

The Future of Work for smallholder farmers in Ethiopia

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EXECUTIVE SUMMARY

The *Future of Work* creates various new opportunities, but also many challenges. While technological developments can drastically increase productivity and efficiency, it can also increase inequality if not dealt with correctly. Governments now have the responsibility to act. For this reason, the DDE/DSO-track of the West Wing Think Tank researched possible effects of the Future of Work. As a case study, this policy advice focuses on how the Future of Work will manifest itself in the agricultural sector of Ethiopia. Our central goal: having Ethiopian smallholder farmers benefit in an inclusive way from technological developments related to the Future of Work in the long-run.

Existing research concerning the Future of Work is mainly oriented on Western labor markets. As the Ethiopian labor market is vastly different, the Future of Work will also take a different shape. We determined four relevant technological developments in the near future of the Ethiopian agricultural sector, namely **mechanization**, **online platforms**, **big data**, and **artificial intelligence (AI)**. Subsequently, we outlined the current Strengths and Weaknesses and future Opportunities and Threats (SWOT) for these technologies and their impact on Ethiopian smallholder farmers. Based on our findings, we posit several policy recommendations for the MFA.

Our central recommendation emphasizes strengthening inclusive, sustainable and open internet access for all in Ethiopia. Online platforms, artificial intelligence and big data require access to the internet to be utilized properly. Supporting and complementing internet accessibility-efforts that are currently being made by the Ethiopian government is therefore an important first step. With our policy recommendations, we seek to empower Ethiopian smallholder farmers in fully enjoying the potential benefits of the aforementioned technological developments. This includes setting up best farmer competitions, promoting role models on online platforms, supporting necessary vocational training (for example via online courses), and supporting knowledge exchange programmes to support the Ethiopian high tech-sector. Furthermore, the MFA should focus on supporting the Ethiopian government and other stakeholders in creating and promoting the use of open data. Proper data gathering techniques can not only support governmental policy making, but also allow local tech-firms to develop relevant applications for Ethiopian smallholder farmers. However, designing policy with regards to the Future of Work also presents a set of challenges for the MFA to consider. Efforts considering big data storage and exchange should be preceded by a mutual agreement between Dutch and Ethiopian authorities regarding privacy-protection. Apart from this challenge, the MFA should also take societal challenges into account, particularly inequality related issues. Not properly ensuring that women can benefit from the Future of Work might increase gender inequality and the digital divide in the Ethiopian society. High illiteracy is another problematic factor in this regard. On a brighter note, however, new digital literacy efforts (using visuals instead of text) can function as a great circumvention of this issue.

The recommendations mentioned in this paper are in line with the MFAs' BHOS policy agenda and various Sustainable Development Goals. Additionally, the recommendations made in this paper are also in line with policies pursued by the Ethiopian government and can function as important building blocks for an improved bilateral relation with the Ethiopian Government. Overall, however, this policy paper seeks to fundamentally improve the living and working conditions of young Ethiopian smallholder farmers. Once again establishing the agricultural sector as an attractive sector can create a more positive outlook for young Ethiopians growing up in rural areas. Furthermore, a booming tech-sector developing relevant applications using acquired data will create additional decent jobs and could positively impact the productivity and efficiency of the agricultural sector.

On behalf of every member of the DDE/DSO-track of the West Wing '18-'19, we hope that our thoughts and ideas on the Future of Work in Ethiopia will serve as an inspiration for further policy development.



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INTRODUCTION

“The Future of Work consists of learning a living” - Marshall McLuhan

The *Future of Work* is shaped by trends that come out of the ongoing process of the interaction between technological innovation and societal developments. It has the potential to transform the labor market and the nature of work. It will affect the quantity and quality of jobs, productivity and efficiency. At the same time, it is also feared that, without decisive actions, unemployment and inequality will rise.¹ Technological innovations—such as big data, automation, robotization, the internet, artificial intelligence and online platforms—are enabling people to work in new ways and play a key role in the opportunities and challenges regarding the Future of Work.²

The trends around the Future of Work are very complex and uncertain, and therefore highly debated. This makes it challenging for governments and the private sector to prepare for its effects. To make matters more difficult, research has been done on the trends of the Future of Work in the developed world, but much less so in a developing context. The current state of affairs regarding the use of technology, the digitalization of economies and demographic trends in Sub-Saharan Africa is not directly comparable to the transformations of the developed world. One such significant difference is that Africa has the youngest population of the world, which will continue to grow in the coming decades, whereas most developed countries have an aging population.

