The Boris Mints Institute
for Strategic Policy Solutions to Global Challenges
The Gershon H. Gordon Faculty of Social Sciences
Tel Aviv University

BMI Conference – Malta, March 29-31, 2017

Executive Summary of Proceedings

Transforming Desertification as a Global Policy Orphan:

Land Degradation Neutrality Strategies Through Prevention and Restoration

Alon Tal, Shira Bukchin, Editors

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Introduction

The United Nations Convention to Combat Desertification (UNCCD) defines desertification as land degradation or processes of reduction or loss of biological or economic productivity in drylands. Given that land productivity is not static but constantly fluctuating, in 2005 the Millennium Ecosystem Assessment redefined the progression of land degradation as processes that lead to persistent reduction in the levels of all ecosystem services over an extended time period. Land degradation corrodes the very pillars of global sustainability: it is a major cause of biodiversity loss, forest depletion and the rise in anthropogenic greenhouse gas emissions.

There are many drivers of desertification – direct and indirect. The major *direct* drivers of land degradation in the drylands include:

- Overgrazing;
- Deforestation;
- Transforming rangeland to cultivated lands;
- Inappropriate water management and irrigation practices.

These phenomena are typically the results of other "*indirect* drivers", among which are land tenure policies and the status of women. Acute desertification typically arises when excessive pressures are placed on sensitive lands, expediting soil erosion and loss of the land's fertility. The steady increase in human population levels is a central component of the world's desertification dynamics. For instance, the number of people living in different African dryland countries is expected to grow five to six folds over the next 14 years – making present challenges of moving people out of poverty while preserving land resources, even more daunting.

While desertification is a ubiquitous phenomenon and a global issue, Africa remains the most vulnerable region on the planet. This emerges from the desertification vulnerability map, which shows recent reclassification in the global climate and soil map (Figure 1).

The extent of the phenomenon depends on the specifics and nuances of technical definitions and so there are widely diverging estimates regarding the spatial extent of land degradation: The levels of meaningful soil and productivity losses reported in different studies range from 15% to 63% of global lands; desertification has been identified at levels from 4% to 74% of global drylands. **Such dramatic variations underscore the need to continue efforts to standardized monitoring methods and increase the resolution global benchmarks and indicators.**

The best assessments at present suggest that 23% of non-desert drylands are now desertified. In dryland areas of Africa, an estimated 4%-10% of the potential productivity was lost every year between the years 1981 to 2003. Some regions are more affected than others: In the Middle East and North Africa, for example, 85% of rangeland are thought to suffer from desertification, accounting for fertility losses in some 45% of open spaces.

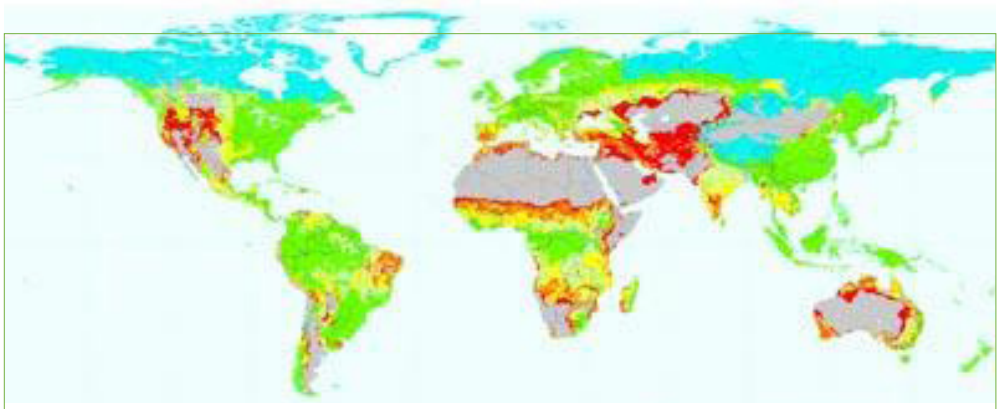

Figure 1. Desertification vulnerability map

Click here to view presentation by Prof. Uriel Safriel

Despite the contrasting assessments of the scope of the phenomenon, most international experts agree that desertification constitutes an enormous global scourge. Indeed, the problem was defined by the hundreds of scientists participating in the 2005 Millennium Assessment as the challenge affecting more people than any other single environmental problem on the planet. Desertification exacerbates poverty by degrading soils, and other vital livelihood-based resources, increasing vulnerability to climatic shocks and impeding resilience. The increasing frequency of extended drought periods in the drylands, apparently due to climate change, makes the problem even more severe for millions of affected individuals.

