Men. Change will only happen if men, without distinction of colors, cultures, religions, become aware of the universality of humanity. Only unconditional love could tip the future in favor of the human cause. With more than 800 million men still living in extreme poverty (with 1.24 and / or 1.90 dollard per day), hunger, inequality, poverty define the contours of the faces of misery. Today, Men are no longer aware of the situation of the world and change can only come from Man for Man.

Our proposal to wipe out hunger in the world, is to urge each organization working for the humanitarian cause to focus its efforts not on a single Sustainable Development Goals (SDGs) but on the joint achievement of at least 3 Sustainable Development Goals. (SDGs) by action, and in this case, to achieve SDG2 more quickly, we advocate working towards the joint achievement of the following 3 SDGs: SDG1: Poverty Eradication, SDG2: Combating Hunger or Food Security and Sustainable Agriculture, SDG10: Reduced Inequality, and annual assessment of Dedicated Indicators by area:

**SDG1: Poverty Eradication**

**Indicators**

Monetary poverty rate

Poverty rate in living conditions

Intensity of income poverty

Renunciation to consume protein for financial reasons

Renunciation of care for financial reasons

**SDG2: Fight Hunger or Food Security and Sustainable Agriculture**

**Indicators**

Renunciation to consume protein for financial reasons

Prevalence of overweight and obesity

Average diversity of arable crops

Organic farming and farms of high environmental value

Animal Exposure to Antibiotics (Animal Level of Exposure to Antimicrobials Indicator)

Consumption of phytosanitary products

Local breeds at risk of extinction

Water withdrawals

**SDG10: Reduced inequalities**

**Indicators**

Growth rate of average standard of living

Income inequalities

Inequalities of heritage

People with broadband at home

People who have connected to the internet in the last three months

Renunciation of care for financial reasons

Housing overcrowding rate

**In Haiti**

To illustrate our remarks, in 2017, **Humanity For The World (HFTW)**set up a humanitarian action **in Haiti**, more specifically at the school "Momance pioneers" in the community Momance located in the city of Léogâne (<https://www.humanityfortheworld.org/post/our-actions-in-the-direction-of-humanity>). This humanitarian mission was originally intended to jointly address SDGs 1: Poverty Eradication, SDG3: Fostering Well-Being and Health, SDG4: Quality Education, SDG5: Gender Equality, SDG10: Reduced Inequality. We observed, at the end of a year, that the population, prolonged our action by buying plans of corn, tomatoes, started a small agricultural production which participates today to feed sustainably the inhabitants of the community of momance. In conclusion, by feedback, in seeking to improve the lives of children and adults in the community, we finally had an action that had a long-term impact on the achievement of SDG2.

**In Martinique**

We have observed that **in Martinique**, referring to sustainable development, often return to refer to SDG7: Use of renewable energies. The analysis of this situation leads us to understand how the effects of a public policy in favor of the environment can lead to a lack of global information on the 17 Sustainable Development Goals (SDGs). Indeed, to encourage the French population to change their way of life, by adopting ecological gestures in favor of the environment and the safeguard of the planet, the French state had to put in place a number of measures aimed at attributing tax and financial counterparties to households and businesses.

The observation is the following: there is a lack of knowledge of other areas of Sustainable Development.

The services of the French state such as DEAL Martinique (Direction of the Environment and Development of the Litoral of Martinique) in partnership with certain associations of Martinique, initiated a work of awareness on the **SDGs14: aquatic life, ODD15: Protection of terrestrial flora and fauna, SDG6: Sanitation water.**

Nevertheless, Humanity For The World (HFTW) is the only organization on the island to offer an unprecedented vision by participating in the transversal achievement of the 17 Sustainable Development Goals (SDGs).

To act effectively, we must educate, inform, sensitize the population on the various global issues in relation to the 17 Sustainable Development Goals (SDGs), which is why we communicate daily on the subject through social networks. To quote the last 2 major communications :

From 30 to 05 May 2019, we linked a non-financial partnership with the **French Ministry of Ecological Transition and Solidarity**, to raise awareness about SDG2. To do this communication media (video and images) in French, English and Chinese have been published on a specialized online media (MediaTerre) and on social networks (Facebook, Instagram, Flickr, Twitter, YouTube, Linkedin, Pinterest) , to raise awareness, to inform on the Sustainable Development Goals, in particular SDG1, SDG2, SDG10.(<https://www.humanityfortheworld.org/post/humanity-for-te-world-hftw-partenaire-du-minist%C3%A8re-de-la-transition-%C3%A9cologique-et-solidaire-seed>)

**Video**: (<https://www.youtube.com/watch?time_continue=102&v=zrbNgf_6Sow>)

From 01 to 07 April 2019, we linked a non-financial partnership with the **REFEDD "French Network of Students for Sustainable Development**", to raise awareness on the 17 SDGs, To do this communication media (video and images) in French, English and Chinese have been published on a specialized online media (MédiaTerre) and on social networks (Facebook, Instagram, Flickr, Twitter, YouTube, Linkedin, Pinterest), to raise awareness, to inform about the Sustainable Development Goals , including SDG1, SDG2, SDG10 (<https://www.humanityfortheworld.org/post/humanity-for-the-world-hftw-partenaire-de-la-refedd-pour-la-promotion-des-17-odd-sedd-2019>)

**Video** : (<https://www.youtube.com/watch?v=qJs8mg4cJhE>)

Without having received any subsidies, our motivation is fueled by our vision for Humanity, "universal unconditional love". Thus, since 2017, we have begun training, information and democratization of the 17 SDGs among the people of Martinique and the world. Through the simple fact of our existence on a French territory of the Caribbean, by the communication of our actions, by the lobbying on the social networks and the breasts of the international spheres of power, in favor of the realization of the 17 SDGs we hope to arouse vocations, because the more we will be working for the cause, the more we will look at a better world.

« **We believe that education is also about the power of example** »

Dr.h.c Audey POMIER FLOBINUS.

## Brandon Eisler, Nutritional Diversity, Panama

***Nutritional Diversity Sciences in Panama is Unlocking the Door to Individual Sustainability.***

As individuals realize their potential and increased performance when consuming [an adequate dietary diversity](https://nutritionaldiversity.com/biodiverse-food-study-panama/) to address their nutrition needs, the individual is forced to seek [permaculture](https://nutritionaldiversity.com/permaculture/)sourced foods, in turn increasing the demand for [diversified agriculture systems](https://nutritionaldiversity.com/permaculture/), and reducing the demand of the [mono culture chemical agriculture model](https://nutritionaldiversity.com/monsanto-suit-glyphosate/). If no permaculture is discoverable in the individual's area, they may be interested in learning to produce their own natural diversely grown robust foods operation.

The realization that the stomach's [digestive culture](https://nutritionaldiversity.com/application/stomach-nutrition/digestive-culture/), now commonly known as the [microbiome](https://nutritionaldiversity.com/application/stomach-nutrition/digestive-culture/), which is the personal, individual garden of youth, vitality, performance and ability growing within us (the stomach), has been a very effective piece of information so we have noticed, in explaining the importance of [diet diversity](https://nutritionaldiversity.com/), and this is because there are waves of references to it from 'science,' and it is the hot topic today in [diet science](https://nutritionaldiversity.com/). The fact that this education wave comes to us in the nuclear age, 2019, is fairly baffling although with the focus now, looking forward the progressive science of nurturing and designing the digestive garden, is a fun and interesting science, that requires little schooling - at least if you can come up to speed with the [Nutritional Diversity core requirements, and experience](https://nutritionaldiversity.com/application/).

Let me remind also that it has been expert after expert and PhD after PhD that has ruined human health, robbed one nutrient after another and got us into an [agriculture model that kills our polinators off and kills us too](https://nutritionaldiversity.com/monsanto-suit-glyphosate/) - so even though it helps to reference this world of science who has effectively harmed more than help, at least in this field it will help us all in the long run to also mention that these guys are the wrong source of information.

Individual information discoveries (or re-discoveries) such as that [we need to eat a diverse spectrum of biological species in order to maintain proper health and support optimal ability and performance](https://nutritionaldiversity.com/biodiverse-food-study-panama/), and learning the skills in growing diverse crops, or harvesting wild nature for nutrition, should be the top priority in developing a food sustainable world, or reliable set of hunger crisis strategies. Education on how to use the land and the body should be basic, known by all and most important to our social culture that everyone know how to sustain themselves well. Curiously, rocket scientists may know nothing of the plant world we depend on, and more so the poor, the rich and the whole world over, outside of a few herbalists, botanists, students of native history or nature and permaculturists; the art of self sustainability is a lost one. Thank God, we have a [team of experimental geniuses in the diet world, to lead us into better health and performance](https://nutritionaldiversity.com/biodiverse-food-study-panama/).

That being said, I can't agree more with the FAO #1 goal of Eliminating poverty everywhere. This too is likely relived simply by the knowledge to do better and to use the full cycle of life and transformation of elements within the biology that is near primary to the human experience. Poverty is likely of the same root as the slave diet that almost the entire world lives by - [bad information](https://nutritionaldiversity.com/mental-culture-of-poverty/).

Poverty is the worst form of violence. ~ Mahatma Gandhi

Goal number two of eliminating hunger ...well, as I have already said above is as simple as sharing  the cutting edge diet information here. So share this information and teach one to fish. I need not quote for that...

To "Ensure healthy lives and promote well-being for all at all ages," simply use the[Nutritional Diversity Guide](https://nutritionaldiversity.com/application/), and you will achieve this health and wellbeing for all who adheres to it.

Inclusive and quality education for all, is deliverable like never before, yet, the distractions for young people are also there like never before on the same platform. That is the internet. So [education about permaculture](https://www.patreon.com/educationinpermaculture), diet and nutrition is all there, but who cares, and who is looking at that, are the questions with sad answers.

A cultural discipline and realization of the importance of discipline is lacking as if humans made it their purpose to rid themselves of every beneficial ritual it once had developed, and replace it with some sort of practice for lack of control or lack in character in something.

Rural poverty often times has no caring intermediary between their villages and the working information and knowledge, which creates a great opportiunity for the entrepenual or humanitarian spirited to come up with advocateds and trainers to deliver the information to those who need it  the most. This I think would be a fun job, and it's a job that creates jobs, spreads vital nutrients and diversity and raises endless innovated potentials in human performance, and in our ecology that we so depend.

Los kiddos urbanos now are into dance clubs, toxins and digital forms of exploration and entertainment far more that any pursuit of actual validity in anything worthwhile, like physical or mental performance or creating a new thing. Here lies a problem that education alone can not solve, especially easily accessible education like internet based permaculture learning for example, without the oversight or internal discipline cultivated in the young person is unseen, never watched, never learned and we watch our youth drift slowly into degrees of poverty and ignorance on all fronts. Learning from mistakes does not happen in the world of education, that world takes no responsibility for it's errors and neither do it's graduates who often times have minds with zero objectivity. The amount of confusion, and congestion in the informational or guiding realms are at all time highs. This is something that is only cleared up by limiting technological associates, going into nature, andgetting a full specturm Nutritional Diversity diet.

Diversification of energy manufacturing is great in itself. Solar generators can be placed through the world with minor impacts to nature. Individual and household energy generation while still highly underrated and likely widely not understood, is really a very capable, effective and efficient field of investment for the family.

"You could take a corner of Utah and Nevada and power the entire United States with solar power." - Elon Musk

Inclusive economic growths can start at the individual level also, and being that successful this would be the most sustainable standard, again I point the individual to diverse food production and independent individual energy production. In Costa Rica we have seen small hydro-plants developed for as little as 3 thousand dollars and they did not seem to effect the life around them at that small size. Solar and air plants are much cheaper and combined with batteries, led lights and diverse panel placement, these systems are more than sufficient to run the needs of the household or small farm.

Homemade production, and diverse goods are officially in demand. Thanks to the cutting edge athletic study here in Panama, along with their educational efforts, the market for individuals seeking alternative agriculture goods, and wild specialties also is growing exponentially. New ideas to deliver [well sourced diverse nutrition to consumers like this new supplement](https://nddiet.com/) are really going to help individuals realize how they should be eating and what kind of interchange with nature is going to get them to where they need to be. New business models are needed for the new species to hit the market looking for a whole new way.

The way we see it,[Nutritional Diversity Diet](https://nutritionaldiversity.com/introduction-nutritional-diversity/)and the individual discoveries made within it's dedicated studies end up being the number one goal that addresses all of the rest, pretty much unlocking the door to individual sustainability and much more.

Reference

[Elon Musk just made an incredibly important point about solar energy](https://www.businessinsider.com/elon-musk-solar-panels-to-power-the-earth-2015-12) - Business Insider

[Application of ND Science](https://nutritionaldiversity.com/application/) - Nutritional Diversity

## Bhubaneswor Dhakal, Nepal

Ongoing global changes can make unprecedented alterations in the state of some natural resources and their ecosystems services (ESs), especially in mountain agricultural landscapes. Considering the risk suggested by the Millennium Ecosystems Assessment, this study collected descriptive (qualitative) data in 14 Nepalese mountain farming communities through field observation, group discussion, and personal interview, and investigated changing conditions of ESs of various natural resources in agricultural landscapes and their repercussions on mountain communities. The results showed that global changes induced new resources and institutions for mountain farming practices and altered important socioecological processes determining ESs.

They have contributed to reductions in natural hazards and climate change and improvements in recreational and waste management services in mountain farming landscapes. Biodiversity status changes of the external factors in the agricultural landscapes are mixed: reasonably enriched plant species diversity and wildlife habitat, and seriously degraded or extinct indigenous species and genetic diversity. One of the serious negative changes is they have contributed to extinction of locally adaptable natural capitals and community heritages that had been developed through century-long socioecological processes and passed through extreme climatic variabilities and other environmental stresses at numerous times. The study determined that some recently emerging local biotic conditions result mainly from changes in the condition of water resources, not from changes in climatic conditions.

The external factors also hampered human input into soil formation in degraded lands, soil quality, soil-water conservation and local knowledge systems. Overall, the effects of the changes found mixed on human and environment health. This multiple natural resources-based study has contested some arguments and conclusions of popular literatures.

Read the full paper here: <http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Prof%201stSTOTEN_31984v2.pdf>

## Roger Leakey, International Tree foundation, United Kingdom

You may be interested in the story "From ethnobotany to mainstream agriculture: socially modified Cinderella species capturing ‘trade-ons’ for ‘land maxing'" for a sustainable world.

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Ethnobotany_Mainstream_Agriculture.pdf>

Best wishes

Roger

## Volker Korrmann, ewind Betreiber- und Vertriebs GmbH, Germany

You may be interested in a solution for low cost desalination of seawater or salted groundwater combined with a large area irrigation approach for agriculture and greening deserts.

Whitepaper in French: <https://app.box.com/s/pv66oaw9zkvuz0nhb5wkhyobixgiw7qq>

Whitepaper in English: <https://app.box.com/s/6154gxxr4a524ai3pgd9hxrvyiry5sq4>

## Olumide Odeyemi, Institute of Marine and Antarctic Studies, University of Tasmania, Launceston, Tasmania, Australia

Aquaculture has contributed immensely to food security globally. Due to high water content, nutritional content, and microbial growth, seafood is highly perishable. However, the spoilage mechanisms of some seafood remained unknown. Therefore, understanding the microbial spoilage mechanism of seafood will help to prevent food waste and economic loss especially in developing countries.

My doctoral research at the University of Tasmania, Australia has over the last four years focused on understanding the microbial spoilage mechanism of packaged seafood. My research unveiled the causes of spoilage of commercially packaged shellfish. The outcome of my research has, therefore, helped to prevent spoilage and also the development of a draft tool for predicting the shelf-life of packaged live shellfish. My research also identified volatile organic compounds that can be used as freshness and spoilage indicators in packaged seafood in addition to the study on the succession of the microbial community present in the seafood.

Overall, my research is helping to prevent seafood spoilage, thereby enhancing food security and achieving Zero Hunger (Sustainable Development Goal 2).

## Parasuraman Nagappan, M. S. Swaminathan Research Foundation, India

Dear all,

I am happy to share my paper on Youth and Sustainable Development Goals; Agriculture Food and Nutritional and Livelihoods Security.

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Youth_and_Sustainable_Development.docx>

Regards,

N.Parasuraman

## Mainsah Gilbert, NORSR Cameroon, Cameroon

ENSURING ACCESS TO SAFE, NUTRITIOUS AND SUFFICIENT FOOD ALL YEAR ROUND WHILE WORKING TOGETHER WITH SMALLHOLDER FARMERS

Agriculture is the largest employer in the world and the leading source of income and jobs for many households. Smallholder farmers despite their inadequate knowledge in advancing their awareness in modern farming technics are still providing up to 80 per cent of food consumed in the developing countries.

With limited knowledge they turn to use inorganic fertilizers and other products to increase their yields. Investing and working together with these smallholder farmers is an important approach in increasing food security, reducing malnutrition and undernourishment, controlling the volume of production per labour unit, the average income of food production and many other challenges faced by these smallholder farmers.

We at NORSR Cameroon are working together with smallholder farmers ensuring that all people have access to safe, nutritious and sufficient food all year round as such linking to poverty eradication and addressing malnutrion, ending hunger, ensuring access to nutritious food to everybody, increasing agricultural productivity and income, ensuring sustainable food production, maintaining the genetic diversity of seeds, as well as increasing investment in agricultural research and extension services, technology development through enhanced national, regional and international corporations.

