SDG 2: ZERO HUNGER

ORIGINAL: To feed a growing population, agriculture is increasingly knowledge-intensive. ICTs help farmers improve crop yields and business productivity through better access to market information, weather forecasts, training programmes, and other online content tailored to their needs.

A SOUTH AFRICAN-SPECIFIC PERSPECTIVE:

HOW CAN INFORMATION AND COMMUNICATION TECHNOLOGIES HELP REDUCE HUNGER TO ZERO IN SOUTH AFRICA?

SUMMARY

The Economist Global Food Security Index for 2018 (https://foodsecurityindex.eiu.com/) ranks South Africa 44th out of 113 countries, the highest rank in sub-Sahara Africa. But, 13.8 million South Africans live below the national food poverty line, of which up to 5.5 million (approximately 40% of the child population) are children[1]. They all experience hunger regularly.

Can ICTs, or any other technology, reduce hunger in South Africa to zero? The clear answer is NO! The technology of farming, according to current scientific knowledge, began some 12,000 years ago in the "Fertile Crescent" (virtually all countries of the Levant and Nile Valley), the Indus valley, and China[2]. Technologically-driven food production has been increasing exponentially since then, casting doubt on the Malthusian pessimistic predictions. Today's very high productivity commercial farms, driven by the full range of Fourth Industrial Revolution (4IR) technologies, which range from Internet-controlled drones and sensors, Artificial Intelligence (AI) machines and robots, biotechnology, etc. provide the food security assurances demanded by modern societies. South Africa is not excluded from this trend.

In the face of immense technological advances that drive food security in the modern era, hunger still exists, and remains a major challenge for humanity, and South Africa in particular. Natural disasters related to environmental degradation and climate change, and the commercialization of food production and distribution, are the main causes for the persistence of hunger. Subsistence farming methods have given way to high technology commercial food production. Access to money in exchange for food is the only means of preventing hunger for many of the world's population. South Africa is not immune.

Poverty eradication, the achievement of the first Sustainable Development Goal, SDG1, is possibly the only route to achieving this Sustainable Development Goal – the end of poverty and the affordability of food.

1. DISCUSSION: ELLIMINATING HUNGER IN SOUTH AFRICA THROUGH ICT

1.1. **Access to Food and Food Production for Zero Hunger:** An excellent explanation of the challenges faced by South Africa in achieving this SDG is a TEDx talk by David Fincham[3], in his promotion of fish farming as a path to hunger reduction in South Africa. A highly edited version of the transcript of this talk is:

A young university graduate and entrepreneur, wishing to start a fish farm in his village, talks to David Fincham:

- David: "*Do you still have family living in the village?*" – reply "*Yes*"
- David: "*How does your family at home eat?*" – a bewildered look leads David to expand: "*How do they put food on the table?*" – response – "*They buy it*"
- David: "*No, they don't*" (pulls out his cell phone from his pocket) – "*They get it from this…..*"

[1] Poverty and Hunger: (1) STATS SA 2017: https://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf: (2) South African Child Gauge 2017: Summary at http://www.ci.uct.ac.za/sites/default/files/image_tool/images/367/Child_Gauge/South_African_Child_Gauge_2017/Child_Gauge_2017_lowres.pdf

[2] History of Agriculture: https://www.environmentalscience.org/history-agriculture

[3] Feeding the rural poor and hungry in the 21st Century with technology: Pretoria February 2017: https://www.youtube.com/watch?v=sr3yhNXWPI0

The conversation proceeds as follows:

Message from mum in the village to her graduate son in the city: "*There is no food at home*"; son responds by SMS: "*Mum, I don't understand your message, there must be food at home – we are rural small scale farmers*"; Mother thinks: "*This is strange – I made many sacrifices for my son, sent him to a good school, university, how can he not understand a simple message like this? I will translate it into a language he can understand"* Her response: "*There is no money at home, I can't buy food*". Son sends **ZAR100** to his mum: Mother spends **ZAR20** on transport to the store; First purchase is airtime, next week when the **ZAR100** is spent, another message will be needed – **ZAR20**; Second purchase is super white maize meal – **ZAR20**, but this needs to be supplemented by nutrient-rich additives, vegetables – **ZAR20**; protein-rich food supplements also needed, most affordable comprises chicken heads, intestines, feet – **ZAR20**. Sadly, no luxuries like salt, sugar, tea – maybe next week. I will "borrow" a few cups of each from my neighbour. Thanks to the cell phone airtime, food will be available again next week, after more SMSs. The whole family will have food, including my son's young siblings and a few relatives still residing in the rural household.