In south Saharan-Africa, for example, the cartographies of rural poverty, hunger, and food insecurity correlate closely with those of land degradation, especially in the vast Sahel. The dynamics of land and vegetation reflected in satellite images from the Zinder region in Niger, for example, reflects the unforgiving reality of desertification (figure 2). From 1955 to 1975, vegetation and land coverage almost disappeared. A once fertile landscape was transformed into desert-like conditions by 1975. The ensuing drop in land fertility produces intermittent famines an escalate migrations, jeopardizing human security and global sustainability - desertification threatens human security.

Land degradation also makes the world's drylands among the planet's most conflict-prone region. As the world increasingly scrambles to address the worst refugee crisis in decades, it is important to recall that present migrations are a symptom of local conditions, and any holistic solution must consider the dynamics behind the loss of livelihoods in dryland regions. Throughout the world, especially in Africa, land degradation constitutes a significant driver of migration. Land degradation is frequently the result of population pressures which push land resources beyond their restorative capacity. With Africa expected to account for more than half of the world's population growth between 2015 and 2050, it is inconceivable that meaningful progress in combatting desertification will be made without significant steps taken towards improving family planning and attaining demographic stability in this continent.

Notwithstanding the toll it takes on the lives of hundreds of millions of people, desertification has not been prioritized globally as an environmental challenge. Funding has never been close to the objective needs of the affected, developing countries to launch meaningful land restoration progress and diffuse the available technologies that could effectively address the problem. Nor have the social dynamics for launching a comprehensive strategy for land management been well understood and taken into consideration by aid agencies. That's why this workshop, convened in Malta, in March 2017, chose to term the issue as "The Global Environmental Orphan". At this gathering, a range of experts reported on different aspects of the issue and offered a range of solutions to existing conundrums. This Executive Summary offers a synopsis of the presentations and the discussions conducted.

A Framework for Policy Makers

Desertification is not destiny. It can be reversed. Land degradation can be seen as the consequence of inappropriate and excessively intensive land use. With appropriate implementation of management practices, these dynamics can readily change for the better. The satellite image in Figure 2 from 2005 also shows regeneration of trees and vegetation in Niger, reflecting improved land productivity, notwithstanding dramatic increases in population (people and livestock). Restoration is surely possible, but it is a difficult, prolonged process. **As a global strategy, prevention of land degradation remains a far more prudent and cost-effective strategy than attempting to bring fertility back to lands where soil has eroded.**

There is nothing new about the process of soil loss and the practices available to prevent it. Erosive phenomena were familiar to the ancients who often showed great conscientiousness in land stewardship, from construction of terraces to controlled grazing regimes. Nonetheless, there are many modern techniques now available for abating and ameliorating desertification even as agricultural productivity is dramatically expanded. There are many countries who have long since proven that human cultivation of land in sensitive, dryland regions can be done without compromising long-term soil fertility. Yet, many simple and time-honored land management practices remain unknown to the very populations that need them most. Public policies must first and foremost prioritize delivering practical and effective interventions to affected regions in developing regions of the world. **Even more important than technology development – is technology diffusion.**

For example, it is highly unfortunate, that the many effective practices for restoration of degraded lands in Niger (so-called farmer-managed natural regeneration or FMNR) have not spread across the border into neighboring Nigeria, even though the population there speaks the same language, faces comparable bio-physical conditions and enjoys rainfall that is somewhat more plentiful. The worsening of soil conditions in the northern areas of Nigeria also shows how important local policies are and how violence and conflict can jeopardize restoration efforts.

