PART II

Planning for the future

- Launched in 2020, the conservation program of Reverte in Brazil aims to regenerate 1 million hectares of degraded pastureland by 2025 in the Cerrado, which covers 25 percent of the country's territory (UNDRR, 2021)

- The Australian government has invested USD 65.4 million in the Drought Community Support Initiative (DCSI) since 2019, assisting more than 25,000 drought-affected households in its first year (Department of Agriculture of Australian Government, 2019)

- Under the current Water Resources Management Plan and Drought Plans in the U.K., water companies are required to anticipate a minimum 25-year planning period as well as tactical and operational responses during a drought event (Water UK, 2016)

- Aiming to improve the productivity of agro- and silvo-pastoral systems through the expansion of sustainable management practices, the 3N Initiative (Nigerians Nourish Nigerians) has successfully reach almost all its 260,000 hectares of degraded lands targeted (UNCCD, 2019)

- The Integrated Resources Plan (IRP), adopted by the Southern California Metropolitan's Board of Directors, ensures supply reliability under various drought conditions through 23 local projects and 200 conservation programs that will yield more than 197 million cubic meters of water per year (The Metropolitan Water District of Southern California, 2021).

- The AFR100 initiative brings together 31 African governments and other partners to restore 100 million hectares of land by 2030 to promote food security, climate change resilience and rural prosperity, with the first 20 African restoration-focused organizations and businesses receiving USD 50,000 to USD 500,000 in the form of loans or grants (Hess, L. 2021).

We have the capacity to create a remarkably different economy: one that can restore ecosystems and protect the environment while bringing forth innovation, prosperity, meaningful work, and true security.
Paul Hawken

The need for proactive interventions

- Billions of dollars have been committed to international climate finance, expanding meteorological forecasting and its integration with remote Earth observation capabilities to observe drought risks (King-Okumu, C. et al., 2021)

- An overall drought vulnerability map based on a total of 14 drought-influencing criteria revealed that approximately 79 percent of Australia's Southern Queensland region in is moderately to extremely vulnerable to drought, helping decision makers to develop and apply proactive drought mitigation strategies (Hoque, M. et al., 2021)

- Full incorporation of proactive drought interventions in Central Asia alone could potentially avoid more than USD 4.5 billion in losses per year (Adelphi & CAREC, 2017)

- Pago por Servicios Ambientales (PSA), the Costa Rican programme for environmental services, has helped to protect 320,000 hectares at a cost of over USD 22 million and will benefit more than 33,000 people in the country, including Indigenous communities and women farm owners (UNCCD, 2021)

- In the short span of two years, Kings Subbasin Groundwater Sustainability Agencies in California's Central Valley have invested in hundreds of hectares of prime groundwater recharge land, anticipated to provide an average of over 18 million cubic meters of groundwater recharge per year on average, directly benefitting communities and agricultural land in the region (Kings River Conservation District, 2021)

- Information Technology and Indigenous Knowledge with Intelligence (ITIKI) is a drought early warning system that integrates Indigenous knowledge and drought forecasting to help small-scale farmers make more informed decisions, for example, on when and how to plant which crops. The support forecast models provides accuracy of 70 percent to 98 percent for lead-times of up to four years, as shown by trials in Mozambique, Kenya and South Africa (Masinde, 2020)

Successful business cases

- By adopting drip irrigation, small-scale vegetable farmers in drought-prone provinces of Viet Nam (Binh Phouc), Cambodia (Prey Veng and Svay Reing), the Philippines (Lantapan and Bukidnon) and Indonesia (Reing and Bogor, West Java; Rembang, East Java) were able to increase water use efficiency by up to 43 percent and yield by 8-15 percent (ESCAP, 2020)

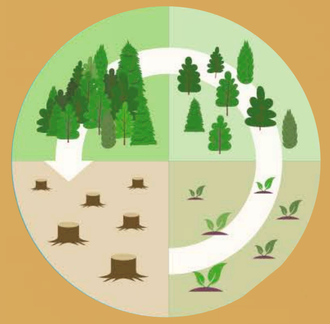
- In Kazakhstan, financial assistance in the form of bank cards was distributed among 650 households in the Turkestan region and 500 in the Mangistau region to encourage greater local investments in drought resilience (IFRC, 2021)