Other key factors from the talk:

- Africa, with vast fertile land, water and human resources spends US$25 billion per annum on food imports;
- Many African nations with huge coastlines and inland water systems spend US$ billions on fish imports;
- Africa is the only continent in the world with a declining fish consumption – the vast fish harvests are exported;
- Tilapia (known to have been farmed by the Pharaohs of ancient Egypt, also called "St. Peter's Fish") is an invaluable fish species which originates in Africa (the Nile River system). It is the most farmed fish species in the world, but most Tilapia consumed in Africa is imported from China.

Subsistence farming in Africa has become unsustainable – labour losses through migration to the cities; growing water scarcity caused by urban growth, water management inefficiencies and costs; seed and planting costs increases; the rise of competition in food production from highly efficient high-technology factory farms. It is much cheaper for Africans to buy refined maize meal and other food products from the nearest local stores, but only if they have access to money.

Technology has indeed reduced hunger for the family in David Fincham's informative talk, but, is the use of technology in this way sustainable for the very poor? 40% of the meagre income spent on getting that income using the technologies of communication and transportation? What if son and other extended family members lose their jobs and incomes, or change their support priorities?

2. **Small, Medium and Micro Enterprises (SMME) to generate money for food:**

Yet another excellent discussion on the sustainability of food production by small businesses in South Africa, is South African entrepreneur Vusi Thembekwayo's highly informative talk[4], also on TEDx:

- The "African conversation" is that its O.K. for Africans to be "just O.K." - It is "just O.K." for Africans to run small businesses. "This is wrong – small businesses are not sustainable!"
- In South Africa, an African entrepreneur created a marvellous low cost easily available food source – the KOTA – a quarter loaf of bread, hollowed out and filled with any filling or relish available.
- From 2005 to 2014, Tibos Kotas ran a small thriving business selling Kotas in the South African economically marginalized suburb of Alexandra. In 2014, Tibos realized an annual turnover ZAR53,000 – just enough to feed and sustain the owner's extended family.
- Eight years after Tibos Kotas started his business, in 2013, a listed South African franchise with significant investment resources started a business named Kota Joe – achieved a turnover of ZAR20 million a year later, drove Tibos Kotas out of business, a loss of income for a significant extended family and other dependents.
- Vusi's conclusion: "We need to unlock our thinking. Its not O.K. for us to start small businesses; Its not O.K. for us to be happy being vendors selling fruit and vegetables on the side of the road. Think big and grow to become big businesses, small is not enough"

The key question from Vusi's talk is: Can small businesses that are known to drive economic growth in most developed and developing countries, survive and thrive in the hostile SMME business environment of South Africa, where more than 70% SMME start-ups are said to fail within the first two years? Can such SMMEs, particularly those engaged in rural food production, contribute sustainably and reach the scale needed to defeat hunger in the country? Or should they abandon smallness and think only of becoming big businesses as Vusi suggests? Vusi's life story told in this video is inspiring –

[4] The Big Lie of Small Business | Vusi Thembekwayo at the University of Namibia 2015: https://www.youtube.com/watch?v=hhBDfJY-xZw.

patience and stubbornness leading to victory over extreme adversity. But, will Vusi's story, and the few South Africans able to emulate it, lead to final success in eliminating hunger altogether as this SDG requires?

ICTs can help the whole process of food production, by supporting the activities of SMMEs and big agricultural corporations alike, and by enabling a vast array of technologies to interconnect and function seamlessly in the production and distribution of food. But, until ICTs enable very poor people to acquire the monetary resources to buy food, they will fail to meet the objectives of this SDG. ICTs must be positioned to assist the development and functionality of social processes and structures that will lead to zero hunger for all South Africans.