Like in many challenges – the axiom "*Think Globally – Act Locally*" is appropriate. Transhumance schemes or seasonal migrations have always been a part of the adaptation strategies of populations affected by desertification and drought. Nonetheless, the surge of illegal migrants from the Mediterranean Sea into Europe can to some extent be understood as an exodus from some of the most degraded, desertified hotspots of the African continent. The trajectories of some of the migrants as reported in international media outlets support that the traditional seasonal migrations or transhumance between neighboring countries are increasingly becoming permanent migrations.

Notwithstanding decades of pronouncements, pilot programs and genuine international concern, few

Figure 2. The dynamics of land and vegetation reflected in satellite images from the Zinder region in Niger introduce the reality of desertification. Each black dot on the images represents a tree

Click here to view presentation by Mr. Luc Gnacadja

countries in the international community have begun to comprehensively address one of the most vexing – but eminently solvable environmental challenges. The engagement of the international community will be critical to garner the financial resources to restore degraded lands. But ultimately, these global phenomena can only be solved at the local level, with cost-effective land management practices and socially- sensitive policies in place to expedite them.

Evaluating the Limited Success of the United Nations Convention to Combat Desertification

Tragic famines during the 70s and 80s in Africa, most notably in the Sahel and the Horn of Africa, increased awareness about the issue of land degradation within the international community and eventually led to the consideration of desertification and drought issues at the UN Earth Summit in 1992. With the strong advocacy of the African governments, the summit recognized desertification as a critical global environment and development challenge and decided to establish a global and legally binding treaty to tackle desertification and mitigate drought phenomenon. In 1995, the "United Nations Convention to Combat Desertification" (UNCCD) came into force.

Unfortunately, the effectiveness of the UNCCD has been limited. To make more progress in the future, it is critical to understand the obstacles to implementation of global policies to improve conditions in countries affected by desertification. There are at least four explanations for the ostensible lack of improvement at the global-level in abating the steady degradation of soils in the drylands.

(a) *Lack of globally agreed goal and target-setting mechanism*. The issue of desertification has not been prioritized and often only receives token "charity attention". The associated actions required have never been adequately mainstreamed in national development plans and budgets.

(b) *Limiting desertification interventions to drylands.* The distinction made in the UNCCD between *drylands* and *non-drylands* was made with the best of intentions, but has actually hindered progress. If preservation of the fertility of global lands is the objective, then land degradation should focus on appropriate land uses and land use change across the planet. Limiting efforts to degradation hotspot is a dry land (with modest rainfall) or not may no longer make sense when preserving global land fertility is the common objective. In this context, it is important to note that drylands are not static but are expanding in many regions of the planet due to global warming.

(c) *The misleading concept of "affected countries".* The United Nations Convention divides countries into two categories: those with areas directly affected by desertification and those that are not. Yet, this can lead to the discounting of indirect drivers, which may arise beyond the borders of an affected region.

(d) *The "taboo" of addressing overpopulation.* The UNCCD specifically mentions the importance of considering "demographic dynamics" in the preparation of National Action Programs to address desertification. Yet in fact, the underlying population growth that exacerbates land degradation so dramatically is almost never addressed in strategies to combat desertification. As a result, the underlying drivers behind the pathology of land loss is for all intents and purposes ignored.

As the international community seeks to move forward, taking these dynamics into consideration will be necessary to implementing new strategies for combatting land degradation.

Moving from a default dynamic of DAM (Degrade-Abandon-Migrate) to a strategy of LDN (Land Degradation Neutrality)

Figure 3. Push/Pull strategy for pest management
Click here to view presentation by Dr. Segenet Kelemu

After almost two decades of efforts, the failure to attain meaningful progress makes it imperative to seek a paradigm shift in the way the international community addresses desertification. It was this recognition that led to a new strategy, formulated and advocated by the UNCCD leadership in 2012. The approach called for *Land Degradation Neutrality* at the local, national and global level.