- To improve drinking water security in China's capital Beijing, a holistic restoration program was rolled out in the adjacent Miyun reservoir watershed (Jiali et al, 2018)

- With the highest water efficiency rate in agriculture, reaching a 70 to 80 percent rate, drip irrigation has helped to solve the problem of water scarcity in Israel (Megersa, G. & Abdulahi, J., 2015)

- The South African treasury invested over USD13 million in the Drought Relief Intervention Project, bringing 65% of the total 2,000 water tanks into serviceable use (Government of South Africa, 2020)

fig.9: Restoration interventions and monetary returns

	Natural Forest Regeneration	Extended Rotation Forestry	Agro-Forestry	Regenerative Agriculture
				
Restoration fix costs:	0-500 USD/ha	300-3.500 USD/ha	450-1.500 USD/ha	50-800 USD/ha
Maintenance costs:	0-150 USD/ha/ya	100-600 USD/ha/ya	50-900 USD/ha/ya	150-1.500 USD/ha/ya
Return range:	300-3.500 USD/ha/ya	1.000-6.500 USD/ha/ya	400-2.500 USD/ha/ya	250-3.500 USD/ha/ya

	Grassland Regeneration	Energy Farming	Erosion Control
			
Restoration fix costs:	100-1.500 USD/ha	50.000-4M USD/ha	200-1.500 USD/ha
Maintenance costs:	10-2.300 USD/ha/ya	2.000-0.1M USD/ha/ya	50-150 USD/ha/ya
Return range:	500-2.500 USD/ha/ya	4.000-0.3M USD/ha/ya	100-1.000 USD/ha/ya

* ranges are due to different levels of degradation, labor costs and market value fluctuations / erosion control estimates do not include coastal areas

- Soil organic matter (SOM) is a key factor contributing to the water-holding capacity of soil, up to 10,800 liters more of water per hectare can be retained with a 1 percent increase in SOM (Libohova, Z. et al., 2018)

- Soil coverage with mosses is characterized by high water absorption capacities. Some mosses can absorb water in amounts up to 1,400 percent of their dry mass, assisting land recovery and facilitating the establishment of higher plant growth in degraded environments (Adessi, A., 2021)

- Up to USD 1.4 trillion in production value can be generated globally by adopting sustainable land and water management practices (ELD Initiative, 2013)

- Approximately 4 million hectares of degraded land within “strict intervention zones” have been rehabilitated under the framework of the African Union–led restoration initiative known as the Great Green Wall – 4 percent of the Wall’s ultimate target of restoring 100 million hectares, helping to reduce the immanent threats of desertification and drought (Vizcarra, N., 2020)

- Farmer-led land restoration innovations are key pathways to addressing severe land degradation that affects the livelihoods of the most vulnerable people living in drylands. Successful restoration efforts reaching a large number of farmers and covering vast areas must be taken to scale to regenerate hydrological cycles, reaching a large number of farmers and by covering large areas (Flintan, F. E., 2020)

- Seven million hectares of land in the Sahel has come under increased vegetation cover over the last 25 years after extensive droughts that ravaged the region in the 1970s and 1980s, driven by various factors including changes in tree tenure (Larbodière, L., 2020)

- In northern Shaanxi, China, bare lands decreased from 5,896 square kilometres in 1988 to 4,477 square kilometres due to active ecosystem restoration interventions over the past five years, holding more water in standing biomass and within soils (Wen, X., 2020)




fig. 10: Integrated landscape restoration and multiple returns

Country	Returns					
	Drought Resilience	Climate Regulation	Biodiversity Increase	Cultural Value	Employment	Monetary Return
Australia	≈ ≈ ≈	☁ ☁	❀ ❀	🏛 🏛	🧍 🧍 🧍	💵 💵
Canada	≈ ≈	☁ ☁ ☁	❀ ❀ ❀	🏛 🏛 🏛	🧍	💵
China	≈ ≈	☁ ☁	❀	🏛 🏛	🧍 🧍 🧍	💵 💵
Germany	≈	☁	❀ ❀	🏛 🏛	🧍	💵
Ghana	≈ ≈ ≈	☁ ☁	❀	🏛	🧍 🧍	💵 💵
India	≈ ≈	☁ ☁ ☁	❀	🏛 🏛	🧍 🧍 🧍	💵 💵
Kenya	≈ ≈	☁ ☁	❀ ❀	🏛 🏛	🧍 🧍	💵
Peru	≈ ≈	☁ ☁	❀	🏛 🏛	🧍 🧍	💵 💵
South Africa	≈	☁	❀ ❀	🏛	🧍 🧍	💵
United States	≈ ≈	☁ ☁	❀ ❀	🏛 🏛	🧍	💵

