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Towards Greening Africa

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TOWARDSGREENINGAFRICA

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Towards Greening Africa

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I. Introduction

A battle for separate regions rich in natural resources and environmental endowment is going on in Africa. In particular, we are considering the whole complex of challenges to humanitarian and environmental security resulting from the destruction of the social and economic infrastructure and causing enormous harm to the civilian population not only in Libya and Sudan, but also on the territory of neighboring states (in Algeria, Tunisia, Egypt). Lack of food, medicine and essential goods, combined with a shortage of qualified medical specialists in the field and the lack of effective public health policy, create conditions of epidemiological danger in conflict zones.

International migration has profound social, economic, political and cultural effects upon migrants, as well as countries of origin and asylum. The following are examples of the effects of international migration.

Mass migration increases the local population in places of destination and decreases in places of origin, thus creating negative demographic effects in both places. For example, according to a study done in West Africa (that included Sierra Leone, Gambia, Senegal, Ivory Coast, Upper Volta, Liberia, Ghana, Mali and Togo), whose population in 1975 was forty million. The migration flow increases the pressure on infrastructure and creates favorable conditions for the development of the shadow economy on a cross-border basis on a regional and global scale. The combination of an increase in the migration flow with the identity of political culture and the laws of wartime in the zones of armed confrontation led to the revival of archaic forms of asymmetric and inherently discriminatory interaction between different racial, ethnic, and confessional groups. The story of migration from Africa is typically told as a mass exodus from conflict or climate change. (https://time.com/5563750/africa-global-migration/Africa migrants account for only 14% of the global migrant population: significantly less than migrants from Asia, which account for 41%, or Europe, which account for 24%. Most African migrations begin and end on the continent. As world leaders recognized in the first-ever United Nations Global Compact on Migration in December 2018, migration, "is a source of prosperity, innovation and sustainable development in our globalized world."Their economic contribution is considerable. Migrants' contribution to GDP is estimated at 19% in Côte d'Ivoire, 13% in Rwanda and 9% in South Africa. Today, 60% of Africa's population is under the age of 25 and by 2100, Africa's youth could be equivalent to twice Europe's entire population. If we do not manage and foster mobility, we run the risk of losing our greatest asset: our young people. The political challenge for Africa - and, indeed, the world - is to incentivize migration in the right way, be it geographical, educational or professional.

In many cases the growth of nations depends much on their natural resource endowment. During the 1970s manufacturing in Africa thrived, however, when economic liberalization and the privatization of state enterprises became rampant in the 1980s, African manufacturing went into decline as the continent could not compete with low-wage Asian countries. The UN Declaration of Millennium, accepted at the UN Summit of Millennium in 2000, marked the necessity to give full support to the political and institutional structures of emerging democracies in Africa, prevent conflict and promote political stability, a reliable flow of resources for peacekeeping operations on the continent, prevent conflict and promote political stability, a reliable flow of resources for peacekeeping operations on the continent, address the challenges of poverty eradication and sustainable development in Africa (September 2000, https://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/55/2).

The population density of Africa making 249 people on 1000 hectares is significantly lower than the average world indicator – 442 persons on 1000 hectares. However in this region large-scale destruction of the environment because of poverty of the population is observed. Natural disasters, such as hurricanes, floods and droughts, happen often and have destructive consequences. Climate change can make climate of Africa even more droughty that will cause serious violations in ecosystems and will turn provisioning into a huge problem. Also diseases which carriers are insects and extending through water and HIV/AIDS still keep the relevance for this region (Climate Change and Sustainable Urban Development in Africa and Asia. Yuen, Belinda, Kumssa, Asfaw (Eds.), 2011, https://www.springer.com/gp/book/9789048198665)
The main environmental problems are abound.

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II. Degradation of Lands

The main problem of Africa is degradation of soils. 500 million hectares of lands, including 65% of agricultural grounds are subject to it. If degradation of soils continues the same rates, then for the next 40 years harvests of crops will be cut by half. In South Africa a major factor of degradation of soils is the excessive pasture of a livestock. The extensive areas of North Africa are under the threat of desertification because of a combination of a number of factors: repasture, variability of quantity of an atmospheric precipitation and drought. In the Western and Central Africa growth of population and change of structure of agriculture led to deterioration in a condition of big grounds.

Desertification is a serious problem in the continent. It has been estimated that 319 million hectares of Africa are vulnerable to desertification hazards due to sand movement. An FAO/UNEP assessment of land degradation in Africa suggests that large areas of countries north of the equator suffer from serious desertification problems. For example, the desert is said to be moving at an annual rate of 5 km in the semi-arid areas of West Africa. (http://www.fao.org/3/x5318e/x5318e02.htm)

III. Destruction of Forests

Though 17% of a universal forest cover still fall to the share of Africa, the areas of the woods are constantly reduced in connection with growth of the population, expansion of agricultural grounds, deforestation for fuel, commercial operation, the fires, civil wars and political instability. In the first half of the ninetieth years rates of reduction of forests in Africa were 0.7% a year. The irrational farming practices, such as the displacing and fire cultivation of lands typical for South and Central Africa contributed to this process as well as commercial cutting, mining operations and works on oil search. Life of 90% of the population depends on wood fuel and other biomass for obtaining energy. Production and consumption of wood fuel and coal doubled during the period from 1970 to 1994 and, according to forecasts, will increase by 5% by 2020. All this influences climate change when in droughty areas there is even less rainfall, and in where their surplus, becomes more damp. These questions are regulated by the Framework Convention on Climate Change of 1992 and a number of the subsequent documents.

The woods provide support of a number of economic and social types of activity and have the vital value for ecological stability. They are a source of a wide range of wood and not wood products and also employment and income and perform the major ecological functions, for example, promote preservation of the soil and water resources, mitigation of the consequences of climate change due to absorption and carbon stocks and also to the conservation of biodiversity.

For the first time the reached global consensus on the woods recognizes that it is necessary to use rationally forest resources and the forest areas for satisfaction of social, economic, ecological, cultural and spiritual needs present and future generations. At the same time it is emphasized that "all forest aspects" of conservation and social and economic development have to be integrated and comprehensive.

The Statement of Principles on Forests underlines that the subject of forestry is connected with the whole range of problems and opportunities in the field of the environment and development, including the right for social and economic development on a steady basis.

IV. Urbanization

Nevertheless, for urban residents who have lost their roots and economic skills of their ancestors, the issue of environmental education becomes important. In most countries in Africa, environmental education is now included in school curricula for "developing a new line of behavior for citizens, groups of people and communities regarding the environment." Today growth rates of urban population of Africa are the highest in the world and exceed 4% a year. In the 1960th about 20% of the population lived in the cities, and in 1995 this figure increased up to 35%. City infrastructure is developed poorly, and suburbs expand, often without having necessary amenities and network of services at all. The Green Building Convention is dedicated to building a greener future. Our purpose is to inspire a built environment in which people and planet thrive. Buildings are one of the main contributors to climate change. Building green is an opportunity to use resources efficiently and address climate change while creating healthier and more productive environments for people and communities. The World Recycling Convention will be representing around 800 companies and 35 affiliated national recycling federations from 70 different countries. Its members are world leaders in the supply of raw materials and a key pillar for sustainable economic development.