The new strategy had both tactical and substantive, strategic components. Among the tactical measures promoted recently is a recrafted message renewing the emphasis on land as both a global and finite resource whose ongoing health is crucial for human security and global sustainability. Providing international leaders with a reliable socio-economic assessment of the costs of inaction and the benefits of avoiding degradation and restoring lands was also recognized as essential in convincing national leaders to embrace the issue. Moreover, to expand international engagement, it was deemed politically important for the convention to tackle land degradation everywhere globally and not just in drylands regions.

But there was a more fundamental, substantive strategic shift that took place in 2012 with the call for a commitment to *"land degradation neutrality"* – a new paradigm for international efforts to combat desertification. The *LDN* concept is pragmatic, based on the recognition that some degradation of land is inevitable as new tracts will need to be utilized for cultivation to meet anticipated increases in the demand for food. At the same time, however, there are also massive areas of degraded lands whose productivity can be restored. A successful approach to addressing global desertification needs to balance these two phenomena.

Offsetting mechanisms for addressing land degradation have already been developed to allow for flexible, operational standards in a range of media. These include greenhouse gas mitigation efforts (e.g., carbon trading, and Reducing Emissions from Deforestation and Forest Degradation REDD), tradable licenses in fisheries, wetland preservation offsets, etc. The LDN mechanism applies this concept to the challenge of desertification by calling for the offsetting of newly degraded land and by the restoration of comparable, already degraded lands. Ensuring such a balance creates a stability in land resources required for long-term resource management and food security.

The shift to LDN means that a global strategy to combat desertification should include parallel efforts: prevention and restoration. Just as climate change policies need to include "mitigation" and "adaptation" two parallel policy foci should be pursued in areas affected by desertification: Land degradation needs to be minimized to the extent possible, while restoration in affected areas needs to be greatly expanded. As the amount of arable, non-degraded soils decreases and the demand for non-degraded land increases, such a combined strategy seeks to stabilize and ultimately reduce the overall magnitude of degraded lands.

Figure 4. The need to combat desertification

This approach also allows efforts to combat desertification to "join forces" with the considerable international efforts already galvanized to address the climate change crisis. Decision makers need to understand that by maintaining or even increasing the amount of productive land, the LDN conceptual framework improves local food security as well. Given the anticipated availability of significant funding, making the case for land restoration and soil conservation, desertification may finally be able to access the level of financial resources needed for real progress.

In 2015, the United Nations formally endorsed LDN as part of its sustainable vision for the planet. It would seem that after many years of disappointments and frustrations, efforts to combat desertification are set to make a quantum leap forward.

In practice, however the concept has not yet become operational. Numerous specific activities can and should be promoted to attain this stabilization of degraded lands.

To begin with, LDN should be made profitable by generating revenue streams from sustainable production and utilization of upgraded lands. This can be done through:

1. Acquisition of concession licenses for degraded lands;
2. Rehabilitation by outsourcing to partner operators or production companies, against a leasing fee;
3. Generating income from sustainable production or use contracted to national and international producers against a concession or leasing fee;
4. Producing additional income streams from restoration credits (e.g. biodiversity, water, etc.) generated by the rehabilitation; and
5. Returning upgraded land to landowners or by selling land concessions to new investors.

This sort of business model or mainstream cost-effective orientation offers a hitherto unexplored avenue for making real progress in combatting desertification.

The Significance of Technologically and Socially Appropriate Development Strategies

Figure 5. Drip irrigation

Certain technologies should be prioritized as they allow for expanded cultivation with limited degradation and salinization of soils as well as restoration efforts. Such efforts are an important part of any strategy for improving the "resilience" of dryland communities as they face a challenging, new climatic reality. These measures include sophisticated integrated management of agricultural pests, including mosquito controls. Integrated pest management has become more critical than ever to sustainable developments efforts because they have the potential not to compromise the pollinators so critical to food security and future adaption of farmers to climate change.

In addition, introduction of drought and heat-tolerant crop varieties and improved fertility management is critical to expanding the yields for key staples that are grown in dryland areas such as maize, sorghum and millet. Afforestation and tree-based agricultural systems based on management of naturally occurring species have also proven to be important not only as a soil conservation interventions but as an agricultural strategy for small plots in the drylands.