Knowing very well that agriculture does not always reduce malnutrition, undernourishment and food security, it is our duty to work together with smallholder farmers, national and international organizations so that by 2030 we shall be able to achieve the [Sustainable Development Goals](https://www.globalgiving.org/sdg/?rf=ggad_19&gclid=Cj0KCQjwxYLoBRCxARIsAEf16-tj2t8WAkbaP_1K2FQyqsPpLsUYjYwkKabCcctgTBnkExkK-kC7fiYaAnqDEALw_wcB) and [SDG 2](https://www.globalgiving.org/sdg/no-hunger/) in particular.

## Dick Tinsley, Colorado State University, United States of America

I have reviewed the opening comment and glanced through all the comments, or at least those in English. I have several diverse comments I would like to add, but will do so on separate comments with links to various pages on the Smallholder Agriculture website I Manage. I believe these comments apply to most developing countries.

The first comment is a major oversight in the approach to development. That is the operational limits face smallholders. The agronomist, which includes myself, do a great job of determining the physical potential of an area, but small plot research does not address the operational resources need to expand the small plot research to a full field, farm, or smallholder community. It just assume it is not a problem. It often blames non-compliance with agronomic research as limited education or risk aversion. However, when limited to just manual tools it takes up to 8 weeks for basic crop establishment with the farmers working as hard as possible, but perhaps limited by diet. The real need is to provide the farmers with access to some forms of contract mechanization to remove the basic drudgery. Who in a typical development project is responsible to determine the labour requirements, the availability of the labour, and what are the rational compromises when that labour is not available? Has this fallen into an administrative void between the agronomist and social scientists? Please review the following webpages:

<https://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeasibility.pdf>

<https://webdoc.agsci.colostate.edu/smallholderagriculture/BrinksDrudgery.pdf>

## Dick Tinsley, Colorado State University, United States of America

My second comments is really an outgrowth of my first concern. It is the dietary energy balance of smallholder farmers. This gets to the major emphasis on nutrition. However, as I have reviewed the nutritional projects, the emphasis mostly academic with primary interest in providing quality nutrition particularly for pregnant and nursing women. What it does not address is the nutritional need to optimize economic opportunity. Since most of the intended beneficiaries are smallholder farmers or other manual labourers, the need is for sufficient calories to put in a full day of work. This is rarely mentioned in the project, and when it is the reference is for active people with a calorie exertion of 2800 kcal/day. I would contend that this represents an office worker with a healthy exercise program of 2 hr/day. That is far from the 8+ hrs a day a smallholder farmer is expected to work which has a calorie estimate I place at 4000+ kcal/day. Unfortunately the data on caloric consumption by smallholder is very limited often in the range of 2000 to 2500 kcal/day. That barely meets basic metabolism requirements with limited work energy. I think this does wonders to explain why farmers are taking 8 weeks for basic crop establishment, how often are our innovations for improving smallholder production expecting them to work harder? Where will that energy come from? As you address the issue of improved nutrition you might take a look as some of the tough choice they have to make in balancing nutrition with their income. Please review the following webpages:

<https://webdoc.agsci.colostate.edu/smallholderagriculture/ECHO-Diet.pdf>

<https://smallholderagriculture.agsci.colostate.edu/calorie-energy-balance-risk-averse-or-hunger-exhasution>

<https://smallholderagriculture.agsci.colostate.edu/ethiopia-diet-analysis>

<https://webdoc.agsci.colostate.edu/smallholderagriculture/DietPoster.pdf>

<https://smallholderagriculture.agsci.colostate.edu/1028-2>

<https://smallholderagriculture.agsci.colostate.edu/affordability-of-improved-nutrition-while-optimizing-economic-opportunities>

## Dick Tinsley, Colorado State University, United States of America

My third concern is the over emphasis on the cooperative business model to assist smallholder farmers. This is very disturbing because it only takes some brief computations on basic business parameters to show that reliance on a cooperative is far more likely to push smallholder farmers deeply into poverty than be a mechanism for poverty alleviations, despite the tremendous rhetoric to the contrary. The reason is the cumbersome administrative overhead costs associated with running a cooperative, particularly if the success of the cooperative requires seconded outside managers. This overhead cost will usually exceed the much promoted but never quantified financial benefits from bulking input purchases or produce for sale. When this happens you have to find a buyer who will pay extra for dealing with a cooperative, or reduce what you can pay the farmers, pushing them further into poverty.

The emphasis on cooperative in development projects goes back some 40 years and is based on the unsubstantiated vilifying claims that private traders were exploiting farmers. Such claims if not substantiated are slanderous and thus subject to litigation. Given the financially suppressed economy common to developing countries this is actually impossible. The limited buying power of the general population put tremendous downward pressure on consumer prices. Fortunately the farmers aren't that gullible and avoid the cooperatives like the plague leaving the development effort catering to a very small percent of the potential beneficiaries and even then the members’ side selling the bulk of their produce to the vilified private traders in contradiction to approved cooperative by-laws. The only market volume passing through most cooperatives is in-kind loan repayments and the net impact on the community economics is trivial.

Please review the following webpages:

[https://smallholderagriculture.agsci.colostate.edu/farmers-organizations-and-cooperatives-is-there-a-competitive-adantage](https://smallholderagriculture.agsci.colostate.edu/farmers-organizations-and-cooperatives-is-there-a-competitive-adantage/)

[https://smallholderagriculture.agsci.colostate.edu/request-for-information-basic-business-parameters](https://smallholderagriculture.agsci.colostate.edu/request-for-information-basic-business-parameters/)

<https://webdoc.agsci.colostate.edu/smallholderagriculture/ECHO-Private.pdf>

[https://smallholderagriculture.agsci.colostate.edu/envisioned-competitive-advantage-for-cooperatives](https://smallholderagriculture.agsci.colostate.edu/envisioned-competitive-advantage-for-cooperatives/)

[https://smallholderagriculture.agsci.colostate.edu/loss-of-competitive-advantage-areas-of-concern](https://smallholderagriculture.agsci.colostate.edu/loss-of-competitive-advantage-areas-of-concern/)

[https://smallholderagriculture.agsci.colostate.edu/perpetuating-cooperatives-deceptivedishonest-spin-reporting](https://smallholderagriculture.agsci.colostate.edu/perpetuating-cooperatives-deceptivedishonest-spin-reporting/)

<https://nextbillion.net/appeasement-reporting-development-projects/?utm_sq=fzx6zhiyh4&utm_source=Facebook&utm_medium=social&utm_campaign=NextBillionnet&utm_content=NBDailyPosts-Facebook>

## Dick Tinsley, Colorado State University, United States of America

My final comment concerns Monitoring & Evaluation. This is a major concern as it has to be done objectively and independent of the projects being monitored. The most important objective of an M&E program is to guide future programs to better serve the beneficiaries. Thus in addition to protecting the under writing taxpayers in assuring their taxes are being effectively invested and the beneficiaries are profiting as much as possible, the M&E effort also represents the beneficiaries. What they cannot be is a tool for propagandizing the projects. Unfortunately, the USAID MEL (Monitoring, Evaluation, & Learning) program is far more intent on propagandizing then evaluation and does wonder to develop impressive but meaningless number, making innovations that by all normal standards are total failures, appear to be highly successful. This does nothing for the beneficiaries, and reinforces the failure to be included in future projects. Hopefully, FAO can do considerable better and develop M&E programs that effectively guide future projects.

Please review the following webpages:

[https://smallholderagriculture.agsci.colostate.edu/monitoring-evaluation-the-voice-of-the-beneficiaries](https://smallholderagriculture.agsci.colostate.edu/monitoring-evaluation-the-voice-of-the-beneficiaries/)

[https://smallholderagriculture.agsci.colostate.edu/mel-impressive-numbers-but-of-what-purpose-deceiving-the-tax-paying-public](https://smallholderagriculture.agsci.colostate.edu/mel-impressive-numbers-but-of-what-purpose-deceiving-the-tax-paying-public/)

## Thatchinamoorthy C, Annamalai University, India

Dear all,

I am really happy to share my paper on “Nutrition Extension – An Innovative Strategy for Enhancing Nutritional Security”.

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Nutrition%20Extension%20%E2%80%93%20An%20Innovative%20Strategy%20for%20Enhancing%20Nutritional%20Security.doc>

Regards,

C.Thatchinamoorthy

Ph.D. Research Scholar

Department of Agricultural Extension

Faculty of Agriculture

Annamalai University

## Thatchinamoorthy C, Annamalai University, India

The agricultural paradigm is already undergoing a shift with focus from cereal production to diversified farming.

Horticultural crops besides improving biological productivity and nutritional standards also have enormous scope for enhancing profitability. This group of crops comprising fruits, vegetables, root and tuber crops, plantation crops, medicinal and aromatic plants, spices and condiments and ornamental crops, would constitute core of any such agro-economic strategy. Past investment has been rewarding in terms of increased production, productivity and export of horticultural produce.

However, challenges confronting are still many. Although, the country is second largest production of fruits and vegetables; the availability of fruits and vegetables still continues to be much below the dietary requirements. With increase in per capita income and accelerated growth of health conscious population, demand for horticultural produce is on increase which is expected to further accelerate, which will require more production.

Consequently, horticultural development has to be seen as integrated approach, addressing important gaps, in harnessing the potential through targeted research with focus on enhancing efficiency. Thus, organic driven horticulture is expected to address the concern for complimentary and nutritional security, health care leading to ultimately economic development.

## Natalia Kireenko, Institute of System Studies in the Agro-Industrial Complex of the National Academy of Sciences of Belarus. Belarus

Good day. My name is Natallia Kireyenka. I represent the Institute of System Studies in the AIC of the National Academy of Sciences of Belarus. I work as a Deputy Director for Research. My main research areas are food security, agricultural trade policy, marketing and logistics.

In 2015, the Republic of Belarus endorsed the UN Agenda for Sustainable Development until 2030 and expressed strong support for its implementation through the achievement of relevant Goals.

Belarus as a subject of the world economy pursues an active socio-economic and agrarian policy, which is fully consistent with the UN Millennium Development Goals in the field of sustainable agricultural development and is aimed at improving the quality of life of the population. The Doctrine of National Food Security until 2030 was developed in Belarus. This is a strategic document. I was directly the developer of this document.

For Belarus, science-based criteria and parameters for the development of national food security were developed for the first time, which take into account current trends and prospects for the development of the national agro-industrial complex, the welfare of the population, domestic competitive advantages in the social, economic and natural resources spheres, as well as the influence of the world food system. Fundamentally new mechanisms of monitoring, management and regulation, as well as regulatory and legal support of national food security, which are fully consistent with the existing mechanisms of state regulation of the social and economic development of the republic, are proposed.

Studies show that the modern structure of agricultural production makes it possible to guarantee the physical availability of food for the population in the energy rating of 3241 kcal per person per day. This virtually eliminates hunger and malnutrition (for reference: in 2017 in Belarus, 5.9% of the total population in the country fall into the category of the poor). The country produces 841 kg of grain per person per year, 675 potatoes, 127 meat, 771 kg of milk, 375 eggs. The country consumes 89 kg of meat and meat products per person, 254 – milk and dairy products, 145 – vegetables, 79 kg of fruits and 288 eggs. In general, the level of nutrition is not limited to the resources of its own production, although the diet of Belarusians. It remains unbalanced in quality parameters.

According to the results of 2017, the integral index of food security in the Republic of Belarus amounted to 1.01, which indicates the physical accessibility of agricultural products, raw materials and food. Thus, the index of agricultural production, raw materials and food is 1.16, the energy value of the diet is 0.95, the consumption of basic products is 0.99, the nutritional value of the diet is 0.95.

Currently, we continue to conduct research in this area. They are comprehensive and innovative, meet international criteria, and are aimed at achieving the Sustainable Development Goals.

## Pabitra Paramanya, Mennonite Central Committee, India

We are all committed to achieve SDG2 beside all other SDGs. I belief this SDG 2 is our top most priority as if people have access to safe food & no hunger, then only we can move for al other SDGs.

My work since 2009 has been helping many underprivileged communities in India (Eastern States) through different food security & sustainable agriculture projects. Mennonite Central Committee (MCC) is working on most of SDGs where SDG2 is our priority. As we are investing on small holder farmers and working together by understanding their context well and planning is very essential to achieve food security. Many young farmers in my projects are coming in front and they are showing the best way that agriculture cannot remain same. When small farmers and local farm science center extension institute (scientists) are working side by side then achieving goal becoming easier. Most of the smallholders are suffering for water stress throughout my country India. MCC and one of its partner addressing this water issues in Odisha state, very easily adopting the spring water harvest system in Eastern Ghat hills. I found that women members are highly benefitted with all smallholder farm families. I have attached two stories of my project.

*Women living with dignity -Water is the engine of change*

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Womens%20living%20with%20dignity_story%20by%20Pabitra.docx>

*Dreaming big*

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Dreaming%20Big_story%20by%20Pabitra.docx>

## Mercy Butta, Tanzania Ministry of Agriculture, United Republic of Tanzania

Creation of a food secure world is a very interesting goal to achieve worldwide but I think it should not be considered the same worldwide.

Things are different in the developing world and the situation is different in many developing countries as we focus on increasing productivity and forget about food safety issues.

We have improved seeds and all sorts of improved inputs for better productivity but then the use of GAPS is very minimum.

Also, authorities that are responsible to ensure people consume safe foods, concentrate more on imports and exports, rejected food produces are returned to the countries to be consumed by citizens.

There is a gap in ensuring that citizens eat safe food of hihyalityborneith vrhigh how the food is safe Inspection.

## Max Blanck, FAO, Italy

Dear all,

Thank you so much for all your insightful comments.

I am particularly impressed by the multitude of issues your contributions touched upon. Aquaculture, nutrition education, food safety, nutrition, monitoring & evaluation, horticulture, access to water, extension services, youth and ethnobotany have all been mentioned.

This reflects very clearly the multidimensional nature of our struggle towards realizing SDG 2 "Zero Hunger". It also shows that one of the trickiest aspects lies in the harmonization of the work and in effective inter-sectorial cooperation.

To allow newcomers to this discussion to get up to speed, I invite you to have a look at the latest two digest that provide an overview of the exchange so far:

[**Digest 1**](http://newsletters.fao.org/q/16vptBEkAzd/wv)

[**Digest 2**](http://newsletters.fao.org/q/16vpu3XFnzi/wv)

Thank you very much once again and keep your stories (experiences, reflections, papers, photos, videos, etc.) coming!

Max

## Kamrul Islam, Cotton Development Board, Bangladesh

Dear All,

I would like to share my idea with you. With my more than 25 years working experience on agricultural research and development, my concept for food secure world is:

For the achievement pf SDG 2: “End hunger, achieve food security and improved nutrition and promote sustainable agriculture” by 2030 we must prioritize the need of the smallholder farmer as agriculture in the developing countries mainly undertaken by smallholder farmers who constitute over two-thirds of the global poor, food insecure and most vulnerable population. For this purpose, we need to insure the right inputs in right time, real time advisory services and ensure the selling price of the farm products.

These can be achievable if we can connect directly farmers with the input dealer, advisor and consumer in a loop using ICT tools such as mobile APP.  Currently, these linkage are broken, passes through many intermediaries and non-transparent. Consequently, smallholder farmers are not using right input, have lower yield and lower selling price while the consumer has less trust of food safety what they buy from market. If we want to create a responsible safe food system, we must create direct link between consumer and producer that will insure the higher return for the smallholder farmers.

Thank you.

Dr. Md. Kamrul Islam

Senior Scientific Officer

[Cotton Development Board](http://www.cdb.gov.bd/)

Khamarbari, Farmgate

Dhaka-1215, Bangladesh

Website: <https://unipartenop.academia.edu/MdKamrulIslam>

## Valentine Obiasogu, University of Ibadan & The International Association of Students in Agriculture and Related Sciences, IITA agripreneur, Nigeria

When George Orwell wrote Animal Farm, his mission was different. Reading this book again and again is a reassurance that it has a message for every reader. In a world where food is scare, we also need to talk about the quality of the ones we produce. Just like crops, meat is a composition of the many activities that involves its production. Unethical meat production releases harmful deposits that may cause health issues if consumed. To this end, I advocate for Animal Welfare particular in Nigeria- Africa's most populous Nation. Animal welfare can be in degrees. Animal welfare for human well being can be said to be more appropriate in Africa where human welfare is still an issue. This is a way of meeting up to SDG2, of ensuring zero hunger, of creating a food secure earth.

Valentine Odinakachukwu Obiasogu  
Department of Animal Science,  
University of Ibadan.

## Adebayo Depo, Togo

Original contribution in French

1. Notre travail à nous est d'aider les producteurs à travers les informations qui contribuent à réduire la fain et les formations sur les nouvelles méthodes et pratiques qui tendent à préserver la nature tout en assurant la sécurité alimentaire.

Après l'adoption des ODD, nous nous sommes plus focalisés dans la production agricole en vue d'apporter aussi notre pierre à l'édifice. Nous avons aussi commencé par utiliser les TIC en vue d'augmenter cette production.

2. Grâce à notre plateforme Web [www.agribusinessdata.com](http://www.agribusinessdata.com/) nous apportons l'information à temps réel aux producteurs pour leur permettre de mieux analyser la situation et de prendre des décisions importantes. Pour garanti r une faim zero, il va falloir aussi travailler les modèles et techniques de conservation, et pour ce fait nous accompagnons les producteurs dans la quête de cette résolution.

3. Les producteurs accompagnés sont suivi pour pouvoir récolter les impacts que ce changement a eu dans la lutte contre la faim. La meilleure expérience que nous avons est que ces petites entreprises arrivent à se certifier en de petit label qui garantit la qualité de leur produit et par conséquence montre leur impact sur la faim et la santé de nos populations.

English translation

1. Our job is to help producers by providing information that could reduce hunger, as well as training on new methods and practices aiming at preserving nature while ensuring food security.