3. **How can ICTS help to defeat hunger permanently and sustainably in South Africa?** Technology on its own will not reduce hunger to zero, in South Africa or anywhere else in the world. The challenge requires highly focussed multidimensional concerted effort that cuts across all facets of human activity and endeavour. The full range of human and natural scientific disciplines need to applied to this very human challenge, together, without one competing against the other for dominance. The intricate interrelationships between each node in the "*web of poverty's disadvantages*" and the "*15 global challenges facing humanity*" depicted on page 3 of the document http://www.sakan.org.za/Docs/ICT4SDG.pdf must be subjected to intensive action-oriented research, but without adding excessive complexity to the action programmes that result from this research. The highly focussed action-oriented research must include the following critical components:

3.1. **Short-term hunger relief:** The core challenge of hunger is the lack of money to buy food in this increasingly commercial world where everything has a price. South Africa has made great strides in tackling this massive human challenge through a national social grant system[5]. But, is this enough? With 25% of the total population, and up to 40% of the nation's child population surviving below the national food poverty line, suggests that this is not enough. How can the South African Social Grant strategy be expanded to progressively drive hunger to zero over time? How can ICTs be positioned to enable such a strategy? ICTs are already providing significant support for the national social grant system, vast and costly electronic systems that enable management of the whole process, and prevent its costly abuse, are based on high technology and ICT. ICT can do much more:

3.1.1. Further reducing the costs of access to these social grants;

3.1.2. Electronic platforms driven by the latest technologies like AI and IoT to evaluate and monitor poverty as a whole, and from such evaluation and monitoring creating the responses that will improve the opportunities and wellbeing of the poor and their families;

3.1.3. Use technologies to protect the poorest population from the vast range of bureaucratic and criminal abuse – numerous financial scams that target the poor have been well documented by experts and the media[6];

3.1.4. Use ICTs to deliver effective and highly focussed public services such as education, health, housing, transportation, etc. to the poorest communities, reducing all bureaucratic barriers that afflict the poor specifically.

3.2. **Long term strategies:** Education is the key to the elimination of poverty, but most local and international educational assessments indicate major shortcomings in South Africa's national educational processes. South Africa ranks amongst the countries with the highest percentage of GDP spent on education, but the results remain disappointing. Inequality, poverty and unemployment are critical factors in the determination of the nation's educational outcomes, adding immense hurdles for the improvement of especially basic education. These major challenges will be discussed in detail in SDG4 – Quality Education.

3.3. **Lessons from abroad:** Numerous developed nations have faced the same challenges faced by South Africa in their recent history, and have systematically overcome them over time[7]. Several developing nations are in the process of overcoming poverty and hunger in many different ways. By 2016 Brazil had joined the ten countries with the lowest levels of poverty in the world, after decades of being one of global inequality leader. Brazil introduced highly focussed poverty alleviation strategies[8] to reduce poverty amongst its citizens. In Africa, after a decade of economic and political turmoil, Ethiopia is gaining international attention over its poverty alleviation progress - 31% poverty reduction in the ten years to 2011, which contributed to the country's GDP growth of 277% between

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[5] Report: The Social and Economic Impact of South Africa's Social Security System: https://sarpn.org/documents/d0001041/P1154-sampsondsd_Sept2004.pdf

[6] Garnishee order rackets scam the poor: https://www.timeslive.co.za/sunday-times/business/2014-01-12-atlas-fin-scams-south-africans-in-garnishee-order-racket/

[7] (1) 2011 Swedish Example: The rise, fall and revival of a capitalist welfare state: what are the policy lessons from Sweden? http://www.ifn.se/wfiles/wp/wp873.pdf (2) Nordic Lessons: https://ips-dc.org/take-lesson-nordic-countries-inequality/

[8] Poverty reduction in developing countries: (1) Brazil: World Bank Report: http://www.worldbank.org/en/news/feature/2014/03/22/mundo-sin-pobreza-leccion-brasil-mundo-bolsa-familia (2)

the years 2000 and 2016[9]. Can South Africa emulate the successes of these countries, and avoid their failures? South Africa can benefit greatly by studying the successes and failures of the strategies adopted by these nations, thereafter adjusting their strategies to suit the local cultural and socioeconomic environment.

One common factor linking all nations that have or are in the process of defeating poverty and hunger, is the focus on ICT growth as an enabler of development. Brazil and South Africa entered the 21st century with the same level of fixed broadband penetration[10], by 2015, Brazil's fixed broadband penetration was nearly five times that of South Africa. China achieved global economic growth leadership through progressive national economic policies supported by one of the fastest ICT growth records in the world. Like Brazil, China entered the 21st century with roughly the same level of fixed broadband penetration as South Africa, but by 2015, China's broadband penetration was nearly eight times that of South Africa's. Ethiopia is fuelling its impressive socioeconomic growth through rapid ICT expansion, albeit from a very low level after the turbulence of the preceding years.