There is no technology with greater potential to transform vast areas of degraded drylands than irrigation. At present in sub-Saharan Africa, only 7.1 million hectares of land utilize irrigation, which constitutes a mere 3 percent of the total cultivated area. Drip irrigation has proven to be a particularly effective way to maintain lands in production in drylands without loss of fertility. Indeed, irrigation is considered to be essential for increasing crop yields. Expanding sustainable irrigation practices is more important than ever as food consumption is increasing globally and people are opting to eat healthier food. With exacerbating water shortages in many dryland regions, the planet faces the challenge of irrigating a larger share of area with a shrinking supply of water. Unfortunately, the technological progress that has been achieved in the area of irrigation technology is not reaching the agricultural communities that need it most. Some basic numbers clarify the nature of the present challenge:

- Around the world, 70% of water is used for agriculture even as 80% of farms around the world are not irrigated;
- Of the 20% of irrigated land, some 77% use flood irrigation, 18% use pivot, and only 5% use drip irrigation; and
- In Africa drip irrigation utilization is only a fraction of this level.

The potential benefit in terms of African food security and land reclamation is enormous: A 2016 estimate by the World Bank suggests that irrigation development is technically feasible and economically viable for some 5–9 million hectares of land in the African dryland.

Drip irrigation enables farmers to grow more crops with less resources and less impact on the environment. Drip and micro-irrigation solutions for sustainable productivity have been developed for poor, rural communities which do not have access to reliable electricity sources or computer capacity, but the relatively modest financing of the equipment and the training necessary for their widespread adoption remains unavailable.

A critical question, which is rarely considered, involves the scale at which saving water should be promoted. Recent policies that shift the resources from centralized irrigation to small scale efforts have a considerable logic. Subsidies have been shown to exhibit a powerful effect on drip irrigation adoption. But, drip irrigation is expensive, and may not be as cost effective, when installed at the small-scale characteristic of African farms. There are also claims, that the increased profitability associated with drip irrigation adoption actually leads to increases in water use as it enables the expansion of cultivated lands which require larger water supplies.

One way to create a more feasible sustainable irrigation program is to recruit farmers in groups that will use the irrigation system together. This is the core idea of the "TIPA" model which has been implemented in Senegal during the past decade. Based on the concept of the African Market Garden it relies on a small-scale horticultural production package based on low-pressure drip-irrigation, a mix of appropriate vegetables and tree crops, and a management package that leads to optimization of the production system. The strategy builds on the traditional culture of cooperation and mutual commitment in local villages. The program's success underscores the importance of understanding site-specific normative and social dynamics.

Far too common are failures of community systems where a "tragedy of the commons" pathology quickly sets in. In this context, any comprehensive strategy must be responsive to cultural sensitivities but remain uncompromising initiatives to empower women. Some 70-80% of small-holder farmers in Sub-Saharan Africa are women. Yet, frequently they are unable to make the critical management decisions that could increase the productivity and profitability of their modest agricultural operations. Gender-sensitive policies can bolster global effort to restore degraded lands by allowing women to receive the necessary training to assume responsibility for expanded cultivation that is a net boon for soil carbon levels and general fertility of local lands. Policies that empower women can also provide an important general boost for sustainable development, as the status of women and access to contraception are keys to stabilizing population levels, without which, pressures on the land resources will only grow worse.

Click here to view presentation by Prof. Alon Tal

The convening of the workshop in **Malta** was instructive. Despite its dryland conditions and the doubling of population during the past fifty years the country has shown that economic growth can be decoupled from environmental degradation and soil degradation. Implementation of the country's *National Action Program* led to the successful quantification of soil erosion by water. It also engendered an economic analysis that showed the considerable economic benefits of taking preemptive action. The research characterized the anticipated soil depth and soil depth lost after 1, 10, 50, 100 and 500 years -- along with the annual expense of efforts required to replace soil volumes. The Maltese analysis argued that as soil formed over long periods of time it is therefore a finite resource. If eroded soil is not replaced systematically, the island will soon become unsuitable for agricultural production. While the initial restoration investment may be considerable, the projected annual return is also substantial. A range of cost-effective management practices were shown in the Maltese analysis to be available, allowing agricultural revenue to continue while land fertility is increased.