The Green Building Council of South Africa (GBCSA) turned ten in 2007. It celebrated the occasion at its annual Green Building Convention, currently under way at the Century City Conference Centre in Cape Town. Going beyond city planning and infrastructure, the 2019 year's convention looks at ways cities can build productive communities that are inclusive and supportive of their citizens.

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V. Convention on Biological Diversity in Africa

For several last decades when rates of demographic growth reached peak values, the highest level was reached in the history also by rates of deforestation. The convention on biological diversity (CBD) was adopted at the UN Conference on the environment and development in Rio de Janeiro (Brazil) on June 5, 1992. It opens a new type of international treaties, and is one of cornerstones of international environment law. It established international legal bases of regulation not only separate aspects of protection of species, but also an environmental problem of global significance affecting all countries of the world. Nowadays in Africa live more, than 50,000 known plant species, 1000 species of mammals and 15000 bird species. Many of them live in forests. This biological diversity is under the threat in all regions of this continent. The biodiversity is public property.

What is required is the development of a national strategy, plan or programme for the conservation and sustainable use of biological diversity and to integrate this into relevant sectoral and cross-sectoral plans. South Africa is already making progress on this through the publication of the *White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity* (GN 1095 of 28 July 1997). Several biodiversity programmes flow from this policy, including the drafting of a Biodiversity Bill (for further details see André Rabie 'Governmental policy reviews and reforms relating to the environment' (1999) 6 *SAJELP* 121). Articles 8-10 of the Convention specify certain types of conservation measures which are supposed to be given effect to in the national policy (eg conservation in protected areas).

The Cartagena Protocol on Biosafety

The protocol addresses the safe transfer, handling and use of living modified organisms (LMOs) that may have an adverse effect on biodiversity with specific focus on transboundary movements. The protocol establishes an advance informed agreement procedure for imports of LMOs, incorporates the precautionary principle and details information and documentation requirements.

In the CBD the developed nations sought to make the national bioresources which are under sovereignty of the developing countries the general ecological resource with universal access to them and a possibility of use by their countries of the North and also use of genetic resources for development of biotechnologies to which firms will have the property right and all rights on change of such technologies. Attempts to privatize genetic resources of developing countries, to export them to the developed countries were made, creating in them gene banks with the exclusive right of use of them. Therefore developing countries connected discussion of questions of a biodiversity with negotiations on biotechnology and, more widely, with the rights for intellectual property as genetic resources, besides natural raw material resources, are nearly only property of developing countries in their negotiations with the developed countries.

As tropical forests contain, by estimates, 50% of the remained biodiversity on the planet, destructions of these woods have catastrophic consequences. At present rates of data of the woods the last considerable virgin tropical forest will be cut down within 50 years that will inevitably cause irreversible loss of types. Cutting of tropical forests also promotes increase in amount of carbon dioxide in the atmosphere.

The predicted acceleration of rates of demographic growth in the next decades will lead to emergence of new problems and will put before need to make a hard choice. In many countries where the largest massifs of the remained tropical forests are located, also the highest rates of demographic growth are observed.

Integration of programs of protection of reproductive health and planning of family into work on creation of forest parks and forest management can become one of possible solutions of a problem of preservation of the remained woods and a biodiversity.

On Madagascar which is one of 25 countries of the world in which there is an unfavourable biodiversity situation, the Conservation International, the World Wildlife Foundation, International Union for Conservation of Nature, and UNESCO together with the regional non-governmental Action International participated in implementation of complex projects in the field of conservation and development. In addition to educational work and rendering services in planning of family, creation of communal policlinics and mobile medical groups actions for ensuring rational use of forest and water resources, development of ecological tourism, cultivation of bees, improvement of methods of cultivation of rice and also educational work on environmental protection are carried out. Also within this project training of employees of the sphere of education on environmental issues and specialists in preservation was carried out to improve understanding by them of family planning methods and environmental protection. If earlier workers in the sphere of education insisted that increase in population had an adverse effect on preservation of resources, they emphasize now that regulation of the period between the birth of children is important for health protection.

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VI. The United Nations Convention to Combat Desertification

In 1973, the UN Bureau concerning the Sudan-Sahel region which headed efforts to combat desertification in the Western Africa was set up. The international convention to combat desertification in those countries which experience a serious drought and/or desertification especially in Africa, is designed to assist 1994 the international cooperation in actions for fight against desertification and mitigation of the consequences of a drought.

VII. Convention on International Trade in Endangered Species of Wild Fauna and Flora

While the world is preparing for the 18th annual meeting of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Conference of the Parties (COP-18), four countries from southern Africa - Zimbabwe, Botswana, Namibia and South Africa - submitted a petition and a proposal aimed at lifting restrictions and allowing international trade in registered raw ivory. CITES rejected past offers from Zimbabwe and Namibia to allow ivory trade with less stringent requirements. This year, at KS-18, it will be possible to observe the continuation of an epic that has been going on for 30 years now since the international ban on the ivory trade entered into force in 1989.

Africa's ivory trade flourished, as did poaching. The International Humane Society reports that from 1979 to 1989the population of African elephants declined sharply - from about 1.2 million to 600,000 individuals. This is what led to the introduction of the ban by CITES in 1989 on the commercial trade in ivory: from this point on, elephants were ranked as endangered species. One of the main requests of these four countries is permission to trade in registered ivory - this means that only tusks of animals that have died of natural death will be for sale. Untreated ivory will come from state stocks, with the exception of seized ivory and bone of unknown origin.

In addition, trade can only be carried out with partners approved by the CITES secretariat. Proponents of this proposal suggest that such precautions will ensure compliance with these conditions, as well as eliminate illegal sales. Those who oppose the sale of wild animal derivatives rely on what happened when CITES allowed a one-time legal sale of ivory to China and Japan in 2008. The idea of a one-time sale was to flood the market, bringing down the prices of ivory, and, ultimately, stop the monetary benefits from poaching. 15 million dollars was received after the sale of 102 tons of state reserves of these four African countries.

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In Johannesburg, South Africa, there is a regular meeting of delegates from countries participating in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In its framework, environmentalists and diplomats discussed the problems and threats to the welfare of wild animals that arise as a result of legal or illegal trade in them. So far, the main decision of this convention has become a total ban on trade in African gray parrots (Psittacus erithacus), adopted by an absolute majority of 95 in favor and 35 against.

A curious, but weakly prevalent in Africa, form of incentives for environmental projects seems to be the mechanism of “debt in exchange for nature conservation”. It allows you to convert part of the country's external debt into domestic securities and provide support to environmental programs, including education, the compilation of inventories of endangered species, etc. The authorities of Zambia, Madagascar and Sudan followed this path.

The ultimate goal of environmental programs is to improve the living conditions for humans and ensure balanced sustainable development of society in accordance with the evolutionary development of the biosphere. Therefore, the degree of involvement of the local population in the implementation of environmental protection measures is a very important indicator of the completeness and adequacy of any environmental program. Locals have long known the causes of such problems as deforestation and soil erosion, and how to solve them. They know well where to look and how to apply plants with unique properties and how to prevent damage to wild crops to agricultural crops. Attraction of the population allows to use this knowledge and life

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experience of the population and to increase the effectiveness of government initiatives.