4. **ICT and Zero Hunger:** As enablers of development, ICTs must be positioned as vital tools for the reduction of hunger:

4.1. Reduce the cost burden of ICTs helping the poor to find food – the ZAR20 per week air time referenced in the anecdote of section 1.1 above. The target price for poverty alleviating ICTs is approximately ZAR39 per month for all transformative ICT products and services, including broadband access as discussed in section 4. Page 9 of the related SDG1 http://www.sakan.org.za/Docs/ICT4SDG1.pdf. This is approximately half the cell phone expenditure that the mother in David Fincham's talk needs to secure food. The affordability gap is more than 200%!

4.2. Position ICTs to contribute directly to income generation to enable the procurement of food. The modified Internet Café model as proposed in SDG1 (http://www.sakan.org.za/Docs/ICT4SDG1.pdf) is designed to create SMMEs providing affordable ICT services to their impoverished local communities, especially the children, and generating enough income to feed their own immediate families. This is a win-win scenario that must be seriously considered by South Africa's policy and regulatory leaders.

4.3. Technological appropriation and digital skills acquired from a very young age (less than 10-years) in preparation for hunger elimination during teens and adulthood. The changing nature of work driven by Fourth Industrial Revolution (4IR) technologies requires critical thinking skills, easily acquired at very young ages through child-friendly ICTs. Such skills head the list of prerequisite skills needed by the 4IR, and prepares children for a lifetime without hunger.

5. The final defeat of hunger with ICT assistance:

The long-term impact of technology in this 4IR world is the massive reduction of work. As inferred in the summary of this chapter on SDGs, formalized work is a relatively recent human evolution, circa 12000 years old in a human evolutionary period spanning more than 300000 years. Prior to that major change in human behaviour, which led to today's socioeconomic systems, the outputs of all food producing labour, which was generally given voluntarily without pay, was shared amongst all members of the community. Today, the only mode of access to food for a large percentage of the growing human population is money, earned in exchange for labour where jobs exist. The primary reasons for hunger in the past were climate-driven famine and related natural disasters. The current technological evolution/revolution offers immense opportunities to return to that golden era of human evolution, where work was an unpaid, shared and highly inclusive activity undertaken in the interests of the whole community. The food and other resources that result from such work, were equitably shared amongst the whole community, irrespective of individual contributions. The few hunter-gather societies that remain in modern day Africa, specifically the Hadzabe ethnic groups of Tanzania, continue to maintain that lifestyle, refusing to adopt the modern food-for-labour economies that dominate today's world. Hunger is very rare in those societies. South Africa's own Khoisan communities, thought to be the genetic ancestors of all humans living today by genetic and paleoanthropological scientists, are progressively being "modernized" (commercialized?) – hunger is endemic amongst these communities[11].

Can technological advances help humanity return to that golden age of self-help and community cohesion, but without the natural challenges that arose from less effective technological availability and usage? The 4IR will enable the mass automation of work as we know it today, enabling vast efficiency increases especially in food production, and rendering vast populations unemployed and unemployable. Much of the work today is in any event tedious, intellectually unrewarding, unstimulating and dissatisfying, but necessary to prevent hunger. This can change, aided and abetted by knowledge shared by many – the original way that technology was used by humanity's ancient ancestors for survival and

[9] An African Miracle? Ethiopia: https://qz.com/africa/1109739/ethiopia-is-one-of-the-fastest-growing-economies-in-the-world/

[10] Derived from ITU Data Explorer: http://www.itu.int/ITU-D/ict/statistics/explorer/index.html

[11] See page 4 and 12 in https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/hidden_hunger_in_south_africa_0.pdf

inclusive growth. Many nations are considering such an eventuality, the introduction of a ***Universal Basic Income (UBI)***[12] for all.

Universal Basic Income: An old idea revisited – a mixed bag of supporting luminaries:

Milton Friedman: The champion of free markets became famous in the 1980s as a prominent adviser to President Ronald Reagan and U.K. Prime Minister Margaret Thatcher. But as far back as 1962, Friedman had endorsed basic income, arguing that it would be more efficient than the welfare bureaucracy at alleviating the problems of low-income households. Other thinkers associated with the so-called Chicago school of conservative-leaning economics, including Friedrich Hayek who also endorsed the idea, though it has seldom been embraced by the elected officials they've advised.