Following the adoption of the SDGs, we have focused more on agricultural production in order to make a contribution to the process. We also began by using ICTs to increase production.

2. We provide real-time information to producers through our web platform [www.agribusinessdata.com](http://www.agribusinessdata.com) to help them better analyze the situation and make important decisions. To achieve zero hunger, we also need to work on conservation models and techniques, which is why we are supporting producers in pursuing this resolution.

3. Supported producers are monitored so that they can capture the impacts that this change has had in the fight against hunger. The best experience we have is that these small businesses manage to certify themselves as small labels guaranteeing the quality of their products and consequently showing their impact on hunger and the health of our populations.

## John Ede, Ohaha Family Foundation, Nigeria

Firstly in parts of Nigeria where the bulk of the food is being produced, is experiencing an upsurge in farmers/herders, clashes, some areas are seeing banditry and insurgency causing hunger and malnutrition, and deaths.

To ensure we have a food-secure world in Nigeria, especially in rural farming communities in Nigeria, we are providing health and well-being services to the farmers and the herders in their communities, because we have learned that the health and well being of the farmers will ensure that farmers can produce food, and also save cost in accessing healthcare services, which would ordinarily be contributed to the food production.

We are also training and teaching local farmers on the need to form a cal association to access financial support from the government and other donor groups to increase food security.

We are also training farmers on modern farming techniques, aimed at improving food production. Part of the training and local capacity building initiative include training farmers on soil health and different types of farming techniques to keep the ecosystem fit for continues use and maximize production.

## Noemi Stadler-Kaulich, Mollesnejta – Centro de Agroforestería Andina, Bolivia

Original contribution in Spanish

Los Objetivos del Desarrollo Sostenible (ODS) fueron declarados para lograr la prosperidad de todos los pueblos en el mundo a través de actividades que protegen el planeta. Entre estos destacan como ODS2: seguridad alimentaria, gestión sostenible de los recursos naturales, producción responsable a través de una agricultura sustentable, acción por el clima y protección de la vida de los ecosistemas terrestres.

La agroforestería dinámica consiste en la asociación de cultivos y/o frutales con “especies acompañantes” en forma de alta densidad y diversidad. Sistemas agroforestales dinámicos imitan la naturaleza, son diversos, ofrecen servicios ambientales múltiples, producen alimentos agroecológicos y al mismo tiempo es protegido el ecosistema local y los recursos naturales. La utilización del material de poda en forma de biocarbón activado y madera rameal fragmentada es un aporte a la mitigación del cambio climático.

En Mollesnejta – Centro de Agroforestería Andina se está experimentando desde 20 años con éxito la asociación de cultivos y/o frutales con especies nativas e introducidas que apoyan como vegetales acompañantes a las especies productivas a través de:

* la protección contra la insolación, las temperaturas extremas y la evapotranspiración, ofreciendo condiciones amigables para la flora y fauna;
* la simbiosis con bacterias y micorrizas a nivel de las raíces logran la nitrificación del suelo, la disponibilidad de fosfatos y de otros nutrientes, lo que hace innecesario la aplicación de fertilizantes químicos;
* la capa de mulch y el aumento de la materia orgánica en el suelo por la hojarasca, el material de poda y la constante renovación de raicillas mejora la fertilidad del suelo y su capacidad de almacenar la humedad;
* por sus exudaciones que actúan como repelente contra plagas y logran un equilibrio natural contra enfermedades no hay necesidad de aplicar pesticidas.

Las ramas que se obtienen por la poda de las especies acompañantes pueden ser procesados en Madera Rameal Fragmentada que (1) se utiliza como material de mulch para conservar la humedad en el suelo; (2) es introducido a la capa arable del labrado con el fin de aumentar su contenido de materia orgánica para fortalecer la biota y su capacidad de almacenar la humedad.

Las ramas más gruesas pueden ser carbonizadas (biocarbón) y después mezcladas con guano, compost, orina y otros sustratos que contienen nutrientes para los vegetales. Este carbón activado esta aplicado en los cultivos y/o frutales. Una característica particular del carbón es su capacidad extraordinaria de almacenar nutrientes y humedad, manteniéndoles disponibles a nivel de las raíces de las especies cultivadas.

La poda en las parcelas agroforestales dinámicas es una actividad necesaria. Mayor densidad de plantación más se debe podar para asegurar el espacio, la ventilación y la entrada de la luz para los vegetales productivos.

Tanto la utilización de la madera rameal fragmentada como el carbón aumentan el carbono en el suelo. Entonces, estas prácticas son un sumidero de CO². Aparte de fertilizar el suelo y darle la capacidad de almacenar la humedad aportan a la mitigación del cambio climático.

Resultados obtenidos en MOLLESNEJTA bajo las condiciones de un suelo erosionado y pedregoso, un clima semiárido y temporadas de sequía que duran hasta ocho meses:

* La aplicación del mulch, de la madera rameal fragmentada y del carbón activado está permitiendo reducir el riego para el cultivo de la cebolla y los frutales (manzano, pera, cítrico, pacay, níspero, guayaba) de manera considerable (aproximadamente la mitad).

Investigaciones de:  
Marcelo Bustamante: Ahorro de agua de riego con la aplicación de carbón vegetal y sach’a guano en la producción de cebolla. Tesis de licenciatura en Ingeniería Ambiental, Universidad Católica Boliviana, Cochabamba/Bolivia 2016.

Lorenz Beister: Conservación de la humedad del suelo a través de la aplicación de la madera ramal fragmentada en el valle semiárido de Bolivia, Investigación de pasantía, Technische Universität München/Alemania, 2015

Marco Guarachi Condori: Efecto de la Madera Rameal Fragmentada (MRF) en un suelo con cultivo de cebolla (Allium Cepa) con bajos porcentajes de humedad y materia orgánica en la estación experimental de Agroforestería andina MOLLESNEJTA en Combuyo- Cochabamba/Bolivia, Tesis de licenciatura en agricultura, Universidad Pública de El Alto/Bolivia 2017

* La asociación de la vid (Vitis vinífera) con el Tagasaste/Árbol falso de Alfalfa (Chamaecytisus proliferus ssp palmensis) es beneficioso, dado que el Tagasaste es leguminosa, quiere decir nitrifica el suelo, tiene simbiosis con micorriza deliberando fosfatos en el suelo, sirve de tutor para la vid, le protege contra mal tiempos y la insolación durante su estado juvenil, es fácil de podar y como su ciclo de vida es de unos 15 años, se auto elimina cuanto el fuste de la vid esta estable; además las ramas del Tagasaste son forraje.

Constatación a través de observaciones de la asociación vid con Tagasaste.

* Se ha constatado la presencia de micorriza en las siguientes especies nativas en la región andina: Chacatea (Dodonaea viscosa), Tipa (Tipuana tipu), Jarc’a (Acacia visco), Jacaranda (Jacaranda mimosifolia), Chirimolle (Zanthosylum coco), Pacay (Inga feuillei), Tara (Caesalpinia spinosa), Chilijchi (Erithrina falcata) y Lluvia de oro (Tecoma cochabambansis) que lleva a un desarrollo favorable y una mayor resistencia a la sequía en los cultivos asociados.

Investigaciones de:

Fabian Sauter: Agroforestería andina en el Valle de Cochabamba, Investigación de pasantía, Technische Universität München/Alemania, 2017

Philipp Lichtenauer y Maxim Schunewitsch: Especies nativas en el Valle de Cochabamba y su asociación con micorriza, Investigación de pasantía, Beuth Hochschule für Technik, Berlin/ Alemania 2019

* Se ha podido observar los beneficios productivos de las especies micorrizadas arriba mencionadas en los frutales asociados. En noviembre 2019 se comenzará un ensayo con la Chacatea (Dodonaea viscosa) y el Tagasaste (Chamaecytisus proliferus ssp palmensis) en asociación con cultivos comunes en la zona.

Archivo adjunto: <http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Agroforester%C3%ADa%20din%C3%A1mica_Mollesnejta-Centro%20de%20Agroforester%C3%ADa%20Andina.pdf>

English translation

The Sustainable Development Goals (SDG) are a call for action to achieve global prosperity while protecting the planet. Some of the key targets are improving food security and ensuring sustainable food production systems (Goal 2), achieving the sustainable management of natural resources (Goal 12), taking action to combat climate change and its impacts (Goal 13) and protecting terrestrial ecosystems (Goal 15).

Dynamic agroforestry involves planting agricultural crops and/or fruit trees and integrating "supportive species” in the same space to create dense environments of high diversity. Dynamic agroforestry systems mimic nature, are diverse, offer multiple environmental services, produce agroecological food and protect local ecosystems and natural resources. The use of their pruning material to produce activated biochar and ramial chipped wood contributes to mitigate climate change.

In Mollesnejta (Andean Agroforestry Centre) agricultural crops and/or fruit trees have been successfully integrated with native and introduced species for 20 years. These support the productive species by:

* providing protection against sunshine, extreme temperatures and evapotranspiration, and providing favourable conditions for flora and fauna;
* enabling the symbiosis with bacteria and mycorrhizae at root level that nitrifies the soil and makes phosphates and other nutrients available, making the application of chemical fertilizers unnecessary;
* creating a layer of mulch and increasing the organic matter in the soil due to the forest litter, pruning material and continuous root renewal, improving soil fertility and soil moisture storage capacity as a result;
* oozing out different substances that repel pests and provide a natural protection against diseases, removing the need for the application of pesticides.

Pruning branches from the supportive species can be processed into ramial chipped wood which (1) is used as mulch material to preserve soil moisture; (2) is introduced in the topsoil to increase its organic matter content with the aim of strengthening the biota and increasing its moisture storage capacity.

Thicker branches can be carbonized (producing biochar as a result) and then mixed with guano, compost, urine and other substrates containing plant nutrients. This activated carbon is then applied to agricultural crops and/or fruit trees. One of the key features of this carbon is its extraordinary ability to store nutrients and moisture, keeping them available at root level of the productive species.

Pruning in dynamic agroforestry plots is necessary. The higher the planting density, the harder the pruning to provide the necessary space, ventilation and light for the productive vegetables.

The use of ramial chipped wood and biochar increase soil carbon. Therefore, these practices can be considered a CO2 sink. Apart from fertilizing the soil and facilitating moisture storage, they contribute to mitigate climate change.

The following results have been achieved in MOLLESNEJTA, a research station surrounded by eroded and stony soil, subject to a semi-arid climate with dry periods lasting up to eight months:

* The application of mulch material -ramial chipped wood and activated biochar- is significantly reducing (by approximately 50%) the amount of water used to irrigate onions and fruit trees (apple tree, pear tree, citrus trees, pacay, medlar tree, guava tree).

Related research work:  
Marcelo Bustamante: Ahorro de agua de riego con la aplicación de carbón vegetal y sach’a guano en la producción de cebolla. Tesis de licenciatura en Ingeniería Ambiental, Universidad Católica Boliviana, Cochabamba/Bolivia 2016.  
Lorenz Beister: Conservación de la humedad del suelo a través de la aplicación de la madera ramal fragmentada en el valle semiárido de Bolivia, Investigación de pasantía, Technische Universität München/Alemania, 2015  
Marco Guarachi Condori: Efecto de la Madera Rameal Fragmentada (MRF) en un suelo con cultivo de cebolla (Allium Cepa) con bajos porcentajes de humedad y materia orgánica en la estación experimental de Agroforestería andina MOLLESNEJTA en Combuyo- Cochabamba/Bolivia, Tesis de licenciatura en agricultura, Universidad Pública de El Alto/Bolivia 2017

* Integrating vine (Vitis vinífera) and tagasaste (Chamaecytisus proliferus ssp palmensis) is beneficial for various reasons. Tagasaste is a legume and as such nitrifies the soil, it forms symbiotic associations with mycorrhiza releasing phosphates in the soil, it guides the vine and protects it against bad weather and sunshine during its growing stage, is easy to prune, it has an average life cycle of 15 years, it decomposes itself once the vine shaft is stable and its branches can be used as forage.

These benefits have been confirmed by monitoring the integration of vine and tagasaste.

* Mycorrhiza have been found in the following native species in the Andean region: chacatea (Dodonaea viscata), tipa (Tipuana tipu), jarc'a (Acacia visco), jacaranda (Jacaranda mimosifolia), chirimolle (Zanthosylum coco), pacay (Inga feuillei), tara (Caesalpinia spinosa), chilijchi (Erithrina falcata) and lluvia de oro (Tecoma cochabambansis). Mycorrhizal fungi promote the development of the integrated crops and increase their drought resistance.

Related research work:

Fabian Sauter: Agroforestería andina en el Valle de Cochabamba, Investigación de pasantía, Technische Universität München/Alemania, 2017

Philipp Lichtenauer y Maxim Schunewitsch: Especies nativas en el Valle de Cochabamba y su asociación con micorriza, Investigación de pasantía, Beuth Hochschule für Technik, Berlin/ Alemania 2019

* The integration of the mycorrhized plant species mentioned above and fruit trees has yielded productive benefits. A trial -integrating chacatea (Dodonaea viscose) and tagasaste (Chamaecytisus proliferus ssp palmensis) into common crops in the area- will be conducted in November 2019.

Attachment: <http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Agroforester%C3%ADa%20din%C3%A1mica_Mollesnejta-Centro%20de%20Agroforester%C3%ADa%20Andina.pdf>

## Maria J.I. Briones, Universidad de Vigo, Spain

Soil biodiversity has to be included in any management policy if we aim at increasing soil health, promoting food production and reducing costs. Soil organisms play a key role in delivering ecosystem services and their abundance, diversity and functional structure must be preserved. Soil protection must include soil biodiversity and management practices have to be implemented to ensure soil biodiversity: stop removing crop residues, keep a plant cover over the soil surface, and decrease the additions of agrochemicals.

Our research has shown that intensive management practices reduces soil biodiversity and soil becomes depleted in nutrients. Consequently, these nutrient losses might not compensate the investments in mineral fertilizers. See more:

<https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.13744>

<https://www.frontiersin.org/articles/10.3389/fmicb.2019.00686/full>

Our current studies also suggest that organic farming promotes not only soil biodiversity but also increases the nutrient content of the fruits produced.

## Helga Vierich-Drever, Yellowhead Tribal College, Canada

The Green Revolution, especially use of improve varieties and chemical fertilizers and other inputs, is one such wizardry of ecological upward manipulation. Adding chemical fertilizers and other inputs to crop varieties vastly improved by the breeder’s art: experimental crosses and hybridization, was among the factors credited with averting starvation in the last decades of the 20th century.

I worked for a Green Revolution Institute, the International Crops Research Centre for the Semi-Arid Tropics, (ICRISAT) during the 1980s. There I found a common assumption that people in subsistence economies, in developing nations, were suffering frequent short falls of food production. it was also assumed they had hit a ceiling of carrying capacity: they were not able to keep up with their rising population. Adding improved crops, augmenting soil fertility with chemical fertilizers, and yield improvement though other inputs like herbicides, pesticides and fungicides; these were the wizard’s gifts to prevent famine and starvation.

Here is my own dilemma: I did not find starvation within the rural areas where I was stationed in Burkina Faso, which was then one of the poorest countries in the world (lowest $.day figures).

My genealogical data indicated that for the period prior to aobut 1960, a rate of infant and childhood mortality that was  close to 30%, on average. Annually, factored against the death rates for all adults, this gave a modest annual growth rate of .07% to .05%.  I also did not see evidence of extreme poverty – if families were put at risk by illness or the death of a parent, they were allotted sufficient cereal from the headman’s granaries (consisting of the collective surpluses of all households in the lineage) until they could recover.

The youngest families in the genealogies, however, had much lower infant and childhood mortality. Their completed family sizes looked much larger, in some families it was doubled. The differences appeared, to me, attributable to vaccination programs initiated in the country in the late 1960s and throughout the 1970s.  There had been efforts through the WHO and Save-the-Children funded campaigns to extend vaccination to rural areas such as those where our study villages were located. Before this there had been a general resistance to such campaigns among rural populations in French West Africa.

My own experience, therefore,  indicated that perhaps the take-off of population growth in these regions had more to do with the success of vaccination programs and the extension of other aspects of medical care and sanitation, which reduced infant and childhood death rates. I was particularly struck by an example of a couple who had lost all but one of a dozen children (born during the 1940s and 1950s) to what appeared, from the descriptions given, to have been tetanus infections following the cutting of the umbilicus.  This was striking in contrast to their only child, a son, who had five surviving children ranging in age from 16 years to 18 months, all born during the late 1970s and early 1980s, when I interviewed this extended family in 1983. They had only lost two children during that time, both during an outbreak of some kind of fever, possibly dengue or yellow fever. I personally got dengue while I was in the field. It is still fairly common there.

As a result of these observations, I am sceptical of the idea that most people, in traditional subsistence economies, go hungry because of inadequate yields. I found substantial surplus production was being concentrated in the granaries of headmen and village chiefs. These leaders traditionally deployed these surpluses when drought caused famine\*1.

In my own view, the Green Revolution may have saved the lives of farming people on land degraded or marginal for agriculture but it was due to the fact that the better land had been take over by colonial plantations and later by commercial ranches and crop operations.

It was a nice idea – save the small farmer all over the world, in India, the Middle East, South America, and Africa but it was, I eventually concluded, in error when applied to tribal societies that showed no evidence of soil damage from over-cultivtion of land, no evidence that malnutrition was common, and which still had local political systems in place that secured surpluses for storage against drought. These traditional small holder subsistence farming economies were perfectly capable of feeding the people within them, and systems like slash and burn were even sustainable and protective of ecological diversity, keeping up to eighty percent of the village lands in secoundary growth and forest. This large area of common land provided supplimental food and fuel tothe villagers, as well as sustiaaning the penetration of rainfall into the water table and keeping wells, ponds, and rivers from either flooding or running dry.