Endangered species are classified according to an Appendix system. Other southern African countries (Botswana, Zimbabwe and Namibia) have similar proposals relating to conditional trade, while India and Kenya have proposed to transfer all elephant populations onto Appendix II - in other words, they seek a total ban on trade in elephants and elephant products.

While the world is preparing for the 18th annual meeting of the Convention on international trade in endangered species of wild fauna and flora (CITES) and the Conference of the parties (COP-18), four countries from South Africa - Botswana, Namibia, South Africa and Zimbabwe - submitted a petition and proposal aimed at lifting restrictions and allowing international trade in registered unprocessed ivory. CITES is "an international governmental agreement that ensures that international trade in wild animals and plants does not threaten their survival"; the Convention will be held in Colombo, Sri Lanka, from 23 may to 3 June 2019. The 12-page proposal seeks to amend the annotation to the list of elephant populations in Botswana, Namibia, South Africa and Zimbabwe in Annex 2. It says that the territories of these four southern African countries has the largest elephant population - it is estimated that 256 000 individuals. This is equal to 61% of the population of all African elephants. CITES rejected past proposals by Zimbabwe and Namibia to allow the ivory trade with less stringent requirements. This year, the COP-18 will be able to observe the continuation of the epic, which has been going on for 30 years since joining

It will be possible to observe the continuation of an epic that has been going on for 30 years now since the international ban on the ivory trade entered into force in 1989. Will it be different this time? An international ban was imposed due to the declining elephant population due to the poaching crisis. According to the African Wildlife Foundation, every year 35,000 elephants are killed for the sake of tusks. The proposal triggered a clash between conservationists and those who benefit from ivory trade for economic reasons. It's like a death sentence for elephants.

It does not necessarily mean that all the elephants will be exterminated. Maybe these countries have a huge stock of ivory. And trade will only allow them to do more for the wildlife of their countries. Before the ban was introduced, with weak regulation of shooting animals in Africa, ivory trade flourished, as did poaching. The International Humane Society reports that from 1979 to 1989, the population of African elephants declined sharply - from about 1.2 million to 600,000 individuals. This is what led to the introduction of the ban by CITES in 1989 on the commercial trade in ivory: from this point on, elephants were ranked as endangered species.

Removal of the ban on the sale of tusks. One of the main requests of these four countries is permission to trade in registered ivory - this means that only tusks of animals that have died of natural death will be for sale. Untreated ivory will come from state stocks, with the exception of seized ivory and bone of unknown origin. In addition, trade can only be carried out with partners approved by the CITES secretariat. Proponents of this proposal suggest that such precautions will ensure compliance with these conditions, as well as eliminate illegal sales.

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However, this caused a sharp increase in poaching. Those who oppose the lifting of the ban, argue that history shows that selling tusks does more harm than good to African elephants, despite the alleged security measures. Elephants are hunted for ivory, which is highly regarded in countries such as China and Hong Kong.

Ivory is considered a valuable material and is used in the decoration of products and in jewelry. It is also sometimes used in traditional Chinese medicine. Some wealthy Chinese believe that having ivory makes them look more successful. Others believe that ivory brings them good luck. The discussion on the ivory trade has already led to major controversies on the African continent: some countries support it, while others argue that selling a certain amount of ivory can actually contribute to anti-poaching costs. It is expected that Kenya will strongly oppose this proposal as a member of the African Elephant Coalition, a consortium of 29 African member countries that do not support the ivory trade in any form, but try to encourage a non-consumptive approach to the use of elephants.

The struggle for the salvation of elephants at the heart of the debates banning the ivory trade is the fact that African elephants still face serious threats to their survival due to habitat loss and poaching. Petitions to lift the ban were partly rejected due to the fact that African countries could not demonstrate real success in reducing the illegal turnover of ivory. As stated in the United Nations Office on Drugs and Crime Report on Wildlife in the World:

Every year, law enforcement agencies in Africa and Asia seize large quantities of ivory, many of which exceed 500 kg. Between 2009 and 2014, the Elephant Trading Information System (ICSA) CITES registered 91 seized shipments, for a total of 159 metric tons. Thus, at least 15,900 elephants were exterminated.However, some African countries, such as Zimbabwe, argue that

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the elephant population is in good condition and therefore support the petition and advocate for a revision of the abolition of the ban on trade. A representative from the Zimbabwe Wildlife Park Agency said the elephant population actually exceeded their carrying capacity: Our elephants are not endangered. There are more individuals than our territory can accommodate. Authorities claim that today the population of elephants in Zimbabwe

However, some African countries, such as Zimbabwe, argue that the elephant population is in good condition and therefore support the petition and advocate for a revision of the abolition of the ban on trade. A representative from the Zimbabwe Wildlife Park Agency said the elephant population actually exceeded their carrying capacity: Our elephants are not endangered. There are more individuals than our territory can accommodate. Authorities claim that the elephant population in Zimbabwe today is 84,000, although in fact there are approximately 50,000.

Most government agencies responsible for the conservation of wildlife in these countries find it difficult to finance conservation activities and manage them. They argue that income from the sale of ivory, could be used for the benefit of the environment. In addition, these funds could be used to strengthen law enforcement, aimed at combating poachers, dealers and smugglers, as well as to increase the ranger staff.

Some argue that CITES has changed from consumer use of wildlife to its preservation, which four African countries oppose. Some critics even suggest that Africa should step out of CITES, stating that the policies of this organization are detrimental to developing countries. If CITES rejects their proposal, these four South African countries may follow the example of Japan and leave the organization.

Botswana, Namibia and Zimbabwe propose to amend annotation 2 of #CITES Appendices in order to remove the restrictions & allow int'l trade in registered raw #ivory of African #elephant from Botswana, Namibia, South Africa & Zimbabwe (https://goo.gl/xkCoVZ). This will be signing the death warrant of elephants.

VIII. Towards Environmentally Sustainable Development in Africa

One can recall the words of Jacques Cousteau. He spoke of the special attention that should be paid to the huge gap between the rate of population growth and the possibilities of educating people. This question of human quality is a stumbling block in the global question of the interaction of society and nature. For the African continent, the most pessimistic conclusions follow, because most of the population (especially the female) is illiterate. And the lack of adequate funding for education is a direct reflection of the economic weakness of developing countries in solving various issues, including and environmental issues. But this region, in which about 15% of the world's population lives, as well as many unique animals, has great potential for sustainable growth and environmental protection.

IX. Climate Change

Climate change is a real and present danger to the sustainability of mother earth. The continent of Africa is the most vulnerable and least resourced part of our globe to adequately deal with the consequences of climate change. The irony is that Africa's heritage of acivilisation based on Ubuntu – the law of nature that each individual thrives in the long run only if the rest of the eco-system thrives as well, according to Dr. Mamphela Ramphele, Co-President of the Club of Rome, South Africa.