EPILOGUE

United Nations
Convention to Combat Desertification

United for land

The devastating impacts of drought reach much further than the dry regions of our planet. Droughts are becoming more frequent and severe across all continents – an omen of a world where freshwater and fertile soils are increasingly scarce. In extreme cases, drought triggers famine, forced migration and even conflicts.

Mortality related to droughts represents around 60 percent of the total deaths caused by extreme weather events, while droughts represent only 15 percent of natural disasters.[1] Between 1998 and 2017, droughts have led to global economic losses of approximately USD 124 billion.[2] Currently, forecasts estimate that by 2050, droughts may affect over three-quarters of the world's population. Heatwaves, sand and dust storms, and desertification are the symptoms of over-exploitation aimed at constant growth, material prosperity for some, uncurbed population development, and an economy that still heavily relies on non-renewable energy sources.

Drought is not just the absence of rain; it is fueled by land degradation and the climate crisis.

Recent scientific studies on drought point to a precarious future for the world and all nation-states, far beyond just those in arid regions. This wake-up call is louder and clearer than ever before.

The fifteenth session of the Conference of the Parties of the UNCCD (COP15) is taking place from 9 to 20 May 2022 Abidjan, Côte d'Ivoire, and among its top priorities should be a full global commitment to drought preparedness and resilience in all global regions. This can only be accomplished by promoting public awareness about desertification and drought, and by letting people know that desertification and drought can be effectively tackled. The solutions exist, and key tools are strengthening cooperation at all levels, managing drought risk proactively, and building an ecosystem restoration economy that aims to rejuvenate-water cycles, land fertility and people's livelihoods at the same time.

We all must live up to our responsibility to ensure the health of present and future generations, wholeheartedly and without delay.

"The atmosphere, the earth, the water and the water cycle - those things are good gifts.
The ecosystems, the ecosphere, those are good gifts.
We have to regard them as gifts because we couldn't make them.
We have to regard them as good gifts because we couldn't live without them."
Wendell, Berry

There's no radar image for a water crisis.
No storm surges, no debris fields -
the Tap-Out is as silent as cancer.
There's nothing to see,
and so the news is treating it like a sidebar.
Shusterman, Jarrod

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Drought specific databases and portals

The United Nations Convention to Combat Desertification (UNCCD) – Drought Toolbox:
knowledge.unccd.int/drought-toolbox
The UNCCD developed the drought toolbox for providing drought stakeholders with easy access to resources to support action on drought preparedness to boost the resilience of people and ecosystems.

Drought Calculator:
www.nrcs.usda.gov/wps/portal/nrcs/detail/nd/technical/landuse/?cid=nrcs141p2_001670
The U.S. Department of Agriculture developed the drought calculator to assist ranchers and rangeland managers in assessing the impacts of drought on healthy rangelands and make informed decisions for drought preparedness strategies.

The International Disaster Database:
www.emdat.be/database
The Centre for Research on the Epidemiology of Disasters – CRED, Université Catholique de Louvain provides information on the human impact of disasters - such as the number of people killed, injured, or affected for vulnerability assessment and rational decision-making in disaster situations

United Nations Office for Disaster Risk Reduction (UNDDR) Preventionweb – Drought Solutions:
www.preventionweb.net/collections/drought-solutions
The UNDDR collected stories and research regarding different drainage solutions

EDO – European Drought Observatory/GDO – Global Drought Observatory:
edo.jrc.ec.europa.eu/gdo/php/index.php?id=2101
The EDO/GDO pages contain drought-relevant information such as maps of indicators derived from different data sources (e.g., precipitation measurements, satellite measurements, modeled soil moisture content).

The FAO Drought Portal:
www.fao.org/land-water/water/drought/drought-portal/en/
The FAO Drought Portal collates tools, methodologies, publications, and best practices from different disciplines to support informed decision-making and promote integrated drought management in agriculture.

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