An important part of the Maltese strategy involves increasing the sustainability of its water management strategy. Already, alternative water sources are rapidly replacing abstraction of groundwater, enabling agriculture to flourish even as domestic and tourist utilization of water increases significantly. A solar-powered mobile polishing plant for high-end agriculture is now available where farmers can

choose different water-quality, according to crop requirements. The equipment is user friendly, fully-autonomous, solar-powered and completely mobile. Such sophisticated water management initiatives are particularly compelling because they do not exacerbate greenhouse gas emissions

Click here to view presentation by Ing. David Sacco

Click here to view presentation by Mr. Stephen Zammit

Click here to view presentation by Mr. Daniel Sultana

The experience in addressing desertification in Malta and Israel represent the kinds of local success stories that need to be shared, albeit adapted to the different social, physical and economic realities in other countries affected by desertification. They show that with a holistic orientation, a commitment to innovation and thoughtful interventions it is surely possible to ensure the sustainable use of soils in dryland regions and realization of a vision of global LDN.

References

Africa Development Forum, (2016), "Overview", *Confronting Drought in Africa's Drylands*, (Rafaella Cervigni and Michael Morris, Ed.) 1-28.

Akhtar-Schuster, M., Thomas, R., Stringer, L., Chasek, P., Seely, M., (2011) Improving the enabling environment to combat land degradation: institutional, financial, legal and science-policy challenges and solutions. *Land Degradation and Development*, 22, 299-312.

Chasek, P., Safriel, U., Shikongo, S., Futran-Fuhrman, V., (2015) Operationalizing Zero Net Land Degradation: The next stage in international efforts to combat desertification? *Journal of Arid Environments* (2014) 1-9.

Malta Environment and Planning Authority (2017), *Combating Land Degradation and Drought in Malta*, website: https://www.mepa.org.mt/newslet35-article15.

Safriel, U. (2017) Land Degradation Neutrality (LDN) in drylands and beyond – where has it come from and where does it go, Silva Fennica. 51 (1B)1650. https://doi.org/10.14214/sf.1650.

Tal, A. 2016, "Rethinking the Sustainability of Israel's Irrigation Practices in the Drylands," *Water Research* 90, 387-394.

UNCCD, (2012) *Zero Net Land Degradation: A Sustainable Development Goal to Rioþ20. UNCCD Secretariat Recommendations for Policymakers*. http://www.unccd.int/Lists/SiteDocumentLibrary/Rioþ20/ZNLD%20Summary%20final.pdf .

Walker, T., Ward, C. Torquebiau, R., Xie, H., Andersob, W., Perez, N., Ringler, C., You, L., Cenachi, N., Hash, T., Rattunde, F., Welzien, E., Koo., Jawoo, Carfagna, F., Cervgini R., Morri, M., (2016) "Agriculture: More Water and Better Farming for Improved Food Security," *Confronting Drought in Africa's Drylands*, (Rafaella Cervigni and Michael Morris, Ed.) 115-136.

List of Participants
(in alphabetical order)