Today, like other traditional indigenous economies, people in these systems are being systematically converted to a much riskier, unsustainable, and ecology-simplifying food production system that is creating socio-economic stratification. Norman Borlaug’s work – arising out of his desire to help people in degraded farming lands, has been turned to the further commercialization of the remaining landscape of the planet.

Of course some families in the ICRISAT villages appeared more prosperous than others. All human societies are marked by disparity of effort and luck, which sometimes manifests as a difference in family size, and may also translate as differences in conservative “traditionalists” and progressive “entrepreneurs”.

I observed this difference deepen through the extension of Green Revolution technologies to the rural Sahel villages. As chemical fertilizers became available, the primary effect was an increase the length of time a piece of land could be cultivated. Instead of being fallowed after a few years and thus returned to the commons, such land was now cultivated for decades with only brief fallows. And it was even being passed down within the family, as a kind of “farm tenure”.

Secondly, the chemical fertilizers, and other inputs like herbicide and insecticide, were subsidized for farmers who were willing to grow a commercial cotton crop. This was done through policies of the agricultural extension services operating in Burkina Faso at the time. I am certainly not suggesting that all of this was down to the “green revolution” efforts of scientists at my institute. They were more interested in promoting cultivation of the sorghum and millet varieties they had been developing. The increased length of cultivation on any one piece of land, and the fact that this pattern was often tied to a commercial crop meant that “entrepreneurial” farmers generally had far more land under cultivation than traditional subsistence farming families. Only some, of the traditionalists, were able to afford the chemical fertilizers. Others often lacked the extra labour (being younger households or those with few sons) to tackle clearing extra land for a commercial crop, as well as for a food crop.

Social stratification was beginning to appear, as well as a shift in land tenure, as land use intensification occured.\*2

A few of the bigger and more entrepreneurial family farms enlarged their holdings from year to year, while everyone else continued to farm small and temporary plots. Some particularly small or older households began to work as additional labourers for larger households. When this was not arranged along lines of kinship, but rather as a contract paid “in kind”, they got some of the crop. If it was arranged by kinship, these households were provided for during the rest of the year from the granaries of their lineage headman. Essentially, however, a landless class of rural labourers was being created. The children of these landless families got discouraged and migrated out of the village to seek work on plantations in the Ivory Coast, or in the growing cities like Bobo-djuolasso or Ougadougou. It was among these migrants, in the poor neighbourhoods of these cities, that I saw some evidence of malnutrition.

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\*1 People who were promenant in these communities were not wealthy, except in the trust of other people. They were the peace-makers, the truth tellers, and the moral examples that the young modelled themselves after. “Big men” and chiefs were not so much exercising power over others as they were exercising responsibility to others.Let me give an example to show what I mean: I was interviewing households in an African village in Burkina Faso, on the subject of how much grain they had in store after harvest. Every one of them had cultivated more than they needed in order to contribute to the stores of the village headman. I then interviewed this headman, and he proudly showed me granary after granary.He told me there was enough grain in store to feed the village through seven years of drought.This was a moment of revelation for me. I had been thinking of him as a powerful and greedy man, who was enriching himself through his political position. Suddenly I saw the man for what he was – an ethical, methodical, and diligent person striving to live up to the great responsibility entrusted to him. He had to constantly monitor those granaries, checking for damage by rot or vermin, and carefully assess all withdrawals from this common fund.

\*2 Boserupian intensification has helped explain land clearing even in the deep past (Ruddiman and Ellis 2009). At present, as human populations are growing and urbanizing, agricultural demand has increased so much that the most intensive agricultural systems are becoming dominant. The good news is that the most intensive systems tend to focus on the most productive land – marginal lands are increasingly abandoned and left to regenerate ( the “forest transition”; eg. Rudel et al. 2009). So even as we go off the end of Boserup’s chart, disaster is not the result and intensification continues- though the planet will never be the same- our agriculture has now transformed the planet for the long-term (Ellis et al. 2010).

<http://ecotope.org/blog/saved-by-ester-boserup/?fbclid=IwAR03YMtSeiKNSzNwnH_CDIKfjV6rU6iw8ZrZP8WiSA99ZBIXRaG-ZYHu8aI>

## Robert Mutisi, Manica Boards and Doors, Zimbabwe

My name is Robert Mutisi from Zimbabwe.  A forester and Beekeeper by profession.

One story I need to share in support of SDG 2 is that of a sunflower project that we set up in one of the farms in our community. The project emphasized the importance of bees in pollination and how honey bees can be integrated to crop farming. The improved seed production and honey ensures improved food security and the reduction of hunger. The stages of the project are seen in the attached document which I produced and it is a story that can be shared. We are encouraging farmers to grow sunflowers and put bees for pollination. During the process farmers can also get honey that can be used as food and medicine. The seed from sunflowers can be used for oil production and cake for stock feed.

Two additional stories share the importance of bees and were realised by Mrs Bhebhe and Chitora primary school.

I would also like to share a presentation I was invited to give by Umbowo Development services.  It highlights the importance of beekeeping for farming activities to a group of farmers in Zvishavane. One major point that came out was that of enhancing crop production through pollination. This will eventually improve food security in the country thereby reducing hunger and vulnerability.

Attachments:

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/INTEGRATING%20BEEKEEPING%20WITH%20SUNFLOWER%20FARMING%20AT.docx>

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/CHITORA%20PRIMARY%20SCHOOL%20SERIOUSLY%20VENTURE%20INTO%20APICULTURE.docx>

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/CASTLE%20BASE%20APIARY%20BHEBHE%20PLOT%20%282%29.docx>

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/FARMERS%27%20INDABA%20ZVISHAVANE%202019.pdf>

## Jean Marius D’Alexandris, Lyseconcept, France

Original contribution in French

La problématique de l'eau potable dans le monde est intimement liée à la problématique de l'assainissement des eaux usées sa principale source de pollution. La terre, le sol et les sous sols, l'environnement, les milieux hydraulique naturels, les nappes phréatiques servent de -poubelle-de l'assainissement des eaux usées.

Les eaux usées à caractéristique ‘biologique’ contiennent de l'OR-ganie, un enrichissement naturel de la terre végétale.

Ce liquide en sortie du procédé «Fosse Biologique»lyseconcept contient de l’eau, de fines particules de matière organique en suspension, une flore bactérienne active, des composants biochimiques (azote, nitrate, potasse phosphate, ammoniaque, urée), le tout formant un engrais naturel.

Cette biotechnologie est implantée sous la forme d’un concept d’épuration biologique intéressant tout endroit consommant de l’eau quotidiennement pour les besoins domestiques.

Cette biotechnologie s’implante en toute zone du globe, en tout lieu, en toute configuration, adaptée à la production d’eaux usées: hôtel, restauration, industrie, école, communauté, individuel.

Quel que soit le lieu de l’installation de la biotechnologie, le rejet du liquide en sortie du dispositif est dispersé sur un exutoire végétalisé en complément d’épuration du procédé. Cette biodiversité pouvant servir de support alimentaire pour l’habitat mais aussi pour la communauté des défavorisés.

Le concept biotechnologique d’épuration des excréments préserve la salubrité des zones à forte densité d’habitat.

La biotechnologie recyclant immédiatement le liquide en sortie du procédé, procure une réduction du prélèvement d’eau potable des réserves souterraines tout en préservant les nappes phréatiques de la pollution.

je vous remercie de l'intérêt que vous porterez à notre -Biotechnologie- d’épuration biologique des effluents d’eaux usées

Bonne réception

cordialement  
Jean Marius D'Alexandris

English translation

The problem of drinking water in the world is closely linked to the problem of sewage treatment, its main source of pollution. The land, soil and subsoil, the environment, natural hydraulic environments, groundwater are used as waste water treatment bins.

Sewage of ‘biological’ characteristics contains organia, a natural enrichment of topsoil.

This fluid resulting from the "Biological Pit" lysis concept process contains water, fine particles of suspended organic matter, an active bacterial flora, biochemical components (nitrogen, nitrate, phosphate potash, ammonia, urea), all of which form a natural fertilizer.

Such biotechnology is implemented as a biological purification concept for any place where water is consumed on a daily basis for domestic needs.

It can be implemented in any part of the world, anywhere, in any setting, adapted to the production of waste water: hotel, catering, industry, school, community, individual.

Regardless of the location of the biotechnology facility, the liquid discharge from the device is dispersed on a vegetation outfall in addition to the purification process. Such biodiversity can serve as a food support for the habitat, but also for the impoverished community.

The biotechnological concept of excreta purification is designed to preserve the sanitation of areas with high population density.

Biotechnology immediately recycles the liquid at the outlet of the process, reducing the extraction of drinking water from groundwater reserves while protecting groundwater from pollution.

Thank you for your interest in our Biotechnology - Biological treatment of sewage effluents.

Regards

Jean Marius D'Alexandris

## Gerhard Flachowsky, Federal Research Institute for Animal Health, Germany

„Protein of Animal Origin: Are there Alternatives for Human Nutrition?“

Considering limited natutal resources, such as land, water, fuel, some minerals and increased emissions as well as rapid population growth, food security is one of the largest challenges of the current century. Apart from sufficient food, the supply with essential nutrients, such as amino acids, minerals and vitamins have top priority in human nutrition. In consequence of the high need of limited resources and some emissions ( e.g. methane, laughing gas) farm animal husbandry is questionable from various views and many people – mainly from the cities in high developed contries – ask for alternatives.

In our study, we analysed potentials for improvement of traditional ways of plant and animal production as well as new possibilities of protein manufacturing. Such alternatives are:

* Avoid food competition between human and animals
* Reduction of land, feed and food losses along the whole food chain
* Changes in the consumption behaviour of men
* Avoidance of overconsumption and overweight of people
* Dogs, cats and other meat consumer can be considered as food competitor
* Improvement of aquaculture
* Imitated food based on plant products (mainly legumes)
* Using of single cell protein and algea in human nutrition
* Insects as feed and food
* So-called „Lab grown (in vitro, cultured or artificially) meat“.

More food for more people with lower resources need and less emissions can be considered as one of the largest challenge for all those, working along the food chain.

(More details can be found in a paper by Flachowsky et al. (2019) in the journal „Zuechtungskunde“ 91, (3); 178-213; 2019; unfortunately in German)

Best regards

Gerhard Flachowsky

Institute of Animal Nutrition

Federal Research Institute of Animal Health

Bundesallee 37

38116 Braunschweig

Germany

## Mansur Abdul Mohammed, Bayero University Kano, Nigeria

Soils are integral to the function of all terrestrial ecosystems and to food and fibre production. An overlooked aspect of soils is their potential to mitigate greenhouse gas emissions. Although proven practices exist, the implementation of climate smart soil management (CSSM) enhance productivity and food security. Some climate smart soil management are multidimensional because they can reduce the incidence of greenhouse gas emission and enhance food production, these include the following:

Non tillage system which control the erosion, water conservation and enhance water efficient by reducing the losses from to surface runoff, reduce the risk of soil degradation improve soil quality and also retain large amount of soil organic carbon (Carbon sequestration).

Use of organic matter increase soil quality and productivity. It was reported that about 98% of total nitrogen in soil is contained in organic matter, all measures aimed at restoring or maintain soil organic matter invariably lead to the increase of total nitrogen which increase production capacity of the soil (Olaitan and Lombin, 1988). The use of organic matter reduce the uses of inorganic fertilizer which has (inorganic fertilizer) the propensity to emit GHGs because it was believed that inorganic fertilizer releases of GHGs. This is adduced by Mohammed and Sadiq (2017) that the application of inorganic fertilizer results in GHGs emission ranging from 0.8 to 10.0kg CO2 eq per kg of fertilizer.

Stone barrier is the system whereby stones are arrange raw by raw in order to reduce the rate of water losses from the area, this improve the water use efficiency (Fig. 1).

 

Fig. 2: Stone barrier

The water will help in natural degeneration of forage to be used by the aminal around the area.

Use of *zai* system like half moon this involve the reclamation of the non cultivated lead as well as soil and water conservation techniques whereby the inadequate water received in the area will be collected and store in the pit due to its crescentic morphology (fig. 2) and also organic manure is applied in each pit which enhance the moisture holding capacity of the soil, supply required nutrient to crops which enhance crop production in the area.

 

Fig. 2: Half Moon

Water management: the water management consist of the various methods for water harvest and efficient use for optimum crop production, in Nigeria polythene bags is normally use in surface irrigation so that the nylon will be an interface between soil and water, water can move freely from source direct to the farm so that waste of water and incident of salinity will reduce drastically because there no direct contact between water and soil. This techniques improve the quality of soil, water use efficient and enhance crop production. Other climate smart soil management to be adopted for reducing the GHGs emission and enhancing crop production include crop rotation, leguminous crop, contours planting, rotation grazing, manure treatments, improve irrigation (drip irrigation).

Policy should be provided to ensure some of these climate smart soil managements were implemented by the farmers by subsidizing some farm facilities such as organic fertilizer (Compost) and early matured crops.

**Further Readings**

Mohammed, M. A. and Muktar, S. (2017). Soil carbon sequestration management practices in

Savanna Ecosystem of Dambatta L.G. A. Kano state, *Dutse Journal pf Pure and Applied Sciences,* 3 (1): 481 – 488.

Field report Picture (2019): Tahou region Niger Republic, Department of Geography Bayero

University Kano, Nigeria



## Margaret Naggujja, Mukusu Motors & Properties Limited, Uganda

*How is your work helping to create a food secure and zero hunger world ? Have you seen work change after the adoption of the SDGs? If so, how?*

Mukusu's vision is aligned to fighting poverty, zero hunger, decent work and economic growth through provision of labour saving technologies along the crop production value chain. The mission of Mukusu is to provide mechanical farm power to smallholder farmers through flexible financing options . This is achieved through establishment of collective hiring center (CHC) and partnering with other value chain actors in crop production to enable farmers access credit, advisory services, markets and prompt delivery of their produce to the market places. Mukusu stocked the CHC with a range of mini tractors and implements which it hires with experienced tractor operators at a fee to farmers to mechanise their farm operations in time and for increased crop production and productivity.

The use of the CHC model has enabled the average farmers who used to depend on subsistence farming to be included in agricultural development in Bugiri district in Uganda where we are mainly based. We partnered with Bugiri District Local Government, Namayingo Buyinja SACCO and Busowa Traders & Farmers Cooperative Society and established a farm mechanisation scheme for their members. In so doing the farmers access crop finance to mechanise their farm operations from the SACCO while the District provides extension support and provides seed for each household to produce a minimum of one acre for own food consumption and a minimum of one acre for crop production for sale.

With reference to the four pillars of food security, Mukusu's hiring of labour saving technologies to these farmers, have contributed to the increased availability of both good and cash crops at household level. Farmers used to scale down their farm operations to an acre or less of an acre while using rudimentary farm tools ( hand hoes, pandas, slashers) in order not to miss the season for good yield. Others could plant late and get less yield due to crop failure. Mukusu has registered about 556 small holder farmers increasing their farm lands from 0.5 acres to more than two acres due to use of mechanical farm power. The grain yield increased by 500kg per acre and saved 61man hours per acre in only soil tillage which they converted to livestock farming and to other income generating activities. Ms. Fauza whose picture is in the company profile attached registered an increase in income from crop production and milk production.

The farmers have contributed greatly to the availability of food in the district and engage in bulk marketing of their well dried and sorted grains/ cereals to offtakers linked by Mukusu. Mukusu transports farmers' produce using tractors with trailers from their farms to accessible locations which the used to carry on their heads in a short time. In this way Mukusu contributes to the pillar of accessibility through hiring tractors and commercial motor vehicles to the market centers.

Food utilization and nutrition are also supported through better harvest and post harvest handling services offered by Mukusu using the collective hiring center model which enables farmers to access mechanical farm power quickly at a fee.

Mukusu does not only hire but sensitizes farmers on mechanisation and skills youth in tractor use, service, repair and maintenance.

See the profile attached for the pictures and achievements for success and progress.

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/file.pdf>

Margaret Naggujja

Mukusu Motors and Properties Ltd

## Maria Sonia Lopes da Silva, Empresa Brasileira de Pesquisa Agropecuária – Embrapa, Brazil

Original contribution in Spanish

Presa subterránea transformando vidas en el Semiárido brasileño

En el Semiárido brasileño, la precipitación pluviométrica oscila entre 200 mm y 800 mm en el Semiárido brasileño, lo que lo hace el más lluvioso del planeta. Sin embargo, las altas tasas de evapotranspiración (promedio de 2.000 mm al año) son casi tres veces mayores que la media de las lluvias de la región. Como agravante se tiene la distribución irregular de las lluvias en el tiempo y en el espacio, reduciendo las condiciones de éxito de las actividades agropastoris y, consecuentemente, la supervivencia de las familias agricultoras en la región.

Para que miles de familias puedan convivir con las dificultades climáticas de esta región, es necesario que dispongan de depósitos para almacenar el agua de lluvia en el período de la sequía y, consecuentemente, puedan satisfacer sus necesidades de acceso al agua y alimentos básicos durante la mayor parte del año año.

Sumado a la estacionalidad de la producción agrícola están los precarios índices de calidad de vida de la población, acarreando en una migración de agricultores familiares hacia los grandes centros urbanos o hacia otras regiones.

Como posibles soluciones, un conjunto de tecnologías sociales hídricas de captación y almacenamiento de agua de lluvia viene siendo utilizado en todo Semiárido brasileño, a través de programas de políticas públicas. Estas tecnologías promueven el uso eficiente del agua, el mantenimiento de su cantidad y calidad, posibilitando la seguridad alimentaria y la salud de las familias agricultoras de la región.