The BRICS summit in Johannesburg in 2018 for the first time during the existence of the BRICS were invited to attend the heads of state and government of several African countries - Angola, Botswana, Gabon, Zambia, Zimbabwe, Lesotho, Mauritius, Madagascar, Malawi, Mozambique, Namibia, Rwanda, Seychelles, Senegal, Tanzania, Togo, Uganda and Ethiopia. The main theme of the summit was: "BRICS in Africa: cooperation with developing countries to achieve inclusive growth in the era of the Fourth Industrial Revolution".

The BRICS partnership on the new industrial revolution, in fact, is to encourage mutual investment in the most advanced and innovative industries. The infrastructure of such cooperation is being formed before our eyes. It is planned to involve African partners in it.

Because Africa is huge, diverse, and complicated, it is difficult to make sense of what is going on in the continent, how the continent interacts with the rest of the world, and how America might best pursue its national interests and the global common good in its relations with Africa.

Six challenges face the African continent are considered for development. *Africa's current economic growth rate is far too low.* A rich programme will also commemorate the 50th anniversary of the 1969 OAU (Organization of African Unity) Refugee Convention and the 10th anniversary of the 2009 African Union Convention on Internally Displaced Persons, also known as the Kampala Convention. Member states are being urged to take the opportunity to ratify and implement the conventions, if they have not yet done so. The activities will seek to engage a wide and diverse global audience, bring increased visibility to the issue and focus attention on finding durable solutions for the forcibly displaced as well as the stateless. A series of six continental consultative meetings in different countries will address

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thematic issues, including ratification and implementation of the two conventions, mixed movements of refugees and migrants, statelessness, global responsibility sharing and the role of parliamentarians in preventing and resolving forced displacement.

Sub-Saharan Africa's GDP per capita (at constant 2005 prices) was $1,036.10 in 2014. At the 1.4% growth rate estimated for 2015, it would take Africa 50 years to double GDP per capita. The five others are as follows,

= African industrial development has been stalled since the 1970s.
= The lives of most Africans are marred by poverty, hunger, poor education, ill health, and violence.
= Every year more Africans live in urban slums.
= Corruption, corruption, corruption.
= Imminent changes to the architecture of global trade will disadvantage African countries *(Gideon Strauss-* Six Challenges Facing Africa in 2016 https://providencemag.com/2016/01/six-challenges-facing-africa-2016/

X. Convention to Combat Desertification

The objective of the CCD is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international co-operation and partnership arrangements, in the framework of an integrated approach which is consistent with *Agenda 21*, with a view to contributing to the achievements of sustainable development in affected areas. The CCD, rather than emphasizing State actions, focuses on process (rather than substance) and ensuring public participation in the development and implementation of plans to combat desertification - a 'bottom-up' approach. Obligations on parties include prioritizing the combating of desertification and drought, as well as the underlying socio-economic causes of these problems. At the heart of the CCD are the National Action Programmes, which provide the blueprint for implementation of the Convention.

This doesn't necessarily mean that elephants have to be killed. These countries may have large caches of ivory. And trade would allow these countries to do more for wildlife in these countries(Quatre pays d'Afrique australe pétitionnent pour une levée de l'interdiction internationale du commerce de l'ivoire 13 Février 2019 https://fr.globalvoices.org/2019/02/13/233073/)

A complex of issues around water of social, healthy, technological, educational nature are tackled.

XI. Exhaustion of Water Resources

Though Africa uses only about 4% of renewable reserves of fresh water, and in some countries there are numerous rivers and lakes, the countries which are in droughty areas, have limited reserves of ground waters. 14 African countries face a problem of shortage of water. It is supposed that by 2025 11 more countries will face this problem. According to forecasts, up to 2020 the need for water will annually grow in North Africa a minimum for 3% in process of increase in population and development of economy. Pollution of a surface water becomes more and more pressing problem which involves serious consequences for health care.

Any threat to the environment is particularly significant in Africa because *around 70% of people* still live primarily off the land. Many African countries also *depend on tourism* as one of their primary sources of foreign currency earnings. Wildlife-based tourism ranks among the top three contributors to the GDP of most countries in southern Africa.

In Africa, there are 63 transboundary river basins, which occupy 64 percent of the continent's territory and contain 93 percent of its total surface water resources (UNEP 2010) *. Water supply to major cities and irrigation are provided through large dams built on both local and international rivers, where lakes and river basin commissions are responsible for managing these shared resources. Coastal countries often have different requirements. For example, Uganda depends heavily on the Nile River for hydropower, while in Egypt most of the water is used for agriculture and domestic purposes. Africa also has transboundary aquifers, mainly in aquifers with high water demand. Some transboundary aquifers, such as the Nubian sandstone aquifer system, contain non-renewable waters that have been stored there for a long time. The demand for water, which is a result of population growth and the stress caused by climate change, can increase aquifer utilization and depletion rates. Aquifers in arid and semi-arid areas, such as North, South and West Africa, are likely to be affected by high temperatures, decrease in precipitation and an increase in water scarcity, as well as increased water use. About 75 percent of Africa's population depends on groundwater resources.

With rapid population growth, environmental problems are increasing. By some estimates, by 2025 the population of Africa will exceed a billion people. This means that environmental problems will certainly double or triple. Some literary sources indicate that South African countries have succeeded in pursuing a fairly effective economic policy, which influenced the development of the continent as a whole, but GDP growth has slowed recently and it is obvious that economic stagnation will cause a reduction in the solution of environmental problems.

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(https://educheer.com/environmental-problems-in-africa/)

In Africa, a number of factors have contributed to increasing attention to environmental law. The end of colonialism is perhaps the most important condition, because it allowed Africans to decide whether to use their natural resources as well as to set their own public health and development priorities. In some countries, unfortunately, nepotism and corruption have led to what can be called "internal colonization," with the result that some African authorities simply assumed the mantle of the old colonial powers, while African countries face many problems that exert scarce national resources and test the carrying capacity of the land on which so many Africans depend. The population, especially in urban centers, has increased dramatically. This put serious pressure on water resources, as well as on forests (for fuel, construction). Forests and other wild lands continue to be cleared to meet agricultural, commercial needs. In order to reduce poverty, African governments have increased public debt, exploited natural resources for hard currency.