Therefore, research on the potential effects of the Future of Work specific to developing regions, such as Sub-Saharan Africa, is needed. It is for this reason the departments of sustainable economy and social development (DDE/DSO) of the Ministry of Foreign Affairs (MFA) have asked The West Wing the following question.

“How can Dutch Foreign Trade and Development aid policy tools aimed at vocational training, youth employment and young entrepreneurship play into the expected effects of the Future of Work?”

Insights from this inquiry could contribute to more informed policy making and improve targeted investments and aid, in line with Dutch development policies and the Sustainable Development Goals (SDGs). The Dutch policy document *“Investeren in Perspectief”*³ aims to create more stable employment and wants to strengthen and modernize the agricultural sector. Furthermore, research on the Future of Work could also contribute to reaching the SDGs by 2030. SDG8 *“Decent Work and Economic Growth”* is of high relevance, but work also has a significant impact on other SDGs (such as SDG1 *“No Poverty”*, SDG2 *“No hunger”*) and big questions about gender equality and food security.

¹ OECD, “Future of Work and Skills.”

² International Labour Organization, “Work for a Brighter Future – Global Commission on the Future of Work.”

³ Ministerie van Buitenlandse Zaken, “Beleidsnota Investeren in Perspectief.”

Justification of and Introduction to Ethiopia

This analysis has been conducted in a specific context. This choice has been made to avoid overgeneralizations and to take unique workforces and differing political and socio-economic characteristics fully into account. To go more in depth this policy paper focuses on one country in that region: Ethiopia. Furthermore, this policy paper takes note of the aims expressed in the Dutch foreign policy document *“Investeren in Perspectief”* to create more stable employment, and to strengthen and modernize the agricultural sector in a developing context. Therefore, the scope of this policy paper covers the impact of the *Future of Work in the Ethiopian agricultural sector*. By means of this focus, this policy paper seeks to lay down the necessary building blocks for further discussion of the potential impacts of the Future of Work on Ethiopia.

Like most other countries in Sub-Saharan Africa, Ethiopia’s population is rapidly expanding. The current population growth is estimated to be around 2.8%, with a fertility rate of 4.9 children per woman. The current population size is 108 million, which makes Ethiopia the second most populated country in Africa. The population is not expected to stabilize until 2100, at about 250 million people. As a result, the average age is low and more than 40% of the population is under 15 years old. Therefore, Ethiopia will face the challenge of finding sufficient employment for its ever-expanding labor force within the coming decades.⁴ This challenge calls for in-depth investigations into the future of the labor market.

First, to better understand the employment opportunities in Ethiopia, a brief overview of the Ethiopian economy follows. Services and agriculture are the main contributors to Ethiopia’s overall GDP, both amounting to around 40%. The industrial sector contributes the remaining 20% and has increased in size rapidly over the last years, mainly due to a construction boom. Manufacturing services have remained constant at about 4%. The rate of employment is divided very differently across the sectors. The far majority of jobs, over 70%, is found in the agricultural sector. Industry and services respectively provide for 7 and 20% of jobs.⁵ Furthermore, the informal economy is very important for the overall economic performance of countries in Sub-Saharan Africa, and Ethiopia is no exception.

Unemployment rates in Ethiopia are between 15 and 20%. Youth unemployment currently remains under 10%, but with three million young people entering the labor force each year, this number is likely to increase rapidly. Besides unemployment, underemployment merits attention. Another issue which merits attention is inequality in employment, as fewer women than men participate in the workforce and unemployment and underemployment is higher in urban areas than in rural areas.⁶

Most Ethiopians currently live in rural areas: only 20% of the population lives in urban areas. Agriculture is not a very popular sector for seeking labor opportunities, which is one of the many factors that contributes to the high rate of urbanization in Ethiopia. The urbanization rate is currently over 5%, meaning that cities expand rapidly. This puts pressure on the urban labor market, and will drain the rural

⁴ Central Intelligence Agency, “Africa :: Ethiopia — The World Factbook - Central Intelligence Agency.”

⁵ World Bank, *Ethiopia Economic Update: The Inescapable Manufacturing-Services Nexus*.