La presa subterránea (PS) es una de las tecnologías sociales hídricas que ha contribuido a la mejor convivencia de las familias en el Semiárido, por proporcionar el acceso al agua para el consumo humano, para la desedentación animal y para la agricultura (usos múltiples).

La PS es una tecnología para almacenar el agua de lluvia dentro de la tierra. Tiene como objetivo interceptar el agua de la lluvia que fluye dentro y / o sobre el suelo. Consiste en una pared construida sobre una formación impermeable bajo el suelo, en el sentido transversal al descenso de las aguas. Se tiene la función de elevar el nivel del agua dentro del suelo, por medio de infiltración, quedando así disponible para la utilización por las plantas. A depender de las lluvias ocurridas, la humedad permanece en el suelo de 3 a 6 meses, o sea, hasta casi el final del período seco, permitiendo el plantío incluso en época de sequía.

<https://drive.google.com/file/d/1jSM_3ModYgE99RWYTodZJuczbmo9ua3U/view?usp=sharing>

Hay muchas ventajas de PS en comparación con las represas de superficie convencionales, tales como: (a) las pérdidas de evaporación son bajas; (b) no hay reducción en el volumen de almacenamiento debido al asentamiento y ausencia de la acumulación de sedimentos en los depósitos; (c) el agua almacenada es menos susceptible a la contaminación ya los riesgos para la salud debido a la cría de mosquitos; (e) la tierra por encima de la presa subterránea puede ser utilizada; (f) las catástrofes potenciales causadas por el colapso de las paredes de las represas son inexistentes; entre otros.

Las relaciones de reciprocidad vivenciadas en el ámbito de la PS reproducen y consolidan acciones sociales que intensifican la capacidad de sostener la actividad de producción y de comercialización de las familias y de valorar su aprendizaje. Es un verdadero espacio solidario, en el cual la autogestión valora el protagonismo de los verdaderos sujetos de la acción. La lógica de las familias es el desarrollo sostenible con generación de trabajo y distribución de renta, mediante un crecimiento socioeconómico con protección del ecosistema.

La cantidad de PS construidas por los programas de gobierno, sociedad civil e iniciativas particulares es de aproximadamente 7.000 unidades, que benefician a unas 35.000 personas, tomando como base un núcleo familiar formado por cinco individuos. Con la implantación de esta tecnología, el cultivo diversificado de hortalizas, frutales, especies forestales y granos está influenciando el rediseño de los agroecosistemas del Semiárido.

<https://drive.google.com/file/d/1kvY8KuzDwGAZGXQuo_zvUx49Ft6-cDq3/view?usp=sharing>

Las PS están directamente alineadas con las cinco dimensiones prioritarias de la Agenda 2030, los llamados 5 Ps (personas, planeta, prosperidad, paz y alianzas). Para las personas, contribuye con la soberanía y seguridad alimentaria y nutricional; para el planeta, contribuye a la recarga de acuíferos, promoviendo mayor estabilidad del agroecosistema familiar del Semiárido; que trae prosperidad a través de la inclusión socioproductiva, tecnológica y ambiental; contribuye con la paz a través del almacenamiento del agua de lluvia que estimula a la sociedad a ser pacífica, justa e inclusiva; y a través de asociaciones em las cuales se establecen cooperaciones técnicas nacionales e internacionales, como por ejemplo, intercambio de experiencias con PS instaladas en países africanos (Mozambique y Cabo Verde) y de América Latina (Honduras).

<https://drive.google.com/file/d/1lFV0Og3pRgn1xz61zkgouCy-tsaj99rE/view?usp=sharing>

La BS contribuye fuertemente al logro de seis Objetivos de Desarrollo Sostenible (ODS) de la Agenda 2030 de las Naciones Unidas, que son: 1, 2, 3, 5, 6 y 13.

Por el poder liberador que el agua propicia principalmente a las mujeres ya los jóvenes, liberándolos de los kilómetros recorridos diariamente en busca de agua para las actividades domésticas y de consumo humano, PS ha proporcionado el fortalecimiento de la inclusión y organización productiva. Con esto, hay disponibilidad de tiempo para que las mujeres y los jóvenes puedan participar de otras actividades dentro y fuera de la propiedad.

La PS, por el ambiente sociopolítico en el que está inserta, desempeña un papel significativo en el protagonismo que las familias agricultoras asumen. Esto debido a la movilización entre las familias y las organizaciones locales de desarrollo rural, que se consolida desde su proceso de construcción. A partir del momento que pasan a tener el derecho al agua, pasan a ser consideradas sujeto de derecho, capaces de producir su propio alimento y desarrollar sus proyectos de vida.

PS ha tenido una expresiva colaboración con los programas de acceso al agua del Gobierno Federal, a ejemplo del Plan Brasil sin Miseria y del Programa Nacional Agua para Todos. En ambos, participó dentro del eje inclusión socioproductiva, contribuyendo con la seguridad alimentaria y nutricional, y el acceso al agua en territorios rurales. Las investigaciones desarrolladas y las soluciones tecnológicas generadas con BS, por la Empresa Brasileña de Investigación Agropecuaria (Embrapa) y socios, desde la década de 1980, han contribuido a la construcción horizontal y colectiva del conocimiento en lo que se refiere a PS, ocasionando cambios en las comunidades rurales que históricamente conviven con las adversidades del clima semiárido.

<https://drive.google.com/file/d/19DLsLMaBnqUjpWF5I3jNYPM3820dp7--/view?usp=sharing>

La Embrapa Solos (www.embrapa.br/solos), una de las 46 unidades de investigación de Embrapa, cuenta con un equipo multidisciplinario, en el cual las complementariedades de competencias maximizan la eficiencia del desarrollo de las actividades, para que, de forma participativa con las familias agricultoras, contribuya al desarrollo sostenible. Los proyectos de investigación y acciones estructurantes y de capacitación con PS en Brasil se desarrollan con socios en una acción conjunta entre las familias agricultoras, universidades, institutos federales de ciencia y tecnología, organizaciones no gubernamentales y gobiernos municipales, estatales y federales.

Un gran desafío que se ha enfrentado se refiere a la selección del sítio adecuado para la implantación de unidades de presas subterráneas. Para superar este problema un proyecto de I & D viene siendo desarrollado por Embrapa y socios, cuyo titulo es Zonificación edafoclimática participativa de áreas potenciales para la construcción de presas subterráneas en unidad agrícola de base familiar en el Semiárido del Estado de Alagoas, Brasil. Este proyecto tiene como objetivo identificar y espacializar geoambientes con aptitud para implantación de PS. Al final del proyecto se generará un documento técnico, conteniendo un mapa con las clases de potencial, que subsidiará tomas de decisión en programas de políticas públicas orientados a la inserción social y productiva de agroecosistemas de base familiar en áreas dependientes de la lluvia.

<https://drive.google.com/file/d/1DzGg7aTNciZecRJvTA0af8E_y3QKFFNT/view?usp=sharing>

English translation

Underground dams transform lives in the Brazilian Semi-arid

In the Brazilian Semi-arid, annual rainfall ranges from 200 to 800 mm, making it the rainiest semi-arid region in the world. However, the high evapotranspiration rates (averaging 2 000 mm per year) are almost three times higher than the average rainfall in the region. Furthermore, temporal and spatial rainfall patterns are erratic, hindering the agropastoral activities -and livelihoods as a result- of family farmers in the region.

Families must have rainwater storage tanks during dry periods to cope with the climatic constraints of this region and secure access to water and basic food for most of the year.

In addition to the seasonal nature of farm production, living conditions are precarious, triggering the migration of family farmers to large urban centres or other regions as a result.

As a potential solution to this issue, public policy programmes are facilitating the use of several social water technologies for rainwater harvesting and storage across the Brazilian Semi-arid. These technologies promote the efficient use of water and preserve its quality, improving the food security and health status of family farmers throughout the region.

Underground dams (UD) are one of the social water technologies that have improved the living conditions of the families in the Semi-arid by providing access to water for human consumption, watering of livestock and for agriculture (multiple uses).

UD are a technology designed to collect and store rainwater flowing within/over the soil. They are built digging a ditch, laying an underground waterproof plastic layer and erecting an adjacent wall, both perpendicular to the runoff flow direction. These dams raise underground water levels by infiltration, making water available for the plants. Depending on rainfall, soil moisture is preserved for 3-6 months (i.e. nearly until the end of the dry period) making planting possible even under drought conditions.

<https://drive.google.com/file/d/1jSM_3ModYgE99RWYTodZJuczbmo9ua3U/view?usp=sharing>

Compared to conventional surface dams, UD offer many advantages, such as: (a) evaporation losses are low; (b) storage volume does not decrease thanks to the lack of sediments and ground settlement; (c) the likelihood of contamination of the stored water and related health risks is reduced; (e) the land covering the dams can be used; (f) any eventual collapse of the walls would be harmless; among others.

The reciprocal relationships experienced with UD replicate and consolidate social actions that strengthen the capacity of the families to sustain their production and marketing activities and value learning. UD are truly supportive facilities in which self-management acknowledges the leading role of its users. Families experience socioeconomic growth whilst protecting the ecosystems, sustainable development is promoted, jobs are created, and income is adequately distributed.

Around 7 000 UD have been built with support from government programmes and civil society and private initiatives, benefiting 35 000 people (assuming 5 family members per household). With the implementation of this technology, the integration of vegetables, fruit trees, forest species and grains is influencing the redesign of the Semi-arid agroecosystems.

<https://drive.google.com/file/d/1kvY8KuzDwGAZGXQuo_zvUx49Ft6-cDq3/view?usp=sharing>

UD are aligned with the five priorities in the 2030 Agenda: the 5 Ps (people, planet, prosperity, peace and partnerships). They increase the food and nutritional sovereignty and security of the people; they replenish the aquifers in the planet, promoting greater stability of the Semi-arid family agroecosystem; they bring prosperity through socio-productive, technological and environmental inclusion; they contribute to peace as rainwater storage stimulates a peaceful, fair and inclusive mindset; and they foster national and international technical cooperation through partnerships, such as the exchange of experiences between African (Mozambique and Cape Verde) and Latin-American (Honduras) countries in which UD have been built.

<https://drive.google.com/file/d/1lFV0Og3pRgn1xz61zkgouCy-tsaj99rE/view?usp=sharing>

UD make a substantial contribution to the achievement of six Sustainable Development Goals (SDG) of the 2030 Agenda: goals 1, 2, 3, 5, 6 and 13.

UD have reinforced the social inclusion and productive organization of women and youth as a result of the liberating power of water, releasing them from their daily journeys in search of water for domestic activities and human consumption, and enabling them to participate in other internal and external activities.

Given the socio-political environment in which UD are built, these storage facilities are key for the leading role taken by family farmers, underpinned by their close cooperation with local rural development organizations from the moment construction begins. Once they have the right water, they are considered subjects of law, capable of producing their own food and developing their own life projects.

UD have been included in the water access programmes of the Federal Government -such as the Programa Nacional Agua para Todos of the Plan Brasil sem Miseria- within the topic of socio-productive inclusion, contributing to food and nutritional security and access to water in rural territories. Related research and technological solutions developed by the Brazilian Agricultural Research Corporation (Embrapa) and its partners since the 80s have contributed to generating collective knowledge on UD, transforming rural communities historically facing the challenges posed by a semi-arid climate

<https://drive.google.com/file/d/19DLsLMaBnqUjpWF5I3jNYPM3820dp7--/view?usp=sharing>

Embrapa Solos (https://www.embrapa.br/solos), one of Embrapa's 46 research units, has a multidisciplinary team with complementary competences which maximizes the efficiency of the activities with the aim of contributing to sustainable development in participative cooperation with family farmers. Research projects and structural and training activities related to UD in Brazil are jointly developed with different partners: family farmers, universities, federal institutes of science and technology, non-governmental organizations and municipal, state and federal governments.

One major challenge has been choosing suitable locations to build UD. To overcome this issue, an R&D project (Zonificación edafoclimática participativa de áreas potenciales para la construcción de presas subterráneas en unidad agrícola de base familiar en el Semiárido del Estado de Alagoas, Brasil) is being conducted by Embrapa and other partners. The objective of this project is to identify and locate suitable geo-environments for UD. At the end of the project, a technical report will be prepared, including a map with potential locations, which will assist decision-making in public policy programmes aimed at achieving the social and productive integration of family-based agroecosystems in rain-dependent areas.

<https://drive.google.com/file/d/1DzGg7aTNciZecRJvTA0af8E_y3QKFFNT/view?usp=sharing>

## Aiah Emmanuel Gborie, Yormatah Youths Farmers Association Kamara(YYFAK), Sierra Leone

MISSION STATEMENT: Commitment to sustainable economic empowerment of youths, in the agriculture, food security sector and the use of natural resources to meet the demands of future generations of youths. This as a concerted effort is done through support from stake-holders and partners thereby enhancing development of youths

VISION: YYFA sees a positive youth generation emerging as useful adults capacitated to make meaningful contributions to the development aspirations of their communities.

OBJECTIVE: The Yormatah Youths Farmers Association is established with the aim of using community initiative to combat the marginalization of youths in socio- economic and other activities at community level, fight poverty, hunger, illiteracy and diseases among rural youths through grassroots initiatives involving local people and support from the local authorities of the Chiefdom, local and national government, and goodwill international agencies and partners supportive of youth development leading of influencing and coordinating plan and strategies to fight poverty and deprivation among the youths

Africa has the youngest population in the world, with two thirds under the age of 35. Yet, youth also make up the majority of the unemployment in Africa (about 60%are between the ages of 15 and 24). By 2050, the youth population in Africa is expected to double to reach over 350 million people, which implies that around 10-12 million new jobs will have to be created per year in the region to absorb new labour market entrance.

Which our country Sierra Leone and Kono District to be specific is not an exception.

Thus enabling sustainable livelihood, economic diversification and promoting economic security as being a challenge all over in this mineral rich district. Increasing their income capacity through Integrated Farming agricultural practices that will ensure a future that offer equality, dignity and opportunity for all.

The Yormatah Youth Farmers Association – Kamara has seeing the needs to partner with your organization and achieve this needing challenges in Kono District through the Integrated Farming agricultural practices in Kono district. Sustainable Livelihood is the key to development at community level.

Supporting rural youths and vulnerable women through Integrated farming practices like, poultry farming Fish and year round Vegetable Farming. Enhances the livelihood of the beneficiaries group by creating economic empowerment, it provide source protein thus supporting food security and promote Quality Nutritionals School feeding for vulnerable school pupils. These will help contribute in achieving the Sustainable Development Goals (SDGs) 2 Zero Hunger, 1 No Poverty, 5 Gender Equality, 8, Decent Work and Economic Growth 4 Quality Education and 3 Good Health and Well-Being.

## Sharon Gordon

\*\*\* 10 Square Meter/100 Square Foot Nutrition Gardens (10/100NG) \*\*\*

ZeroHunger’s first challenge is exactly that—enough calories to survive. A second important challenge is good nutrition. Often it seems that all the labor or financial resources go to the staple crops such as grains and legumes that provide the calories with little left to provide the foods that round out the nutrition and promote health.

10 Square Meter/100 Square Foot intensively and diversely planted Nutrition Gardens I10/100NG) for each person are a solution to providing the nutrition to add to the staple crop calories. This size garden can provide 195 kg/400 pounds of produce in a six month growing season. If season extension such as row cover is available or year round gardening is possible, an additional 45+kg/100 pounds of food may be grown in most months. These gardens reduce water usage and weeding with their intense planting. Gardening and harvesting can be accomplished in an average of two hours a week.

Cities and towns are encouraged to make at least this much food gardening space available to each person as part of the land around their housing or in nearby allotments and community gardens. People on farms can put the 10/100NGs in a kitchen garden near the house. This allows the stay at home gardener to garden it between other chores and makes it easy for students to tend it before or after school.

Gardeners are encouraged to grow a mixed selection of produce that provides nutrition and flavoring including greens, alliums, herbs, tomatoes, eggplant, peppers, summer squash, Fresh peas, green beans, and fresh non-staple root vegetables such as radishes/beets/carrots. Productivity improves with succession planting and trellising. The gardening can be accomplished with as few tools as a flat bladed D-handle shovel and a bucket. A homi (triangular headed hand hoe), stakes for trellising, string, and watering can/hose add to productivity and make the job easier.

A 10/100NG positively impacts the gardeners food in as little as three weeks when the earliest radishes and their greens are ready to eat. Photo shows a day’s harvest from a 10/100NG test garden in a temperate climate garden at the height of the summer. Other vegetables and herbs were available on other days and in other months.

Garden organizers are encouraged to develop sample gardens along with the gardeners that will be implementing them that suit the area's preferred foods, and to provide a matching planting and harvesting plan to help increase a fast start and success. Observing how local expert gardeners implement the process can lead to additional sample designs. If space and gardeners are available at demonstration garden sites, a third type of sample garden that introduces people to new vegetables that are especially nutritious can be useful if combined with a cooking demonstration and tasting opportunity.

\*\*\*Resources\*\*\*

How to Grow More Vegetables, Ninth Edition: (and Fruits, Nuts, Berries, Grains, and Other Crops) Than You Ever Thought Possible on Less Land with Less Water Than You Can Imagine by John Jeavons

One Circle: How to Grow a Complete Diet in Less Than 1,000 Square Feet by David Duhon

\*\*\*Calculations and conversions\*\*\*

100 square feet = 9.29 square meters

400 pounds = 181.5 kg

10 square meters = 107.64 square feet

1.0764 \* 400 pounds = 430.56 pounds =195.3 kg

Test gardens had 4 foot wide beds (1.2 meter), for example 4 feet by 25 feet (1.2x 7.62 meter) of garden bed space.