Key issues include water pollution. First of all, water pollution is caused by oil transportation to seaports, poor water management, lack of financial resources necessary for sustainable development and efficient use of resources, lack of effective regional and basin development plans and joint management, as well as underestimation of groundwater potential to supplement irrigation and drinking water systems. Thus, Africa's problems with freshwater are acute and acute. Freshwater shortages are the two most serious barriers to development in Africa;

Water pollution is one example of growing global awareness and effort to tackle this issue. It should be noted that the environmental consequences associated with the exploration and development of oil fields have caused controversy over the World Bank's approval in June 2000 of the Chad-Cameroon pipeline project.
(https://educheer.com/environmental-problems-in-africa/Environmental Problems in Africa)

Environmental law has grown out of tort law, primarily its principles. For example, in Uganda, the question of locus standi, the polluter pays principle, the doctrine of public trust is included in the Constitution, the Law on the Environment and the Law on Land. All other principles come from environmental law and, in general, tort law. Even the above changes have been specifically included to change and, in fact, change of tort law. To understand environmental law, you must first evaluate the history and nature of tort law. The growth of this right followed the growth of production and exchange. The booming industrial revolution, the widespread use of machinery, the increase in the quantity of goods, in terms of diversity and use, made it necessary to change the old laws based on the feudal economy. More and more people owned a large amount of property, property and land. Communication and transportation are greatly facilitated with the development of technology, facilitating and making interaction more frequent due to the narrowing of people's proximity. To take into account this situation, it was necessary to develop laws. (Handbook on Environmental Law in Uganda - Greenwatch, 2009 http://www.greenwatch.or.ug/files/downloads/Handbook%20Envronmental%20Law%20Vol%201%20Second%20Edition.pdf)

The manifold importance of transboundary water management in Africa is addressed in various international documents with guidelines such as. G8 Action Plan in Africa; New Partnership - Action Plan for Africa's Development (NEPAD) and the Abuja Declaration of the African Ministers' Council on Water Resources (AMCOW). In addition, the G8 Water Action Plan contributed to its support for improving the management and development of shared river basins and promoting "river basin cooperation around the world, particularly attention to the African River Basins" (G8 Water Action Plan). This direction also has a link to the work of the Advisory Board of the UN Secretary-General Water Supply and Sanitation Council and the international organization "water for life" Decade proclaimed by the UN General Assembly (2005-2015). The Zambezi is the largest river in southern Africa with a basin in most states. Its basin has significant development potential in Africa.

Lake Victoria is Africa's largest international lake, which has significant economic importance for coastal states. The creation of the Commission on Lake Victoria here in November 2003 was a new and promising development in the development of the African continent. In addition, the basin is directly connected to the Nile, without a doubt the most politically sensitive river basin in Africa. Lake Victoria and Lake Chad are transnational bodies of water that are associated with problems as opposed to commonly encountered problems up and downstream along transboundary rivers. Lake Chad, which has a very large pool, is exposed to very high levels of environmental degradation. In addition, the basin has a long history of institutional cooperation (or, at least, attempts in this regard it should be noted that the Lake Chad Convention was signed in 1964. One of the agreements deserving special attention is the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (April 1997). - http://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf Only 20 (?) countries have signed the Convention and only 12 (?) have ratified them, including no more than two African countries "South Africa and Namibia," and therefore it has not yet entered into force. The convention is based on previous documents (in particular, the 1966 Helsinki Rules for the Use of the

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Waters of International Rivers). It contains a number of basic principles, including the principle of "fair and reasonable use", the obligation not to cause "significant damage to other watercourse states" and the principle of "optimal use and adequate protection of international watercourse" (1997 UN Convention, Articles 5, 7, 8). The Convention sets standards that provide guidance for international water management in the river basins analyzed here.

Below will be presented some key hydrological, economic and political framework data on water bodies currently selected for analysis: Orange-Sencu, Limpopo, Zambezi, Lake Victoria, and Lake Chad. They are used as a basis for assessing risks and conflict factors as well as the potentials and needs of cooperation.

XII. The Orange River

The length of the Orange River is about 2300 km. Its immediate coastal states are Lesotho (source), South Africa and Namibia (estuary). Botswana also shares the Orange River Basin, which has an area of about 1 million km2. The largest share of the basin (60%) is occupied by South Africa, followed by Namibia (25%), Botswana (12%) and Lesotho (5%).

a) Higher level African organizations and their role in transboundary water management

Higher African institutions and programs, such as the African Union (AU), African Development Bank (ADB), the New Partnership for Africa's Development (NEPAD) and African Ministers, the Water Council (AMCOW) and regional communities such as the African Community and the Community on the development of southern African countries (SASD) play different roles in terms of transboundary water management in general and basin organization in particular. Calls for cooperation on transboundary water projects have been made by all of the above institutions and programs and can be found, for example, in the Abuja Declaration and the NEPA environmental action plan, and they play a prominent role in connection with the inter sectoral efforts for regional integration in Africa. The important role of regional organizations in the formation and operation of river basin organizations (river basin organization –RBO is best illustrated by SACD. Its members have committed themselves to the integrated and joint management of transboundary waters in the SACD region. Water SACD and water resources SACD. Separation can be considered as the institutional basis necessary for the implementation of the protocol on common watercourses.

b) South African Development Community (SACD)

The SACD was created on the basis of the Coordination Meeting of South Africa's Apartheid Countries (Southern African Development Coordination Conference-SADC, founded in 1980) and has become a regional community of nations committed to supporting the development efforts of its member countries. SACD consists of 14 members: Angola, Botswana, Democratic Republic of Congo, Lesotho, Mauritius, Malawi, Mozambique, Namibia, Zambia, Seychelles, South Africa, Swaziland, Tanzania, and Zimbabwe. Objectives and institutional structure (SACD laid down in the agreement signed in 1992 by the heads of member states of the country. Then in 1995 a protocol on shared water flows was adopted.

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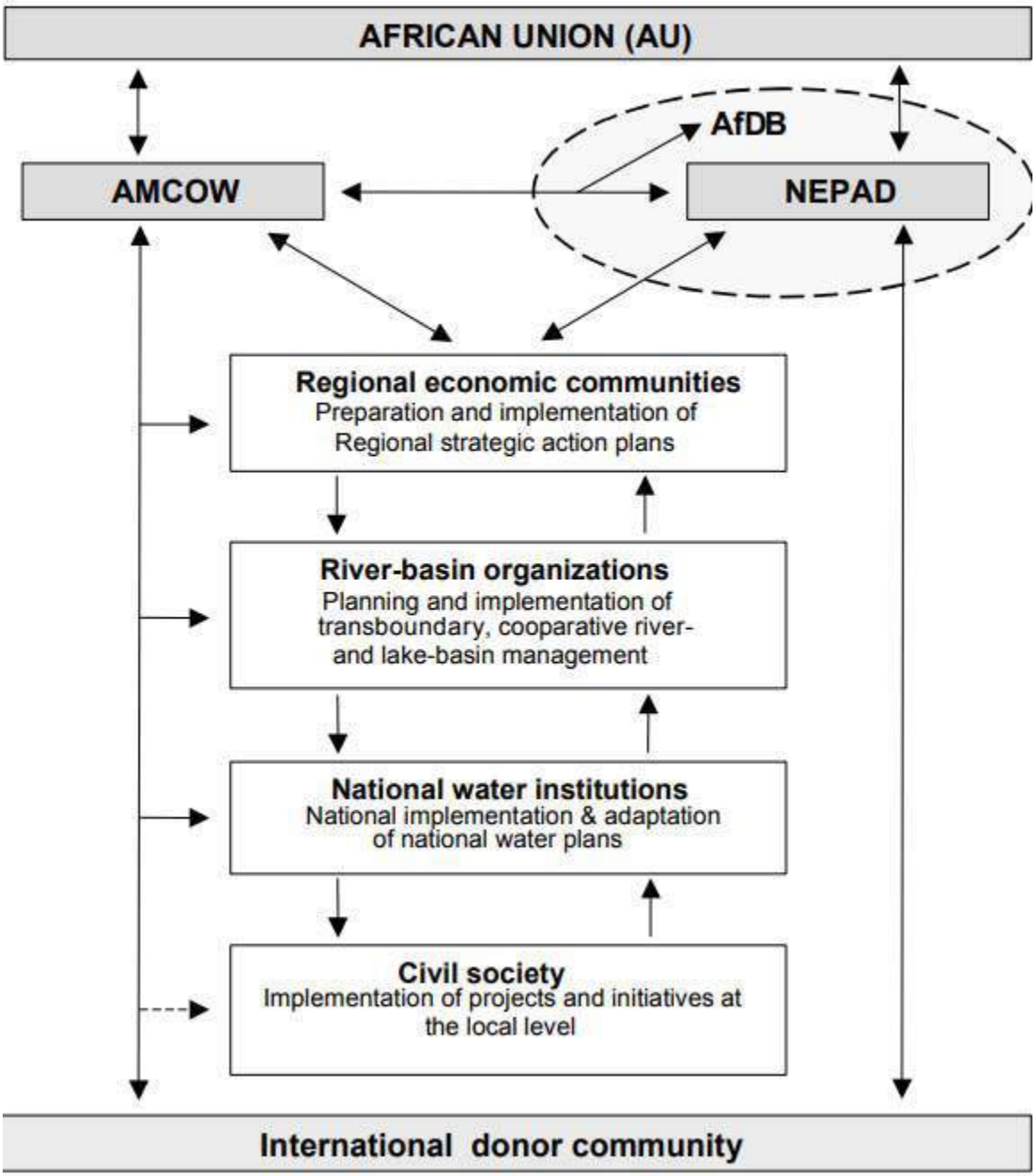
Then a coordination group was established (SACD for the water sector and SACD Water Division.