⁶ Broussard and Tekleselassie, “Youth Unemployment: Ethiopia Country Study.”

labor market in the long run.⁷ On top of that, rural families are overall poorer, dependent on agriculture, and less resilient to economic shocks compared to urban families, augmenting inequalities between rural and urban areas.⁸

Another rural-urban inequality is the low level of internet penetration in rural areas. The average internet penetration is 15%, which lies far below the continental average for Africa. The lack of access to internet is mainly due to underdeveloped telecommunications infrastructure. Such infrastructure is often close to non-existent in rural areas. If internet access is available, the connection speed is generally slower in rural areas than in urban areas. Internet access also varies between different groups in society. Statistics on social media usage demonstrate that youth between 18-34 represents 82% of all social media users, with a greater representation of men compared to women, 73% and 27% respectively.^{9 10}

The quality of education in Ethiopia has been and continues to be underdeveloped. This issue affects women more than men. Despite equal attendance, female literacy is only 40%, compared to 60% of male literacy. Furthermore, education levels are lower among the rural population compared to the urban population. A recent UNICEF report demonstrated that twice as many children in rural areas do not have access to education compared to children in urban areas. On a more positive note, literacy rates among younger age groups are higher.¹¹

Additional gender inequalities exist in the agricultural sector. Legally, women are able to own land. However, it is not culturally accepted for women to individually perform all agricultural duties. As a consequence, women are often unable to own and manage farms independently. Another inequality in the Ethiopian society runs across the lines of ethnicity. Regions in Ethiopia are generally divided by ethnicity, with one dominant ethnicity in most areas. As some regions are much more developed than others, some ethnic groups hold a significantly stronger socio-economic position. Concludingly, the inequality between genders, ethnic groups, and rural and urban areas are—in the context of this policy paper—the most relevant societal inequalities in Ethiopian society.

Finally, Ethiopia is currently subject to politically tumultuous times. Newly appointed PM Abiy has come with a grand vision to economically and politically liberalize Ethiopia, while pursuing a transformation of the economy as well.¹² Aside from PM Abiy indicating he seeks greater private sector involvement, the Growth and Transformation Plan II (GTP II)¹³—the government's economic development program—provides an overview of his intended reforms.

⁷ Ozlu et al., "Ethiopia - Urbanization Review."

⁸ Demissie and Kasie, "Rural Households' Vulnerability to Poverty in Ethiopia."

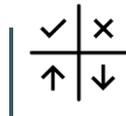
⁹ FreedomHouse, "Ethiopia."

¹⁰ Kemp, "Digital in 2018."

¹¹ UNESCO Institute of Statistics, "Data for the Sustainable Development Goals: Ethiopia."

¹² "2nd Quarter 2019."

¹³ Ethiopia National Planning Commission, "Second Growth and Transformation Plan (GTP II)."



METHODOLOGY: SWOT

This policy paper takes a Strength-Weaknesses-Opportunities-Threats (SWOT) analysis approach to substantiate its policy recommendations to the DDE/DSO departments of the Ministry of Foreign Affairs (MFA). The SWOT analysis is a tool for strategic planning purposes and maps the strengths, weaknesses, opportunities and threats of the Future of Work for smallholder farmers in Ethiopia. The strengths and weaknesses will reflect the internal current situation considering the effect of four chosen manifestations of the Future of Work for smallholder farmers in Ethiopia. The opportunities and threats reflect a hypothetical situation in which the manifestations will be further developed by external parties, for example through the Dutch development policy.

These SWOT analyses assess four different manifestations of the Future of Work within the context of smallholder farmers in Ethiopia. To this end, an extensive literature review has been performed and interviews have been conducted with experts on the Future of Work and the agricultural sector in Ethiopia.

The manifestations that we have chosen are **mechanization**, **online platforms**, **big data**, and **artificial intelligence (AI)**. Although different studies on the Future of Work highlight different effects, we have chosen the manifestations assessed in this policy paper for the following reasons. First, we focused on the manifestations which are most relevant in the context of developing countries. Second, we prioritized manifestations that could feasibly be addressed from a Dutch development policy perspective. Other manifestations of the Future of Work, such as the rise of the gig economy, or a rapidly growing and urbanizing young workforce will therefore not be analyzed in this SWOT analysis.



SWOT 1: Mechanization

Mechanization in the context of agriculture refers to the process of the increase in the use of machinery in agricultural work.

Although mechanization is not *the* most revolutionary aspect of the Future of Work, it has always been a driver of enormous change in the agricultural sector all over the world. It helps to increase productivity, meaning more output can be achieved with the same land-tile. Mechanization in agriculture can refer to any size of machinery, from small manual handheld devices independent from electricity to large agricultural machines such as combine harvesters.