## Manuel Moya, International Pediatric Association. TAG on Nutrition, Spain

Zero Hunger and Child Hospitalization.

When visiting the pediatric section of two teaching hospitals in the central parts of Nigeria and Sudan, I was initially upset at the sight of a child of around 7 years suffering from malaria at an advanced stage, his clear undernutrition I thought was consequent to the ill course of the main disease. As the visits were going on, again a quite relevant proportion of undernutrition appeared in acute patients suffering from limb fractures, acute respiratory infections or common surgery. Two small for gestational age newborn babies in an open cot showed also a slow growth rate

It is clear that the clinical status of certain diseases was aggravated by underweight with the consequence of a greater recovery time greater than in normal weight children. It is well known that underweight (> -2 SD) is associated to: Unduly hospitalization, painful hospitalization (the malaria child was mostly alone) and disadvantageous long term prognosis.

Zero Hunger policies if widespread would lead to a situation where the number of (pediatric) diseases requiring hospitalization would decrease and for a greater efficacy the earlier they are established (pregnancy) the better. Quality of food can also be beneficed through producing lysine enriched cereals in wide areas of the world.

Manuel Moya, MD

University Miguel Hernández. Spain

## Guljahan Kurbanova, FAO, Russian Federation

Guljahan Kurbanova.

Monitoring cereals markets for food security and nutrition through SDGs and for the achievement of SDGs.

*Foreword. From my experience in monitoring agri – food markets it is necessary to pay due comprehensive attention to economic indicators as well as to main trends in consumption and influence of environments and climate change issues. Changes in dietary preferences in food consumption and an increase in utilization of cereals for feed are essential for meat and milk production. At the same time the stability of production and utilization of cereals are under the impact of a number of factors requiring there consideration in light of SDGs.*

*Sustainable development goals and FAO strategic objectives.*  Current and future sustainability of agriculture is based on an integrated triple approach of economic, social, and environmental issues reflected in sustainable development goals (SDGs)[[1]](#footnote-1). These goals direct to workable options for eradicating poverty, hunger, and malnutrition, and improving environmental performance combined with simultaneous interventions along the whole food and feed chain from production to consumption. More than any other sector, agriculture is the common thread which holds the 17 SDGs together: zero hunger, sustainable and responsible production and consumption, climate change and others\*\*. These SDGs are linked to the FAO’s Strategic Objectives:[[2]](#footnote-2)

* Help eliminate hunger, food insecurity and malnutrition (Goal 2- Zero hunger)
* Reduce rural poverty (Goal1 – No poverty, Goal 10 – Reduced inequalities)
* Make agriculture, forestry and fisheries more productive and sustainable (Goal 15 – Life on land, Goal 13- Climate change,
* Enable inclusive and efficient agricultural and food systems ( all 17 SDGs)
* Increase the resilience of livelihoods to disasters (goal 13 – Climate change, Goal 3- Good health and well- being, Goal14 – Life below water).

Sustainable future to large extent means eradication of poverty, hunger and inequalities including stable food security and nutrition (FSN). Therefore its regular monitoring includes analysis of agri-food markets, and it is framed by SDGs (in particular directed to SDG 2 on Zero hunger and its targets on food security and nutrition (Targets 2.1, 2.2). It requires consideration of sustainable agriculture based on an integrated approach to environmental, economic, and social issues reflected in SDGs. This approach requires the consideration functioning of agri - food markets such as cereals.

*The role and specifics of cereals markets*. The largest part of agri-food markets are cereals. The main part of dietary energy requirements for humans and animals is derived from cereals. According to FAO statistics the energy derived from cereals in 2015 is around 45 % while in developed countries/ EU it is about 30-32 %[[3]](#footnote-3). During last five years globally cereal production is relatively stable and sufficient to provide ample supply thanks to sufficient level of stocks steadily increased since 2012.[[4]](#footnote-4) Currently cereal utilization shows a slight increase driving mainly by increased cereal use for animal feed. Total cereal use for feed also indicates a slower expansion in 2017/18 MY.

The global trends, such as the changes of dietary preferences toward products of animal origin, push to increasing the use of cereals for feed with adequate protein content. The concerns are raised with regard to contamination of cereals by mycotoxins from planting to consumption stages resulting in socio- economic losses. The impact on human and animal health by mycotoxins result in accumulating quick and chronic deceases in the form of cancer, immune deficiency and reproductively problems.[[5]](#footnote-5) The feed supply chain is crucial for feed quality from the point of protein content and mycotoxin contamination. In particular, mycotoxin contamination significantly impacts human and animal health, economies and international trade while protein content in cereals identifies productivity of livestock and quality of food.

*Macroeconomic overview for cereals markets.* The state of agricultural markets highly depends on overall macroeconomic situation including currency fluctuations, employment, international prices on main commodities, annual growth rates. In light with that it is directly linked to SDG 8: Decent work and economic growth and characterized by the following trends and factors:

* World population growth is expected to slow to 1.0% p.a. in the next decade, and estimated at 7.5 million in 2017[[6]](#footnote-6) (SDG 8 – Decent work and economic growth).
* Economic growth in 2017 and 2017-2021: globally – 2.7 and 2.9%; EU -1.5 and 1.4%; rest of ECA – 1.7 and 1.6%; [[7]](#footnote-7) ((SDG 8 – Decent work and economic growth).
* Lowering agricultural growth rates; volatility due to climate, environment and market conditions (also linked to SDG 13 –Climate action, SDG 14 – Life below water, SDG 15 – Life on land, SDG 17 – Partnership for goals).

At the same time, it requires the consideration of progress towards SDG 10: reducing inequalities due to factors such as:

* Influence market peculiarities and political uncertainty (migration, and elections), exchange rate and main commodity prices fluctuations
* Income growth combined with changing dietary preferences drive firm demand for meat and dairy products, therefore, feed demand is the fastest growing sector.

*The ECA Region cereals markets*. The challenges faced by agriculture and food sectors differ by regions and countries. In challenging conditions a vital interest of the ECA’s multifunctional agriculture is to enhance the production of an adequate quantity, high quality, and safe food in a profitable and competitive way but at the same time by addressing to social issues, ensuring balanced territorial development including rural areas. There are three main producers and suppliers of cereals in ECA: EU, Kazakhstan, Russia, and Ukraine. Europe is one of leading cereal producers in the world and has a great potential to keep its role as a global food supplier in particular of cereals. The EU countries supply around 12 percent of the global cereal production. With increasing demand in meat and dairy products quality of cereal food are also important from the point of livestock quality and productivity of the sector. Since 2009 the use of cereals for ethanol production in EU remained steady, and it accounts about 2% of EU cereals supply.[[8]](#footnote-8) Bioethanol is and feed driving an increase in EU cereal consumption.

*Utilization of cereals for animal feed in Europe.*  Cereals utilization for animal feed in Europe is almost twice higher than world average: 62 and 34 percent respectively. Since nearly two-thirds of the EU's cereals are used for animal feed, with around one-third for human consumption and only 3% is used for biofuels, quality of cereals with adequate protein content is extremely important of livestock sector of the union. Therefore, cereal animal feed is extremely important for dairy and meat sectors of the EU. Milk is accounts for 15 percent of agricultural output of EU. Thanks to that the EU is major player in the word dairy market as the leading exporter of many dairy products, mainly cheese[[9]](#footnote-9). The EU also is the world’s second producer of pig meat and the biggest exporter of it. The utilization of cereals for animal feed is also pushed by the poultry production since the EU is one of the world’s top producers of poultry meat and a net exporter of poultry products.[[10]](#footnote-10) For 2015-2018 years the use of cereals for animal feed in EU is estimated to increase by 3.44 percent (the authors ‘estimation) with an increase of protein content in cereal animal feed by 3.3% in EU.[[11]](#footnote-11)

In Europe cereal animal use provides a significant portion of calories and protein needed. On average dietary protein comes from: cereals– 50, legumes– 20, and animal products 30%. Protein content in cereals ranges from 7 to 15 % depending on the species (2015- 2018)[[12]](#footnote-12) in line with cereal basket composition for animal use. In a whole the EU’s protein content in feed is deficit: between 65 -75%[[13]](#footnote-13) although on average protein content in EU is slightly above the world average.

*The progress towards the achievement SDG 13 (Climate action), SDG 14 (Life below water), and SDG 15 (Life on land) depends on environmental and climate change issues* raising concerns on quantity, quality and safety of agricultural products, in particular cereals. It is related with protein content, loose of nutritious elements in soil, and contamination such as by mycotoxins. Mycotoxins are toxic secondary metabolic products of molds present on almost all agricultural commodities worldwide. Unlike primary metabolites (sugars, amino acids and other substances), secondary metabolites are not essential in the normal metabolic function of the fungus.[[14]](#footnote-14) Other known secondary metabolites are phytotoxins and antibiotics. With regard to mycotoxin contamination it is even worse since, as it outlines by the Codex Alimentarius, majority of related issues the control measures are not fully effective. In addition the countries’ regulations on mycotoxins are far of rationality since used tolerant risky thresholds. At the same time the survey conducted by BIOMIN 2014-2017 demonstrates increasing threats, mostly related with weather conditions, hazards, and climate changes observed in the forms of frequent droughts, floods, irregular rains, extreme wet, cold, and humidity.

Among food contaminants, mycotoxins will have greater consequences in terms of both human and animal health as well as economics. Mycotoxins - poisonous chemical compounds produced by fungi, found in food and animal feedstuffs (grains and seeds). They are very sensitive to climate and environmental conditions due to ecological imbalance, systematic violation of biosphere, climate change (irregular rains, floods, droughts or unusual cold weather). Mycotoxins are substances produced by moulds that contaminate various agricultural commodities either before harvest or under post-harvest conditions. In addition to the various moulds occurring in crops which are improperly stored, certain plant diseases are responsible for the production of mycotoxins.

Mycotoxin contamination results in serious socio-economic implications in particular on health. The consumption of mycotoxin-contaminated commodities is related to several acute and chronic diseases in humans as well as in animals. While the exact cause and effect relationship has been established for only a few of the diseases, speculation about the role of mycotoxins in the etiology of various illnesses has been based on circumstantial evidence in other cases. The acute diseases for which there is some evidence of an association with mycotoxins. Increase of mycotoxin contamination levels observed for corn, finished feed and soy.**[[15]](#footnote-15)**

Results of BIOMIN Survey[[16]](#footnote-16) for 2014 – 2017 show an increase of risks on mycotoxins contaminations: South-East Asia (from 70% to 76%), East Asia (84% to 88%), Oceania (8% to 24%), South America (from 37% to 74%) and South Africa (from 45% to 73%). In Europe a high contamination of crops observed in 2014, early 2015, and an increase in 2016: from 45% to 64% above the risk threshold. The main mycotoxins discovered in feed: aﬂatoxins

(AFs), DON, fumonisins, ochratoxin A (OTA), T-2 toxin and ZEA. Concentration of mycotoxins in Europe: AFs and fumonisins – Southern Europe, Don – Northern and Central Europe, ZEA – Central Europe. Among crops the most increase of mycotoxin contamination levels observed for corn, finished feed and soy. 76% of feed and raw commodity samples contained two or more mycotoxins.\*

As a results of the above said there is a huge concern linked to SDG 3 (Good health and well -being for people) and SDG 6 (Clean water and sanitation).

Costs of protein and mycotoxin contamination in cereals result to socio-economic and environmental consequences. Mycotoxin contamination leads to different losses and costs This might be grouped as socio –economic and environmental costs. The socio –economic costs cover:

* By FAO estimations 25 percent[[17]](#footnote-17) of the world's crops are affected by mycotoxins (annually losses in fields, transportation, storages and damages not applicable for processing due to deteriorated quality, decreased productivity of live stock, health impact on animals and humans;
* in Europe – estimations from 65 to 75 mln t.; additional health costs[[18]](#footnote-18)
* Annual losses of around 1 billion metric tons of foods and food products or from $1-5 billion \*
* A health risk (animals and humans): chronic or cumulative diseases, cancers and immune deficiency, reproductive problems

From the point of environmental consequences the following is observed:

* Adequate protein nutrition is important for minimization of nitrogen excretion and reduction of pollution.
* Not fully used animal by-products containing protein pollutes environment with increasing level of mycotoxon contamination
* Mixture use of grain and forage in farming helpful to counteract soil erosion and loss of soil fertility.
* Concentrations of mycotoxins occur as a result of annual weather ﬂuctuations and climatic conditions (aﬂatoxin accumulation)
* Cold regions with a cool and excessive wet produce DON, ZEA, OTA (furasium toxins)

It is obvious that urgent short and long term comprehensive measures are necessary for improving the above said. It is clear that a proper control system has to be placed which is costly and require institutional system based on deep analysis of reasons, factors and instruments to be used. Farmers, food producers, consumers, and all other participants of food chain have to be properly informed and received adequate. Knowledge on existing problems related with cereals. Regulations established in 100 countries; in some of them it is based an Acceptable daily intake (ADI) or Tolerable daily intake (TDI). International legislation on foods and feeds established by Codex Alimentarius (CAC)[[19]](#footnote-19) as well as other policy documents, for example CAP in EU but their implementations require additional investments for development and modernization of existing organizations and regulation for research, monitoring and controlling cereals markets and their safety.

*Conclusions and recommendations.* Provision of food security and nutrition confirms the role of cereal markets. The cereal production and consumption have to be considered with sustainability approach including economic, social and environment issues. These issues are linked and reflected in SDGs. However, the stability of cereal markets and sustainability in a whole are connected with global and regional threats and challenges such as quality of cereals, for example, protein content and mycotoxin contamination. The conclusions require a deeper additional analysis, however, it is obvious that a certain steps have to be taken urgently and those ones are in need of more investments for monitoring environmental conditions for cereals production and utilization, investing in R & D, education and knowledge on different factors impacting cereal production and utilization and impact of mycotoxins (SDG 4 – Quality education and SDG 9 - Industry, innovation and infrastructure) and reviewing the risk thresholds in regulation documents for the control of mycrotoxins (SDG 3 – Good health and well – being, SDG 6 – Clean water and sanitation, SDG 17 – Partnership for the goals).

Thus, for this purpose further work and actions are needed to use adequate indicators and targets of SDGs with their links to FSN.

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## Josué Francisco da Silva Júnior, Brazilian Agricultural Research Corporation (Embrapa), Brazil

Promoting community management of underutilized tropical fruit genetic resources in Brazil: in situ conservation strategies and good practices for the mangaba

In 2003, in order to promote research, conservation and use of fruit species, the Ministry of the Environment in Brazil prioritized native species of current and potential economic value through a project called Plants for the Future involving research institutions, educational and non-governmental organizations.

Research covered various scientific disciplines, but did not include in situ conservation or the role of traditional communities in the management of biodiversity in natural habitats. Studies on good practices for managing Brazilian native fruits are scarce and the information available focuses mainly on post-harvest and processing activities. Research efforts on sustainable management of resources, especially in natural habitats, are rare.

Despite the dearth of information generally, one traditional group from the North and Northeast of Brazil who continue to manage Brazil’s wild plant resources has been widely studied: the ‘catadoras de mangaba’ (mangaba women pickers). Information has been gathered on the resources that they use to feeding, to survive, how they access and manage them, their habitats, related national legislation, labour, gender, sociability and exploitation of raw materials.

Mangaba (Hancornia speciosa Gomes) occurs naturally in open vegetation areas such as the coastal tablelands and lowlands and savannahs of Brazil. It is also found in Paraguay, Peru and Bolivia. The trunk of the tree is used for the extraction of latex for medicinal purposes. The fruit is a source of protein and iron. It has a delicious taste and colour and is used in agribusiness for making juices, sweets and ice creams.

In 2003, [Brazilian Agricultural Research Corporation](https://www.embrapa.br/) (Embrapa) started work on the conservation, characterization and use of mangaba in the Northeast region of Brazil noting that the mangaba pickers, who were mainly women, were de facto responsible for conservation of mangaba in the areas identified. These women had accumulated significant knowledge concerning the management, reproduction and post-harvest activities of this fruit (Mota and Silva Júnior, 2003; Silva Júnior et al., 2006).

Despite the market demand for mangaba, it is overwhelmingly threatened by destruction of its natural habitats because of the expanding cultivation of sugarcane, coconut, eucalyptus, grassland, corn, cotton and soya beans and real estate development in tourist areas and coastal cities. The mangaba pickers’ livelihoods are further threatened by the increased activity of shrimp farming, which destroys the mangrove ecosystem and drastically reduces mollusc harvesting, another activity carried out by many of the communities concerned.

To explore how best to sustainably conserve and use mangaba, a team of social and natural scientists was assembled and a large amount of information was generated about the history, mapping, profile and typology of pickers; threats to natural habitats; access to and management of sites; knowledge and endangered traditions; organization of communities; and sale and consumption habits for mangaba (Mota et al., 2011).

Changes in the mangaba tree habitats and exploitation (economic interests of landowners) and in land use (tourism, agriculture, shrimp production) require efforts to be made for sustainable management and conservation of mangaba. Good practices already exist. Some practices contributing to community harmony are agreed among pickers, such as that each family can collect mangaba, but from different trees; farmers from other locations collecting in areas used for generations by specific groups are not well regarded. Fences on private land are commonly respected, though there are also transgressions, such as collecting fruit without permission from the land owners.

A set of good practices for conserving mangaba in natural ecosystems was jointly defined through expeditions to different sites, meetings, coaching, training and knowledge sharing among farmers and researchers. According to Mota et al. (2011), good practices are associated with the type of access that women pickers have to private areas or to common lands. The good practices are listed below as sets of recommendations for natural ecosystems, private lands and post-harvest practices.