c) Water Management in Africa



AU - African Union,

AMCOW - African Council of Ministers for Water

AfD8 - G8 countries of African states

NEPAD - New Partnership for African Development

XIII. Regional Economic Communities - Regional Economic Communities

Preparation and implementation of regional strategic action plans River basin organizations - Planning and implementation of the transboundary, cooperative river- and lake-basin management- River basin organizations Planning and implementation of transboundary cooperation in the management of river and lake basins.

National water plans- National Water Planning Organizations Implementing and adapting national water plans.

At the local level- Civil Society Implementation of projects at the local level.

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International donor community - International financial organizations(source - Transboundary water management in Africa Challenges for development cooperation WaltinaScheumann/Susanne Neubert (Editors), German Development Institute, 2006, http://edoc.vifapol.de/opus/volltexte/2013/4364/pdf/Studies_21.pdf

The role of AU, AMCOW, NEPAD, and AfDB is important in transboundary water management).

As mentioned above, there are a total of 63 international river basins in Africa. Agreements on 20 of these basins, including on all important transboundary waters of Africa, have already been concluded, and organizations on river basins have also been established in 16 of these basins. In Africa, there is an uneven distribution of water resources. Different levels of demand and the role of water resources in the further development of individual countries have already given the international character of competition for water resources. This led, for example, to a discussion on the issue of exporting water from Central Africa to South Africa. This is not the only reason why there is a need for a coordinated African approach to the management and use of transboundary water resources. This problem has been identified and framed in the form of action programs by both regional organizations, such as SACD, and African initiatives such as NEPAD and AMKOV. Along with the NEPAD water program and its short-term action plan (CTP) in the area of transboundary water resources, not least the AMCOW, with its Abuja Declaration and the first Pan-African Conference on Implementation and Partnership in the field of water resources (December 2003), a promising trend has been created African Capacity Development in the water sector. Here, it should also be noted that, along with the national participation of individual donors, an important role in this regard is played by the international initiatives of the Group of Eight - an action plan for Africa - and the EU-EU initiative on water (EUWI).

There are still no effective institutions and well-developed interdepartmental processes and procedures, although it should be noted that some of these institutions and initiatives are still relatively new. During the consolidation process, some ideas were developed on the role that the institutions discussed here should play in the future in addition to their political mandates (if they were given a political mandate in the first place). It is safe to assume that the current obstacles to the put and coordination of programs and the implementation of projects will gradually collapse.

Until now, these initiatives have not had much importance for the formation or operation of the RBO. Nevertheless, at all levels - AMCOW, NEPAD, SADC-emphasizes the importance of the RBO for the implementation of any management of the basin's water resources. In this regard, the following NEPAD STAP for transboundary water resources can be noted:

River Basin Organizations (RBO) are the main institutions for the joint development and rational use of water resources in their respective river basins. RBOs will be responsible for planning, implementing and monitoring basin activities in the development of water resources in the basin "

Despite the problems outlined above, transboundary river basin management in southern Africa is relatively successful, at least in the context of intergovernmental and regional efforts (SACD).There are various reasons for this. It is important to take into account the general political balance of states. So, the UAR, the leading economic and political power, pursues a pro-integration policy in the region. She decided not to pursue a one-sided policy focused exclusively on her own interests, although the weight of South Africa in the region, of course, necessitates her involvement in pursuing such a policy.

South Africa seeks to pursue its own interests in such a way as to ensure consensus with its neighbors and attract them. This is why South Africa places particular emphasis on policy development in the context of SACD. This approach is also reflected in transboundary water policy, and here South Africa, of course, could act alone; but instead she chose a collaborative approach and provides her resources (know-how, personnel, administrative and financial capabilities) available to neighboring countries.

SADC in general and the SADC water sector in particular are contributing factors to transboundary water management. They constitute a common, relatively open framework for transboundary cooperation. The SADC water protocol serves as a guideline and base for specific cooperation projects. All institutional progress made in river basins is closely related to SADC and the SADC water sector. This facilitates and paves the way for future institutional building efforts. It is realistic and appropriate to consider SADC (water resources) as a support and support channel for individual river basins through SADC RSAP. SADC is rightfully considered an advanced economic community in general and a leading force in the water sector in particular. In this regard, he can assume a typical function for ECOWAS, IGAD, and EAC and their water policy.

It is now becoming clear that AMCOW is in the process of creating a continental cooperation context encompassing economic communities that can facilitate the exchange of work experience among African regions. For comparison, NEPAD should be seen more as a discussion forum that can provide AMCOW with additional impulses; but AMCOW is and will remain a key structure. What we see at the present time is a tripartite structure consisting of AMCOW/AU, regional economic communities, such as SADC (water), and river

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basin organizations. In the future, the latter should also take on the role of implementing organizations. At the political level, it is important to make reference to the overall context within which the river basins and the RBO cannot be considered separately. In southern Africa, for example, problems and progress in a river basin are always associated with problems and progress in other river basins - and inevitably take into account the scope of SADC activities. This provides an opportunity and a good measure of policy flexibility in transboundary water resources. When one country makes concessions to another country in one river basin, it can well expect concessions from another country in the neighboring river basin. The fact that several countries can share several river basins creates the conditions for many different trade-offs. This flexibility in water policy creates the possibility of substantial involvement in the conduct of the same specialists and institutions that can develop over decades.