1. Ms. Joelle Aflalo, Member of BMI Advisory Board, Founding Member, Matanel Foundation
2. Mr. Daniel Azzopardi, CEO – Energy and Water Agency, Malta
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7. Dr. Simeon Djankov, Member of BMI Advisory Board, Rector of the New Economic School in Moscow and former Deputy Prime Minister and Minister of Finance of Bulgaria
8. Mr. Sergei K. Dubinin, Member of BMI Advisory Board, Member of the Supervisory Council, JSC-VTB Bank, Former Chairman of the Bank of Russia 1995-1998
9. Mrs. Ayelet Fishman, Adv., BMI Director of Research and Development
10. Dr. Ram Fishman, Department of Public Policy, Tel Aviv University
11. Dr. Kristalina Georgieva, CEO, World Bank Group
12. Mr. Luc Gnacadja, Past Executive Secretary of the UN Convention to Combat Desertification
13. Dr. Jose A Herrera, Minister for Sustainable Development, the Environment and Climate Change, Malta
14. Dr. Segenet Kelemu, Director General of the International Center of Insect Physiology and Ecology (icipe) Nairobi, Kenya
15. Mr. Václav Klaus, Member of BMI Advisory Board, Co- Founder of the Václav Klaus Institute, former President of the Czech Republic
16. Dr. Boris Mints, BMI Founder and President
17. Mr. Gabi Miodownik, Senior VP & Head of EMEA Division, Netafim Industries
18. Mr. Joseph Muscat, Prime Minister of Malta
19. Dr. Alexander Pesov, Representative of BMI President
20. Mr. Seppo Remes, Member of BMI Advisory Board, Co-Founder and Chairman of EOS Russia
21. Ing. David Sacco, Water Services Corporation, Malta
22. Prof. Uriel Safriel, Faculty of Nature Sciences, Hebrew University, Former Chair of the Science and Technology Committee, The UN Convention to Combat Desertification
23. Prof. Itai Sened, Head of BMI, Founding Chair, School of Social and Policy Studies, Tel Aviv University
24. Mr. Daniel Sultana, Environment and Resources Authority, Malta
25. Prof. Alon Tal, Chair, Department of Public Policy, Tel Aviv University
26. Mr. Stephen Zammit Water Services Corporation, Malta

Desertification – A Growing Global Challenge

Westin Dragonara Resort – Malta, March 2017

Wednesday, 29.3.17

16:00 BMI Board Meeting re Collaboration with the World Bank – with **Dr. Kristalina Georgieva**, CEO, World Bank Group

17:00 BMI Steering committee – Business Meeting

18:00 BMI Board Meeting

Thursday, 30.3.17

08:50 **Prof. Itai Sened**, Head of BMI
BMI Celebrates Second Year of Full Activity

09:00 **Symposium: Desertification – The Policy Orphan**
Convener: **Dr. Boris Mints**

09:15 **Opening Lecture:** Luc Gnacadja, Past Executive Secretary of the UN Convention to Combat Desertification; Former Minister of the Environment, Benin.
Combating Desertification - Lessons learned from twenty-five years of international efforts

09:45 **Dr. Joseph Muscat**, Prime Minister of Malta

10:00 **Dr. Kristalina Georgieva**, CEO, World Bank Group
Famine in Africa: Causes and Solutions

10:25 **Mr. Daniel Azzopardi**, CEO – Energy and Water Agency, Malta

10:35 **Dr. Jose A Herrera**, Minister for Sustainable Development, the Environment and Climate Change, Malta

11:00 **Panel #1: Policy Responses, Water Uses & Management**
Prof. Uriel Safriel, Faculty of Nature Sciences, Hebrew University; Former Chair of the Science and Technology Committee, The UN Convention to Combat Desertification
Examples of Synergistic Policy Responses – Climate Change and Desertification

Mr. Stephen Zammit, Water Services Corporation, Malta
The Distribution Implementation of 2nd class Water in Malta

Ing. David Sacco, Water Services Corporation, Malta

14:00 **Panel #2: Success Stories – Combating Desertification**

Mr. Gabi Miodownik, Senior VP & Head of EMEA Division, Netafim Industries

Dr. Ram Fishman, Department of Public Policy, Tel Aviv University

Friday, 31.3.17

09:00 **Key Note Speaker: Dr. Segenet Kelemu**, International Center of Insect Physiology and Ecology
Protecting biodiversity to combat desertification

09:30 **Daniel Sultana**, Environment and Resources Authority, Malta
Numerical modeling and economics of agricultural land degradation in the Maltese Islands

10:00 Discussion

10:30 **Closing Lecture: Prof. Alon Tal**, Chair, Department of Public Policy, Tel Aviv University
Can We Stop Desertification Without Stabilizing Human Populations?

11:00 Discussion

11:15 **BMI Active Research Projects: Dr. Ram Fishman & MA Student Shira Bukchin***

11:45 **Closing Remarks: Prof. Itai Sened**, Head of BMI

Manna Center Program for Food Safety & Security
Tel Aviv University

* Funded and conducted through our association with the Manna Center Program for Food Safety & Security

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