In situ conservation and sustainable harvesting of mangaba are closely related to the work of mangaba pickers because of their economic, social and cultural dependency on them. Farmers’ contributions to safeguarding biodiversity and traditional knowledge are critical to valorise, cultivate and use these resources, which in turn will enhance their livelihoods and will sustainably ensure resource availability for future generations. The strategy of linking good management techniques, developed over generations by traditional communities, with scientific knowledge has contributed to the conservation of natural ecosystems of that species and to the valorisation of farmers – especially women – as beneficiaries of public policies for social inclusion.

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## Pathawit Chongsermsirisakul, Panyapiwat Institute of Management, Thailand

"Organic farming to achieve SDG#2"

Our main research area is agricultural food security for environmental conservative in accordance with the UN agenda for sustainable development 2030 .Mission of Topic # 2 Zero Hunger supports the operations to achieve the goals. Which we believe that if the main factors of which used in the cultivation are no toxic contamination. Food production for human will be saved, including to the environment as well.

By the organic farming concept to improve the soil quality, it’s can be solved by agricultural nature as organic way in rotation crop and seeking the healthy plants , of which for food safety and friendly environment. Moreover for solving the other soil problems of which, we continue to conduct research to be the comprehensive and innovative, meet international criteria, to achieve the Sustainable Development Goals.

## Dalva Mota, Brazilian Agricultural Research Corporation (Embrapa), Brazil

Brazilian Food Purchase Program promotes food security to traditional communities

This work is about the experience of a group of women in the commercialization of gathered wild fruits through the governmental Food Purchase Program (in portuguese PAA) in the Brazilian State of Sergipe. The analytical framework is associated to the debate on poverty and specific public policies for traditional communities in rural áreas and theirs consequences to food security. The women hold a collective identity as the mangaba gatherers, based on their use of common pool resources with low environmental impact. They mobilize themselves through the Movimento das Catadoras de Mangaba - MCM (in english, Mangaba Gatherer Women´s Movement). Although they have recently been recognized as having specific legal rights, they are experiencing the dwindling of the resources they gather, as well as difficulties in commercialization of the fruits due to their seasonality and the unpredictability of access. The experience was carried out between 2008 and 2011 and involved direct and participant observations and open-ended interviews. In addition, negotiations were conducted with the institution responsible for the PAA for improve on the price of the fruit. The main results show that the PAA has contributed to increased income, increased consumption and variety of food and self-esteem. There was a re-arrangement in their way of participating in the program, meanwhile some of their traditional practices were relegated. The program rules were re-signified and adapted locally. While growing solidarity has been observed among the gatherers, competition for the fruits has also increas.

For more information:

<http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-20032014000300003&lng=pt&nrm=iso&tlng=pt>

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## Jessica Bridgers, World Animal Net, United States of America

Improving animal welfare in agricultural development can make a significant contribution towards the achievement of food security; and the production of safe, healthy, nutritious food. Higher-welfare systems are needed in order to safeguard and develop local production/consumption systems and to ensure future sustainability, food safety, and human health. The High Level Panel of Experts on Food Security and Nutrition mentions the importance of animal welfare in its 2016 report stating that “Animal welfare is linked to economic development and the education, cultural practices, religious beliefs and knowledge of farmers. Improving animal welfare can contribute to both resilience and resource efficiency.”[viii]

For these reasons, World Animal Net has for several years been engaged with a multi-stakeholder partnership along with the World Bank, Wageningen University and Research (WUR), the Food and Agriculture Organization (FAO) and the World Organisation for Animal Health (OIE). This project is called the “Wageningen process”, and its goal is to develop “Good Practices for Animal Welfare in Development”. These will support the broader development and cooperation community in assisting Low- and Middle-Income Countries (LMICs) with the effective implementation of good animal welfare practices for the sustainable development of the agricultural sector. The project provides practical guidance and promotes the implementation of good animal welfare practices in agricultural development activities. Currently, guidelines for implementing good animal welfare practices for pigs are nearing completion. Work is slated to begin in September 2019 on a set of guidelines for working equine welfare and a set of guidelines for broiler chicken welfare.

The introduction of industrial animal agriculture systems in developing countries can result in increased food insecurity. This is because such systems are concentrated in the hands of a small number of major commercial interests, which mainly produce for more lucrative export and urban markets. They compete unfairly with local, small-scale producers and often put them out of business or integrate them as contract producers—incrementally eliminating sustainable, local production. They are also import and technology dependent, which can increase insecurity, especially due to factors such as: lack of plant maintenance, technical expertise and equipment supplies (especially in cases where there is lack of expertise and experience with modern systems and technologies, and where there is not a culture or tradition of regular maintenance); insecure power supplies; and volatile global trade/market and currency fluctuations.

Industrial animal production systems decouple animals from the land by relying on feed inputs like grains and soy, also grown intensively and which could otherwise be used to directly feed humans. According to the World Economic Forum[ix], this means that up to 20% of calories produced per person today are lost to feeding animals. More people could be fed, using less land, by reducing the amount of grain fed to animals rather than humans. The sheer scale of the losses entailed in feeding cereals to animals means that this practice is increasingly being recognized as undermining food security. The UN FAO states that further use of cereals as animal feed could threaten food security by reducing the grain available for human consumption[x].

Furthermore, these close-confinement animal systems and crop monocultures are particularly vulnerable to disease and accidents, increasing food insecurity and health risks. Various pharmaceutical and chemical inputs are used, including antibiotics, to keep such systems functional in the short-term, but these have detrimental impacts over the longer term (in terms of sustainable food security; as well as health, environment and animal welfare).

Animals only contribute to food security when they are converting materials that people cannot consume – such as grass, crop residues, and unavoidable food waste – into food that we can eat. This is what happens in small-scale, high welfare, agroecological production. Such systems provide local food security; and do so in a manner which replenishes and protects natural resources and the soil for the benefit of future generations.

Good animal welfare includes the use of agroecological systems, such as raising animals on extensive pastures and rangeland and integrated crop/livestock production. These systems restore the link between animals and the land, enhance sustainability and contribute to food security. One example is silvopastoral systems for cattle that, alongside pasture also provide shrubs (preferably leguminous) and trees with edible leaves and shoots. Such systems do not need synthetic fertilizers, produce more biomass than conventional pasture and hence result in increased meat and milk production.[xi]

Good animal welfare also includes improved healthcare and nutrition for the animals through better disease prevention and management, which results in increased livestock productivity and quality. This will improve smallholders’ purchasing power, making them better able to buy the food that they do not produce, further supporting food security.

World Animal Net’s joint project with the World Bank and other partners is ultimately contributing to creating a more food-secure, Zero Hunger planet and is shedding light on how animal welfare and the SDGs are inextricably linked.

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## Raquel Rodrigues, Brazilian Agricultural Research Corporation (Embrapa), Brazil

Mapping and monitoring of native mangaba tree (Hancornia speciosa Gomes) in the Northeast, Brazil

The mangaba tree is native from Brazil witch, over the years, it has been suffering a deforestation process. In Coastal Tablelands and Lowlands territories from the Northeast Region, the mangaba tree has been managed by ‘catadoras de mangaba’ (mangaba women pickers). Since 2009, the Brazilian Agricultural Research Corporation (Embrapa) have mapped and monitored the areas of native mangaba trees in Sergipe State.

The territories used by the mangaba women pickers are in the cities of Santa Luzia do Itanhy, Indiaroba, Estância, Itaporanga d 'Ajuda, Aracaju, São Cristóvão, Nossa Senhora do Socorro, Barra dos Coqueiros, Pirambu, Santo Amaro das Brotas, Japaratuba, Pacatuba, Japoatã and Brejo Grande. In 2016, these territories occupied 34,033 ha, however, there was a reduction of 10,456 ha (29.6%) of the areas mapped until 2009. The livelihoods and lifestyle of mangaba woman pickers are been threatened by the increased activity of sugarcane and eucalyptus growing, shrimp farming, resorts, which destroys the ecosystem and drastically reduces the native vegetation and mollusc harvesting, another activity carried out by many of the communities concerned.

This research has alerted public makers to the risks of extinction of the plant and livelihoods of mangaba women pickers in Sergipe, in addition to the risk of harming more than 5,000 people who depend on the activity to survive. Brazilian Ministry of the Environment (MMA) has build publics policies of ensure access to land and conservation of lifestyle of mangaba women pickers. The National Supply Company (Conab) has followed the Embrapa´s researchs to defined the prices of mangaba fruit in it programs.

More information:

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RODRIGUES, R. F. de A.; SILVA JUNIOR, J. F. da; MOTA, D. M. da; PEREIRA, E. O.; SCHMITZ, H. 2017. Mapa do extrativismo da mangaba em Sergipe: situação atual e perspectivas. Embrapa, Brasília. 56 p. Disponible in: <https://www.embrapa.br/en/busca-de-publicacoes/-/publicacao/1085370/mapa-do-extrativismo-da-mangaba-em-sergipe-situacao-atual-e-perspectivas>.

## Mylene Rodríguez Leyton, Universidad Metropolitana de Barranquilla, Colombia

**Sustainable Development Goals - your story of creating a food secure world**

**By: Mylene Rodríguez Leyton**

Teaching Researcher, Nutrition and Dietetics Program, Research group on food and human behavior. Universidad Metropolitana-Barranquilla, Colombia.

**How to help you reach a world without hunger and in the sense of food security?**

I am a Dietician Nutritionist and my work focuses on the training of future professional students of Nutrition and Dietetics, I work as a research professor at the Metropolitan University, in the city of Barranquilla located in the Colombian Caribbean. Our work contributes to reach a world without hunger and in which food safety prevails from the teaching, research and extension processes; based on the model and the pedagogical strategies found in the classroom of the class, in the practice sites, in the projects of formative research, in extension and in innovation. The solution of the problems of Hunger in communities, groups and vulnerable people, especially children, seniors and pregnant mothers.

Teachers play roles as advisors and facilitators in the management processes of policies, plans, programs and projects in local, national and local scenarios.

From the research the teachers contribute with the generation of new knowledge and innovation products with scientific evidence to be taken as an input in the interventions for attention and prevention of malnutrition.

**Has your work changed after the SDGs were approved? If yes, how?**

Of course, in my personal experience in the courses of deepening in public nutrition with students of last semesters I have generated spaces for discussion, analysis and reflection so that students understand the complexity of the problems and later as future professionals assume that they have social responsibility in the solution of nutritional problems.Particularly in the month of October 2018, in commemoration of World Food Day, I had the opportunity to organize a Symposium with national and local guests to execute and share together with a team of teachers from the Nutrition and Dietetics Program. different points of view related to Hunger and food security, with the generation of innovative products; but the most important point was the realization of a Panel called Zero Hunger where a group of students of Nutrition and Dietetics from Colombia and students from Mexico who were in exchange at my University made an analysis from their perspective of students on the problem of malnutrition in the two countries Colombia and Mexico; this intervention generated a positive impact on the students attending because they allow them to become aware from the identification of the magnitude of the problem through the appropriation of the data and the figures of the indicators, allowing them to empower themselves and prepare themselves to exercise an active role from your period of professional training. A product of this event was a compilation of reflections elaborated by students in a World Food Day Bulletin, In this year 2019 with a group of my Seventh Semester students; a series of forums were held in the classroom to present their views on the problems of hunger and malnutrition, from case reviews and bibliographical reviews, then the students individually elaborated writings that they socialized with their peers. class, later the students who had common themes were integrated to elaborate new writings and finally elaborated with a magazine that entitled Public Nutrition to the Day in which they are the authors of the essays; this experience allows them to make their ideas visible, creates a sense of ownership and sensitizes them to the role they play in the eradication of hunger and malnutrition.

**Can you share some stories about how your work has contributed successfully to achieving SDG 2 in your country?**

In Colombia, the entity responsible for malnutrition care policies is the Ministry of Health and Social Protection, and the Colombian Family Welfare Institute also plays a leading role in the implementation of the policy of comprehensive care for the poor. early childhood.With the emergence of the Sustainable Development Goals, in Colombia food and nutrition security policies have been strengthened; guidelines and norms have been defined to fight against malnutrition; the strategy of care and prevention of child malnutrition is being developed, which is a set of food and nutrition actions with a family and social pedagogical perspective aimed at the care and prevention of malnutrition from pregnancy, its objective is to improve the nutritional status of the beneficiaries prevent low weight for gestational age in pregnant women and malnutrition in children under 5 in previously targeted areas.In Colombia there is an intersectoral commission for food and nutrition security that is composed of government entities that coordinate in a coordinated manner the actions to achieve the objectives and goals of food security for the execution of the food and nutrition security policy in the country. Priority has been given to regions where morbidity and mortality rates due to malnutrition have been high, as in the case of the departments of La Guajira and Chocó.For its part, the Ministry of Agriculture and Rural Development has been developing projects to strengthen the rural sector in response to a need for post-conflict.We, as academy participate directly in the development of these policies and contribute from the community level in extension projects, volunteering, to participation in the planning and execution of public policies on food and nutrition; likewise from the research we are generating new knowledge, proposing innovative and sustainable solutions to reduce hunger and achieve food security; We are clear that there are challenges such as the issue of migration that affects the population of Venezuela that arrives in Colombia under difficult conditions of health and nutrition.

My vision as a teacher is to ensure that our young students and professionals lead the fight against hunger and malnutrition and achieve Zero Hunger in our local environments, thus adding to the achievement of SDG 2.

Revista Nutrición Publica al Dia Unimetro

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Revista%20Nutrici%C3%B3n%20Publica%20al%20Dia%20Unimetro.pdf>

Boletín Dia Mundial de la Alimentación Unimetro 2018

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Bolet%C3%ADn%20Dia%20Mundial%20de%20la%20Alimentaci%C3%B3n%20Unimetro%202018.pdf>

## Lal Manavado, University of Oslo affiliate/Norwegian Directorate of Health, Norway

Towards a World of Adequate Food Security

Reality around us compels us to admit that even though much effort and other resources have been spent towards achieving SDG-2, the progress o far remains short of what we may reasonably have expected to make. True, in some countries, situation seems to be satisfactory, but as a rule, those are affluent and technically advanced. But even there, it is uncertain whether it would remain sustainable. This note discusses what we might do to make this sombre picture a little less gloomy.

I shall begin with a few obvious things we always need to keep in mind:

• Unquestionably, the value of food stems from its being essential to life, hence, securing its sustained availability at an affordable cost is of vital importance.

• Unless it is sustainable, food security is of limited duration, and as such of limited value.

• Today, food security exists in some places, but its distribution is highly fragmented.

• We need to decide on what food security means to a social group, which may be a country or some part of it.

• It should be remembered that what food security means for a group should not be imposed on it from the outside, but should be decided as objectively as possible with reference to the following:

1. Its food culture.
2. Individual nutritional needs of each member of the group.

• Production/harvesting (eg. fishing) depends on the adequate availability of ecosystem services; its inadequacy is countered by its supplementation by the use of fertilisers, biocides, etc., which often has adverse consequences.

• Wide variety of human activities reduce the availability of ecosystem services.

• Therefore, neither food security nor its sustainability can ever be achieved in isolation. It requires sincere and very close cooperation among a variety of human activities and their harmonious coordination.

• Mankind enjoys food; only babies can be fed according to some table of nutrients and energy content. Most cultures have developed its own culinary tradition in order to derive some ‘dietary enjoyment’ from its food. It is considered to bea a valuable social good.

• Vast majority of people today procure food by purchasing it; therefore, unless gainfully employed, a varied, wholesome and a balanced diet is available to them at an affordable cost, and they possess sufficient dietary competence, elimination of hunger and nutritional disorders would remain elusive.

Rest of this note will be devoted to ascertaining whether the current efforts to achieve sustained global food security pay sufficient attention to the points given in the above non-exhaustive list. It must be emphasized that all the points raised there represent knowable logical facts, and as such, they are not open to dispute as are contingent facts like ‘value chains’ where each of its elements is valuable only to a specific group. This is irrelevant, because the value of food is universal, hence the need for it cannot be adequately satisfied by catoring to what such a group desires.

I do not advocate a single solution, nor yet a limited bundle of them. But our hope lies in the fact that every good solution to global food security and nutrition has the same set of attributes or features that may take different forms depending on the location. For instance, low altitude dweller in temporate climes like Europe require more protein than those who live high altitude locales like Tibet or in Andean highlands. Even though it is cold in both places, low atmospheric pressure there makes it imperative to eat more carbohydrates and fats that are easily digested than proteins which requires a great deal more energy to digest. This is clearly reflected in the food culture of those peoples, and we ignore it at their peril.

So to recap the necessary conditions for a world with adequate food security and nutrition, we need to ensure the following:

• An adequate and sustainable food supply that enables the people to procure a wholesome, varied and balanced diet as close to their own food culture as possible. This last requirement makes a significant contribution to world’s agricultural bio-diversity as well as to environmental well-being as it is the best suited to the local geographic,soil and weather conditions.

• What food is best produced in a locale or harvested from its environment is not a given; hence food producers/harvesters have to acquire this knowledge by learning, while the skills needed to use it will have to be gained by training. This is the purpose of agriculture education.

• This food supply should be available at an affordable cost to everybody. Unless such affordability is ensured, the rest would be of limited use.

• Even if the two above conditions are met, they will fail to achieve adequate public nutrition unless the people know what to eat, where to procure the necessary ingredients and prepare them as meals for consumption. This dietary competence is not given to a person at birth, and it has to be acquired through dietary education and training. One has to acquire it at home and possibly at school or public education schemes. Unfortunately at present, insufficient attention is paid to this vital need.