In addition, relatively weak states (for example, Namibia, whose rivers originate in other countries, or Mozambique, a country that finds itself in a classical situation downstream) can always enter the SADC context. And the reason this is possible is that the "heavyweight country" of South Africa is pursuing an integration course at SADC, which makes it vulnerable to the pressure exerted through SADC. At the political level, SADC can define goals and offer explanations that will remove the accumulated obstacles in the course of negotiations between those responsible for water policy at the basin level. This is how policy priority reveals its positive effects.

As an example, one of the main driving forces of the process of the formation of organizations can be cited, which should be taken into account in political considerations aimed at leveling the negotiation field. As a rule, relatively weak countries insist on creating new organizations, because they do not have national resources that would give them a fairly equal voice in managing transboundary river basins. On the other hand, South Africa has national structures that are so strong that the country does not necessarily need secretariats or the like for river basin organizations. The picture, of course, is very different for Namibia or Mozambique.

Therefore, management of international river basins involves a lengthy learning process, a process that member countries must go through without reducing it. After this process is completed, work can begin on assigning larger and more complex tasks to river basins: for example, developing and implementing common river basin water sector plans or preparing action plans to achieve the UN Millennium Development Goals. Meeting of the OECD Council at Ministerial Level Paris, 22-23 May 2019, OECD, underlined'

"We reiterate our continued support to the G20 Africa partnership, including the Compact with Africa (CwA), with strengthened bilateral engagement by G20 members and enhanced roles for WBG, African Development Bank, and IMF in implementing the CwA, and G20 initiative on supporting the industrialization of Africa and other relevant initiatives that contribute to the realization of the African vision as set out in the African Union's Agenda 2063. We remain committed to address illicit financial flows and will take stock at future Summits.

The quality infrastructure with open and fair access is key. In addition to shortfalls in Internet connections, there are also often large gaps in access to high-speed Internet (Shenglin et al., 2017[60]). In Africa, for example, significant investment is needed to upgrade backhaul infrastructure (more than two-thirds of mobile connections are 2G, while 4G connections represent only 2% of the market) (Connecting Africa, 2017[61]) and to design regulatory frameworks that incorporate good practices and are appropriate to local contexts (AUC/OECD, 2018[62]). Moreover, developing countries generally lag behind on digital literacy, preventing them from taking full advantage of the digital transition (Shenglin et al., 2017[60]) https://mg.co.za/article/2019-06-25-00-youth-need-skills-for-the-fourth-industrial-revolution.

Youth need skills for the fourth industrial revolution. There is a whole world of career prospects for the highly skilled out there. The youth will have to work hard, but the older generation needs to show them the way, to advise on the needs of the country's future and create opportunities for learning, growth and livelihoods. The youth unemployment rate in South Africa is staggering, and increased from 54.7% in the fourth quarter of 2018 to 55.2% in the first quarter of 2019. The unemployment rate is highest among people aged 15 to 34, according to Statistics South Africa. Furthermore, the 2018 World Economic Forum (WEF) report made significant conclusions, The Future of Jobs and Skills in Africa, stated that sub-Saharan Africa has a global share of high-skilled employment of only 6%, in contrast to the global average of 24%. It is forecast that with the impending disruption to jobs and skills brought about by the fourth industrial revolution (4IR), 39% of core skills required across occupations in South Africa will be wholly different by 2020.There is a tremendous burden on our education system to prepare school leavers for an uncertain future. Urgent reskilling and upskilling efforts are needed for higher education and adult learning curriculums. But, we have the opportunity to start much younger. For this we need a future-ready curriculum that speaks to the increasingly technology-driven economy and learners require proficiency in science, technology, engineering, maths (Stem) and digital literacy. Currently, according to the WEF, South Africa scores second to last for quality of Africa's education systems.

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With these numbers, it's not difficult to see why the young people of our country have become discouraged with the labour market and are not building on their skills base through education and training - they are not in employment, education or training. The unemployment rate among the youth is higher irrespective of education level, but we beg to differ. In the debate about youth unemployment, the role of education is crucial - access to education is a precondition for access to opportunities. We should not just be teaching for intelligence quotient (but also emotional quotient. We should be teaching to develop character, confidence, critical thinking and creativity. We should be teaching in a way that encourages a joy for learning and discovery, and instils a love for Stem subjects.

Early childhood development (ECD) is a fundamental part of education, and for this reason it is the first stepping stone in the model initiated by nonprofit organisation Afrika Tikkun called Cradle to Career 360, this model is designed to produce school leavers prepared to be productive and participating citizens. There is ample research to suggest that children who participate in quality ECD programmes have higher levels of cognitive development and are better prepared to learn when they enter primary school. Afrika Tikkun's youth and career development programmes acknowledge that when young people choose Stem subjects in their secondary and tertiary studies, the earlier they develop an interest, the better. Competency in Stem subjects and the ability to be self-directed are not only powerful competencies in the 4IR, but essential for survival. They give children a path of hope and they subsequently have better employment prospects.

At Afrika Tikkun, post-matric graduates are trained in coding, web design, network security and computer literacy. But people require more than a connection to scientific knowledge; they also require things like smartphones, tablets and access to the internet. With the help of our partners, among them Internet Solutions, Work Online and Vox, Afrika Tikkun can provide well-equipped computer labs with fast internet connectivity.

Increasing the number of technologically trained youth is also vital to economic landscape and the future of society. Although science is a male dominated industry, Afrika Tikkun believes that young girls should pursue careers in science. They should talk in a way that encourages curiosity and hooks them. It is necessary to motivate a sense, among boys and girls, that science and technology, engineering and maths is for everyone.

Blockchain is a wide-ranging and flexible type of data structure which operates under the principles of a Distributed Ledger Technology (DLT). A DLT refers to a novel and fast-evolving approach to recording and sharing data across multiple data ledgers which each have the exact same data records and are collectively maintained and controlled by a distributed network of computer servers.

With the emergence of blockchain (a protocol that eliminates intermediaries), it is possible to establish an auditable encrypted ledger that can record energy consumption, credit histories (which are relevant when there is a need for access financing), as well as provide energy trading between households; giving consumers more control of their energy requirements and consumption.

In 2017, a non-profit, Energy Web Foundation (EWF), started developing an open source, scalable blockchain platform with the aim of creating a market standard for the energy industry to build upon and run their own blockchain-based solutions. A business-as-usual attitude will not change the energy outlook of Africa. First, Blockchain will inspire fast adoption of decentralized energy system in places with or without electricity. Second, it will not only increase productivity among small energy consumers, but new ways of defining energy end-use will emerge (https://www.weforum.org/agenda/2018/11/blockchain-will-change-the-face-of-renewable-energy-in-africa-here-s-how/)

A member of a blockchain system, or a node, can only add a transaction that is verified by other nodes. Before a block can be added into a chain of blocks, or a blockchain, a consensus mechanism is needed to verify that the block meets predetermined criteria and rules of the system such as no double recording of the same data. The validation activity, called hashing, includes solving an assigned mathematical problem. The correct answer to this problem is called a nonce. Once a node finds the nonce, other nodes verify it, and then a cryptographed identifier, called a hash, is given to the transaction. A hash consists of numbers and letters. Then, a block of data consisting of this cryptographed, digital identification is created. Hashing and consensus-reaching computations are done using computer software. After a consensus is reached, the new, identified, cryptographed, validated block can be added to the blockchain. The new block will be linked to previous blocks in the same chain, such as to blocks that contain previous transactions of the same data or asset. When a block is added to a chain, system members will be informed and own a copy of the block (not the data) in the distributed ledger accessible to them. If a block needs to be changed, another consensus mechanism is needed.