Dr Martin Luther King Jr.: Over his years as a civil-rights activist, Dr King came to see economic equality and racial equality as fundamentally intertwined, and he began urging the federal government to do far more to lift people out of poverty. In his final book, *Where Do We Go From Here?* (1967), Dr King called for a basic income "pegged to the median of society."

Source: FORTUNE: By Matthew Heimer June 29, 2017: http://fortune.com/2017/06/29/universal-basic-income-history/

The concept of a Universal Basic Income is not new to South Africa – it is supported by some of South Africa's leading Capitalists (Johan Rupert and Elon Musk), and Sociologists (Bongi Maseko), and has received significant media coverage. With South Africa's exceptionally deep socioeconomic inequalities, including poverty and unemployment, and an educational system in need of urgent repair, the concept could become a vital extension or replacement of the nation's social grants system, moving the nation rapidly towards achievement of this SDG.

ICTs are vital tools for the development of UBI – a platform for global knowledge sharing about the concept, a technological testbed for the idea, and a needs identification and monitoring tool. Can the emergence of 4IR technologies drive the development of UBI and the defeat of poverty, and vice versa (Technology driving economic growth, and UBI empowered citizens to drive technological growth)? The 4IR will render much of today's low/medium skilled work obsolete, thus driving further the need for UBI, and for more 4IR technologies that generate the incomes to support UBI. This cycle of interdependency between technology and UBI could ensure that poverty and hunger in South Africa are eroded sooner rather than later. For UBI to work for South Africa, and release the creative energies hidden behind the national masks of poverty, ignorance and poor access to knowledge via ICT4ALL, a quantum leap in the nation's educational outcomes is vital. But, realizing such a quantum leap is a complex and very long-term process, ICTs can elegantly bridge this educational gap, early childhood development (ECD) of the technological kind to instil the capacity for critical thinking in very young children from poor communities as proposed in the ICT4SDG1 document in this series of South African SDG responses.

South Africa is known to be well-endowed with creative artistic talent, and UBI has the capability of releasing this talent to contribute towards the defeat of hunger, but first the mundane struggles for daily survival must be removed. The ICT industry as it evolves to virtually unlimited broadband capacities offers numerous opportunities to market South Africa's artistic skills globally, further decreasing hunger and deprivation. An excellent example of such artistic talent marketed worldwide directly via Internet streaming from his home with great success, is JR's rendition of the blues classic "Hard Time Killing Floor Blues", composed by Skip James (1902-1969)[13]. The lyrics are closely aligned to South Africa's massive societal challenges.

UBI is not without its critics[14], but can South Africa afford not to consider this concept as a solution to the nation's deep triple threats of inequality, poverty/hunger, and unemployment? South Africa's partners in the BRICS Community are seriously considering the potential of UBI as a tool to defeat hunger and poverty. Brazil, India and China have made significant progress in developing the UBI concept. China[15] in particular is rapidly building the links between technology and UBI by rapidly progressing towards global leadership in AI and other 4IR technologies, and rising towards global economic leadership through UBI-type poverty alleviation. The BRICS partnership with South Africa offers excellent lessons and possibilities for developing the vital links between the 4IR technological advances and the UBI concept in South Africa, both aimed at final freedom from hunger and unrewarding low-paid labour that often perpetuates poverty instead of reducing it.

[12] A brief history of UBI, a relatively old concept: https://www.newyorker.com/magazine/2018/07/09/who-really-stands-to-win-from-universal-basic-income

[13] JR's rendition of Hard Times Killing Blues: https://www.youtube.com/watch?v=2g254CZHsC4

[14] FORBES: S Universally Bad Idea: https://www.forbes.com/sites/marcoannunziata/2018/07/27/universal-basic-income-a-universally-bad-idea/#911f9143269c

[15] China: Beyond 2020: Discussing Universal Basic Income as a Potential Poverty Alleviation Policy Option for China: http://www.cn.undp.org/content/china/en/home/presscenter/articles/2017/10/19/beyond-2020-discussing-universal-basic-income-as-a-potential-poverty-alleviation-policy-option-for-china-.html