• At this point, how to achieve an affordable wholesome food supply has to be addressed. It requires a two-pronged approach. The first of them involves enabling the end-user to purchase food, which requires creating the conditions under which one may legitimately earn a decent livelihood. Secondly, the large profits made by the innumerable intermediaries engaged in food trade and some of their practices such as speculation in commodity futures would make it extremely difficult to make wholesome food affordable even if near full employment is attainable. The reason for this is glaringly obvious, viz., not all the people have the ability and skill to procure the kind of work that would enable them to afford the comparatively high prices of wholesome and varied food. This would leave the majority especially in non-affluent countries to live on some cheap unwholesome and/or industrial food. This may be a version of ‘not leaving anyone behind’ where they will be limping on somehow. Therefore, the second essential prong of the approach is to streamline the human food system with reference to the soundest criteria of justifiability and common decency. Here, it may be hinted that such a food system would serve a common value, viz., the value of one’s own life to oneself from which food derives its own value as the third most essential thing for life after air and water.

• Thus, it is essential to render the human food systems in use today not just ‘efficient’, ‘highly productive’, ‘utilise the latest technology’, etc., but rather sustainable, yield wholesome and varied food items at affordable prices and serve as a benign employer to as many people as possible rather than being capital-intensive. In other words, embody a cooperative food production and distribution rather than competitive production and selling. I think it would repay to establish the structure of a justifiable generic food system through a really open and reasoned debate.

• Now one may wonder why I have not said a word about environmental degradation, climate change, global warming, right to food, etc. My reason is very simple, the first three are fully subsumed by the term ‘sustainability’ which also includes human over-population (an unpopular truth), while any right to food becomes less than academic if it is not affordable, unwholesome, and if one’s country simply cannot afford to provide sufficient social help., etc

Now another recap of what is necessary to ensure a sustainable and an adequate FSN:

• Sustainable food production/harvesting keeping as close as possible to what food cultures recommend.

• Appropriate agriculture/harvesting education and training.

• Corresponding dietary education and training of the end-users. Neither of these should be theoretical for they are required in real life, hence, should be practical.

• Justifiable streamlining of human food systems now in use; unless this is achieved without delay, no increase in world food production, nor yet increased GDP’s will ever enable us to significantly reduce the current levels of global hunger, malnutrition and NCD’s.

Let us assume for a moment that wholesome and varied food is available to all of us, we know where it is, how to prepare it, etc. Even a child would now cry out, but we don’t have money to buy it! So much for scientific availability. Come, let us see what to do to make it affordable. Streamlining the grossly obese present food systems clanking their value chains has already been mentioned. The hungry and the inadequately/inappropriately nourished need not only dietary competence, but some means of earning a decent living. What might one do for it? And this is the crux.

• Food production/harvesting may offer some employment, but is not sufficient toaccomodate sufficient numbers as decently rewarded employees. It seriously fails to open up its potential by the following:

1. Its increasing tendency to become capital-intensive even in the poorest countries where high unemployment is rife.
2. Its neglect of practical education and training.
3. Its failure to educate the public as to its vital importance to man above ‘freedom’, ‘rights’, ‘glamour’, simply because starving man has little use for those fine abstract entities while agriculture enables him to live, and then, conceive of those.

So, attaining our goal has to depend on other fields to provide people gainful employment so that they may procure food. This is becoming increasingly difficult as global unemployment figures clearly show, and it is most severe in poorer countries. In affluent countries, a wide variety of trivial jobs keep those figures apparently low, while that and dole ameliorate its worst physical effects on people. Ever growing world population keeps on exacerbating this serious social problem.

Therefore, a sustained and adequate global FSN requires an appropriate, just and devolved food production/harvesting and distribution system and suitable employment schemes, both of which are to be embedded in an envelop of sustainability.

In providing employment, apart from safety at work, reasonable pay, etc., theorists should remember that the unemployed are not concerned with the monotonous nature of some jobs as they are, and it is unreal to believe the poor unemployed are as interested in finding exciting or challenging work as many securely employed theorists seem to think.

I have already mentioned the necessity of streamlining the current food systems. Let us take a brief look at some of the conditions food production/harvesting, distribution should meet in order to be justifiable and sustainable:

• Economy is simply concerned with an exchange; it may involves an exchange of physical goods, physical acts or services, value tokens like conventional money or any symbol thereof, a promise or an undertaking to be fulfilled in the future, etc. Note that these transactions may involve any combination of items mentioned earlier. The sole raison d’etre of such exchanges is the belief that it would enable one to gain something of value.

• But this type of exchange could not have endured if all of them were biased in favour of one party and the other always sustained a loss of value. In other words, economy depends on a fair exchange of values, which is not the case at present. Enormous profits made by various types of food sellers, processors, transporters, speculators, the plight of rural and indded most farmers, huge farm subsidies affluent nations have to pay their farmers, and price of wholesome food, etc., are indisputable indicators of unfairness in the exchanges involved in food systems of today. They make up the ‘value chains’ that bind people tightly to inequity of poverty, hunger and indifferent nutrition, not to mention the non-sustainable nature of those.

1. What steps have those responsible for achieving SDG-2 taken to make ---

• Food producers/farmers receive a fair price and the end-users are able to purchase wholesome food at a fair price? These two things are logically inseparable if one wishes to achieve SDG-2.

• What steps have been taken to ensure that the end-users have reasonable access to fresh food?

• Why nothing has been done to ensure the freedom and independence of food producers/harvesters and end-users? Near monopolies of every ilk are encouraged, which puts both groups at the mercy of trade.

• Why the authorities and experts seem to be equally averse to a justifiable notion of human food system?

• Why has agriculture remained a despised kind of employment even though without it, we would still be just wandering groups of skin-clad savages wielding stone implements?

• How far have we come in reducing agro-industy farming, and supporting smaller mixed farms that are profitable?

• Have we stopped the rate of abandonment among small holders, and what have we done successfully to encourage increase of small holdings?

• How far have we reduced monoculture with a corresponding increase in multi-culture?

• By what percentage have we managed to reduce the use of mineral fertilisers and biocides? If so, has it been accompanied by a comparable increase in using their biological counterparts?

• What percentage reduction in soil pollution have we achieved?

• What percentage reduction of soil erosion have we managed?

• What percentage of polluted and/or eroded soil we have successfully restored?

• What percentage of solid and dissolved marine pollution (in both fresh water bodies and sea) have we managed to stopp?

•What percentage of total marine pollution have we remedied?

• What is the total extent of our successful re-forestation during the past two years?

• What is the total extent of our urban and village re-forestation during the same period?

• When are we going to admit a balanced diet is not just a source of nourishment, but it is also the source of a unique human enjoyment and valuable means of cementing relationships? Culinary art of most cultures bear witness to this fact.

• Will the experts immediately stop denying the future generations of their patrimony of food culture and the dietary enjoyment it offers even the present generation by their exaggerated claims concerning novel and scientific foods? When will they realize this is one of the reasons that motivates the rural youth in poorer countries to value ‘western’ industrial food and spend their meager supply of cash onit?

• How great is the proportion between the material resources spent on data collection and analysis, seminars, conferences, productivity research, etc., and that expended on actual agricultural projects and the acquisition of appropriate agricultural and dietary competence?

It is with much regret I notice that when answered honestly, replies given to the questions above are a cause for serious concern. However, we know already how to deal with the unsatisfactory answers to them. What we seem to lack is the will to direct our energies into the real world and make good use of the appropriate bits of knowledge and skills we possess. It would bode well for the future if we are ready to make a drastic cut in the indefensible disproportion I have refered to in the last question above. Then, let us leave our thinking pads and laboratories and go out into the barren fields and they may bloom yet.

Not quite yet; I have to say a few words on enabling people to buy food. Agriculture and food distribution can be expected to offer more employment through rational labour-intensive methods. But it will still leave a vast pool of unemployed labour, most of which comes from semi- or unskilled people. They need food now, and not after the completion of some scheme that may bear fruit in X years.

So, it would be essential to initiate immediate and vigourous action to bring about a dramatic rise in sustainable and dependable “employment in situ”. What this means is to employ people where they are or getting them back to their homes from city slums. Its advantages and vital importance is too obvious to be elaborated.

I cannot specify specific measures to be used unless the general conditions obtaining at a place are known. I do not mean the kind of data one might need ‘research’ to procure. Here, the local people in the area are the best source on which one may rely.

Let me outline some paths to explore towards the above objective. They do fulfill two essentials, viz., sustainability and fairness necessary in the type of value exchange we have discussed earlier. Let us remind ourselves that our future depends on the availability of renewable material resources is mediated by the environmental well-being, hence, the latter is the mediator of sustainability and indeed our survival.

• Immediate and effective steps to stop the global population increase, and promote effective ways of reducing it gradually.

• School and public education to inculcate into the people the vital importance of the well-being of the environment, agriculture, health, security, family planning, and civilized enjoyment, while money is desirable because it a tool that enables a person to adequately satisfy one’s fundamental needs i.e., nutrition, good health, education, security, procreation and civilized enjoyment in a way that does not harm anyone else or our environment. This may be scoffed at as impractical, but if you do, do you endorse the ‘glamourous’ a la tabloid or do you have a civilized alternative?

• Political devolution has become a fashionable necessity, but when economy is increasingly monopolized, it becomes an empty phrase. So, let us initiate real economic devolution so that the end-users have a real choice instead of itspathetic parody available in most affluent countries today.

• People are supposed to elect their leaders, but when the leaders (as long as they are sufficiently honest) will have no power to apply people’s will to the business of government when their economic hands are tied by monopolized finance. Hence, economic devolution including more power to national governments in economic affairs is essential. Otherwise, democracy is a joke and becomes a silky version of the late and unlamented Bolshevik dictatorship whose effect on humanity of man is awful. Let us bear in mind that there can be Gulags where one can be voluntarily kept inside with perpetual digital entertainment and cheap industrial food and drink.

• Promote labour-intensive clean small industries. This can be used to a surprising extent provided that we are willing to look at the aftermath of many a technical ‘advance’.

• Stop insisting that every youngster should seek a ‘higher education’. Let there be ample opportunities for all those who wish it and are capable of it. Let there be equal opportunities for those who want some professional training rather than ‘higher education.’

• End-users pay billions of US dollars per year to keep advertisers alive. People should boycott heavily advertised products and services and patronize those that simply give facts about them. Authorities should spare children from such misleading acts of mind management. Whether it is done by a noxious dictatorship or a tradesman for profit, it is equally unacceptable.

• Discourage consumerism and promote durable products. This is crucial for the well-being of our environment.

• It is fair that a trader should be rewarded for his services of convenience. However, as an intermediary, it is unfair that his reward should exceed that of the actual producers. As the backed financeial resources of the world are finite, it is certainly unfair for a few control a greater share of those than the rest of the world.Therefore, it seems reasonable to impose a certain limit on one’s economic resource ownership be it a physical or a legal entity.

These notes may seem somewhat hurried as they indeed are. They are by no means comprehensive, but they point towards an unpopular yet a fair way towards a world where hunger and inappropriate nutrition may loom less accusingly at our centuries of resounding words hiding our indifference.

Lal Manavado.

## Nkeng Pius, NDEF, Cameroon

Dear Forum Members

Greetings from Bamenda, Cameroon.

The National Development Foundation (NDEF) is working to empower smallholder farmers to use ecological farming practices to reduce the vulnerability of their households to food, health and income insecurity while ensuring a sound  environmental management.

The National Development Foundation (NDEF) is working to empower smallholder farmers to use ecological farming practices to reduce the vulnerability of their households to food, health and income insecurity while ensuring a sound environmental management.

Specifically on SDG2, we are working on a number of programmes aimed at helping rural poor people in villages of the North West and South West Regions of Cameroon to have zero hunger. We are developing a farmers’ agroforestry resource centre at our head office in Bamenda to demonstrate how a number of interrelated activities could be carried out on a small piece of land to boost food production and use land to its maximum capacity. Our work is helping to create a food secure and Zero Hunger world through the following programmes:

* Agroforestry Programme
* Plantain Multiplication Programme
* Cassava Programme
* Beekeeping Programme
* Moringa Programme
* Fish Rearing in containers and concrete tanks
* Poultry keeping
* Pig rearing
* Crop processing for value addition Programme

In the agroforestry programme, we target beneficiaries or clients who live in the poorest rural communities where the need for sustainable incomes and life opportunities are most urgent. We prefer to work with constituted groups of people  
such as farmers and structured development committees. We train farmers to establish tree nurseries from which they get improved trees seedlings for integration into their farms. We train them on modern tree propagation techniques (such as grafting, airlayering and rooting of cuttings) and effective nursery techniques. We also train them how to construct and use propagators. NDEF was technically supported here by the World Agroforestry Centre (ICRAF) Yaounde.

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Global%20Forum%20on%20Food%20Security%20and%20Nutrition%20%E2%80%A2%20FSN%20Forum%20Contribution.pdf>

## France Gina Djoumessi Tobou, université de Dschang-Cameroun, Faculté d'Agronomie et des Sciences Agricoles (FASA), Cameroon

Dear Forum Members

Greetings from Dschang, Cameroon

My name is Djoumessi Tobou France Gina. I am a PhD student in Nutrition and Feeding animals at the University Dschang-Cameroon. My area of ​​research is food security.

The food security is general and particular in a security of the western regions. Indeed, the population growth of 1.14 per year (Ria Novosti - Sputnik, 2019) creates an imbalance between demand and supply of protein of animal origin, malnutrition especially in low income families. To fight against this scourge, the development and the vulgarization of the mini-breeding, offer you an alternative alternative to what you want to contribute globally to the economy of the African countries by the promotion of the employment, exchanges and exchanges preservation of biodiversity. Thus, the culture which was an unconventional breeding, was above all a pledge of food security. The guinea pig is a monogastric herbivore whose major interest lies in its prolificacy, its high growth rate, its lean meat and its inexpensive diet. Despite its importance, diet remains the main limiting factor for the expression of the production potential of animals in a tropical environment. Indeed, in this zone, the animal culture is rustic, the animals feed mainly on kitchen waste, crops and grass grasses often deficient in essential nutrients such as proteins and minerals (Noumbissi et al., 2014). This results in low productivity, stunted growth, decreased fertility, abortions, and small ones with low birth and death rates (Niba et al., 2004). Improving productivity among consumers can do the other, improving their diet and especially their implementation.

To overcome this scourge (malnutrition), our studies focused on the valorization of Moringa oleifera seeds in the guinea pig diet in order to increase the availability of animal proteins.Our study shows that Moringa seeds are very rich in protein (38%) and can be used both human and animal. In addition, these seeds significantly improved the average daily earnings of guinea pigs. In short to fight against food security we can advise the practice of this breeding, the use of Moringa seeds to improve the yield of animal productions.Indeed, guinea pigs do not compete with humans for food. It is herbivorous, its waste is less polluting, but can be used to fertilize the pond or crops. Its breeding makes it possible to avoid the hunting with excess thus protection of the biodiversity.

In conclusion, it is a good candidate for sustainable development and for achieving the Sustainable Development Goals (SDGs) by 2030.

## Adam Sneyd, University of Guelph, Canada

"Taking the SDGs at face value and not conceptualizing them to be the result of political conflict would be a huge mistake. The global cacophony of politically correct communications that the SDGs have stimulated could also cement power relations that recreate inequalities and marginalization in the global political economy. This bleak reality is in no way foreordained, though — political analysis can help us uncover the politics that works against the goals, and can inspire more informed engagements in SDG politics.

Regarding the "zero-hunger" goal specifically, there is a clear multilevel politics of ideas animating discussions about the future of food. Stakeholders who are situated differently in relation to food tend to vehemently disagree on the interventions and investments necessary to enhance food security and realize the right to food. The targets and indicators linked to “SDG 2” are subject to this broader food politics. Fractious political divides pertaining to the availability of food, and to its accessibility and to dietary adequacy, set the limits of the possible for realizing this SDG."

<https://blogs.lse.ac.uk/lsereviewofbooks/2019/06/26/book-review-politics-rules-power-globalization-and-development-by-adam-sneyd/>

-Adapted from Politics Rules: Power, Globalization and Development (Fernwood Publishing and Practical Action Publishing, 2019).

## Max Blanck, FAO, Italy

Dear All,

With this interesting discussion now closed, I would like to express my deepest appreciation for the time you dedicated to sharing your SDG-related stories.

In this online discussion we have deliberately invited you to comment on a very openly formulated topic as we did not want to limit you in telling the stories you deemed important.

In my view, the most important result of this exchange is that it underlined once again the complexity of the fight against hunger and malnutrition and the multitude of avenues that we can follow.

Something that many of the examples you shared have in common is that they provided innovative approaches or applied tested solutions in an innovative way. This is encouraging as it showcases the high level of commitment towards realizing SDG2 and the vitality of the development sector, especially at the grassroots level.

The diversity of the examples you shared also underlines the importance of knowledge sharing initiates to help us stay updated and able to learn from each-other.

For this reason we also appreciate the more critical comments you shared as they highlight pitfalls that can jeopardize our success.

Over the next weeks we will analyse your comments in greater detail and might get back to you should we require further information.

Once again, thank you very much!

Max

1. SDGs - Sustainable Development Goals 17 Goals, to transform our world; Sustainable Development Goals 17 Goals, to transform our world, <http://www.un.org/sustainabledevelopment/sustainable-development-goals> [↑](#footnote-ref-1)
2. \*\*FAO Strategic Objectives, http://www.fao.org/about/what-we-do/en/ [↑](#footnote-ref-2)
3. FAO, Global and Regional food Consumption; <http://www.fao.org/docrep/005/ac911e/ac911e05.htm> [↑](#footnote-ref-3)
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