A block has two parts a header, which includes a unique block reference identification number, the time the block was created, and a link back to the previous block; and the content, which usually is a validated list of digital assets and instruction statements, such as transactions made, their amounts, and the addresses of the parties to those transactions. A blockchain data

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ledger consists of unique blocks that each connects to individual transactions.

Blockchain technology is playing an important role in the fourth industrial revolution. It can eliminate existing environmental problems, change the way the global environment is managed, and bring people to a new level of quality.

Research breaks down the sectors in which distributed ledger technology can bring significant benefits into six areas: climate change, the conservation of Earth's biodiversity, the challenges of the world's oceans, air purity, weather resistance, and resistance to natural disasters. Each direction, in turn, is divided into narrower segments.

The potential of blockchain in the environmental safety sector is usually not taken into account by developers, investors, and governments. But this is the only way to unblock and monetize the value that is contained in the new ecosystems.

The technology of the distributed ledger should focus on the possibilities of helping mankind solve global environmental problems and expand opportunities for societies.

Africa is the second largest continent in the world in terms of both territory and population. There are 55 states located on the continent. Economies in Africa differs from country to country. In Africa, cryptocurrency tends to be sold with a large trade margin which can even reach 100% due to several reasons. Firstly, Bitcoin in Africa is very difficult to mine because of the climate and lack of infrastructure. Also, cryptocurrency is in big demand in Africa as national currencies are vulnerable to hyperinflation. Besides that, since there are only a small number of virtual currency retailers they are able to set high prices. The relative financial stability of digital money and the opportunities for profit make cryptocurrencies very popular in Africa.

The Blockchain Association of Africa is set to launch innovation centres related to blockchain across Africa in line with the association's goals. This joint force also stirs towards promoting technology education, community outreach, and local talent in order to increase blockchain adoption across Africa. Business value on the African continent is expected to increase from this.

Africa is no longer the Dark Continent, and everyone is looking at Africa now Blockchain will ensure that Africans are now stakeholders in what the continent has to offer and it all starts with education. This partnership will ensure that the upcoming generation is equipped with the right skills and expertise to move the continent further."*Blockchain Association of Africa is based* in South Africa, Uganda and Nigeria with an aim to equip each and every stakeholder with the best Blockchain education, acumen and tools. The association has partners in Zambia, Dubai, Ghana, Kuwait, Namibia, Zimbabwe, India, Kenya, and Botswana and streamlines its aim to shaping Africa's future. Its organisation is one that creates meeting avenues for cross-continent blockchain stakeholders to drive collaboration, innovation, and education.

An Innovation Centre will be formed in Tanzania, South Africa, Rwanda, and Uganda under the body of Blockchain Worx's Blockchain according to plans. The Blockchain Innovation Centre will help both private and public institutions to understand and leverage the blockchain. *Blockchain Worx is a FinTech-RegTech venture* with its headquarters *in Singapore.* Their initiative offers solutions such as anti-money laundering transaction monitoring systems and securities tokenisation platforms. The third partner, Afriplains Digital is a next-generation technology services company based in Tanzania. With the use of technologies like the blockchain they solve business and socio-environmental issues.

The world is undergoing technological development at an unprecedented and explosive pace. Considered the "Fourth Industrial Revolution," this exponential growth will fundamentally alter the way we live, work, and relate to one another. These changes are further accelerated by the advent of blockchain technology and are perhaps most palpable on the African continent.

With much of the continent still dealing with the multi-generational ripples of colonialism, Africa's systems and infrastructure are badly broken; built from the bones left behind by their colonizing nations. The majority of African states are still considered developing nations - some half-century post-colonization - and many continue to struggle with armed conflict, corruption, and poverty as a result. Herein lies Africa's greatest opportunity: to leverage blockchain technology from the very start across every industry, systematically. Today, much of Africa has an opportunity to leapfrog the development mistakes of the West by reimagining entire systems of production, financial services, and governance fueled by blockchain, positioning itself as the ultimate unicorn case study.

It is obvious that Africa needs technological innovations to jump a generation and catch up with other countries. The continent can indeed turn the lack of infrastructure from a disadvantage into an asset. It offers a blank playground to test and validate new concepts such as mobile payment, which has quickly gained ground, as it remains the major mean of payment for a wide majority of Africans.

With the Internet of Things (IoT) and Artificial Intelligence (AI), low banking rates and booming mobile services, blockchain technology represents a real opportunity for Africa. In fact, beyond crypto-currency (virtual currency not guaranteed by the central bank such as *Bitcoin*), the blockchain consists of a decentralized and non-falsifiable register, allowing

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transactions to be validated almost instantly and without a central control unit. Called a trust machine, the blockchain technology will provide the confidence that the continent still lacks today and will contribute to its development by streamlining its financial circuit.

In addition to its "secure" and "transparent" nature, the attractiveness of the blockchain lies in the diversity of its applications, including agriculture, public administration, finance etc. This disruptive technology, which first appeared in 2008 in the aftermath of the global financial crisis, can be used in all areas where a trusted intermediary is required.

Although it is difficult at the moment to assess the long-term effects of the use of blockchain, the paradigm shift that this technology induces will impact many areas. Emerging countries, particularly in Africa, are an exceptional field of exploration.

Why Blockchain for Africa? Blockchain technology is still relatively new in Africa, but it has the potential to completely revolutionise the economy in this region. Here are a few ways Blockchain could reshape business and financial services in the region. With this technology you can trade value with another person without having a third party as an intermediary. Blockchain will get rid of cumbersome, costly and bureaucratic legacy systems because it removes the middleman. The right application of this technology could assist in elevating the level of smart services provided to citizens in Africa from a cost, time and efficiency perspective. Creating an 'Internet of value' Blockchain not only stores information, but anything of value, including money, equities, bonds, titles, deeds, contracts and other kinds of financial assets. Blockchain technologies offer the opportunity to create an economy that is not only about goods and services, but is also more open, inclusive and fair. This is particularly relevant for Africa where a large portion of the population is unbanked. These people are excluded from the global economy because they can't open a bank account without a birth certificate, passport or utility bill or because they have insufficient funds. With Blockchain, trust is established through mass collaboration and intelligent algorithms rather than through centralised intermediaries like banks or governments. The system is also fully transparent because transactions can be viewed and corroborated by anyone else using the system. For Africa, this could alleviate many of the problems arising from corruption and fraud. The implications of this are important, not only for the financial services industry but also across most aspects of society.

Traditionally the financial services industry has always been a centralised unit of operations, meaning they are more vulnerable data breaches and cyber-terrorism. Blockchain can improve security and encrypt data during transactions, rather than when the data is moving or at rest. Because Blockchain is shared among a large number of users, it's virtually impossible to hack into or corrupt, and once a transaction has taken place, it cannot be reversed.

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