MECHANIZATION IN ETHIOPIA

The majority of the Ethiopian labor force is currently employed in the agricultural sector—70%—, of which self-employed smallholder farmers form the largest share. The government has appointed the agricultural sector as the main driving force of the Ethiopian economy and has consequently been investing in the sector since 2010 in its first Growth and Transformation Plan. According to Ethiopian officials and the GTP 2.0, investing in high-tech mechanization plays an important role in their efforts to improve productivity. Given Ethiopia's high (expected) population growth rate¹⁴, and the fact that currently a portion of the population is dependent on food aid¹⁵, increasing productivity is an important priority. Currently, only a small percentage of Ethiopian smallholder farmers is able to use mechanized tools on their lands.¹⁶ With an average of 80% of agricultural plots currently prepared by animals, compared to 0.7 percent by machines, the productivity level can indeed still be improved by much.

STRENGTHS

No internet access required

As noted previously, internet access in Ethiopia is deficient. A strength of mechanization is therefore that it does not necessarily require internet access. Especially low-tech agricultural machinery can usually operate without access to or know-how of the internet.

¹⁴ United Nations, "World Population Prospects. The 2017 Revision. Volume II."

¹⁵ USAID, "Food Assistance Fact Sheet - Ethiopia | Food Assistance | U.S. Agency for International Development."

¹⁶ Berhane, Hirvonen, and Minten, "Synopsis: Agricultural Mechanization in Ethiopia: Evidence from the 2015 Feed the Future Survey."

Mechanization improves agricultural productivity

Mechanization has enormous practical relevance to the Ethiopian agricultural sector and has already shown its ability to boost agricultural productivity. Smallholder farmers that have mechanized their means of production have also drastically increased their agricultural yields.¹⁷ Simple tools such as seed drilling machines, for instance, can already double the yield of certain types of crops.

Educational programs

A wide range of substantial education programs for agricultural businesses, geared towards providing technical training and stimulating the use of simple machinery, are already in place.¹⁸ Such trainings are provided by several foreign organizations active in Ethiopia, such as the GIZ. Consequently, a basis of knowledge for the use of machinery in the agricultural sector has already been laid down, providing fertile ground for the stimulation of further mechanization. A critical side note to this strength is that most of these developments have been limited to larger commercial farms, instead of smallholder farmers.

WEAKNESSES

Practically difficult to successfully implement

The characteristics of the Ethiopian agricultural sector pose serious difficulties to switching to mechanical farming. Ethiopian smallholder farmers lack capital to invest in agricultural machinery. Moreover, the use of machinery on small and scattered agricultural plots is rarely cost-effective.

Additional investments in commons required

Mechanizing Ethiopian smallholder farmers will only be beneficial if they also improve access to (local) markets or other parts of the value chain through infrastructural investments. For instance, a tractor designed to carry heavy weights around a smallholder farm is not very useful when it is unable to reach the nearest market due to lacking basic infrastructure. Mechanization in isolation is therefore rarely sufficient by itself in improving smallholder farmers' productivity.

Difficult to maintain mechanization progress

As mentioned earlier, mechanization is often achieved with support from foreign donors, who provide funding and required training on how to operate these machines.¹⁹ ²⁰ The difficulty, however, lies in providing the tools and knowhow to use and repair such mechanized tools over time. In other words: to ensure adequate maintenance. Often, either such knowledge is lacking, or the funds to support repairs of machinery dries up, rendering it useless over time.

¹⁷ Sims and Kienze, "Making Mechanization Accessible to Smallholder Farmers in Sub-Saharan Africa."

¹⁸ GIZ, "Agricultural Mechanisation & Rural Employment."

¹⁹ Rijksdienst voor Ondernemend Nederland, "Appropriate Solutions for Mechanisation of Agriculture in Ethiopia | RVO.nl."

²⁰ GIZ, "Agricultural Mechanisation & Rural Employment."

OPPORTUNITIES

Government initiatives

The GTP II by the Ethiopian government acknowledges that the agricultural sector is the country's most important engine for economic growth and poverty alleviation.²¹ To use this potential, the Ethiopian government has initiated, for example, a leasing program for tractors and other machinery and training for smallholder farmers on increasing agricultural yields. The Ethiopian Government particularly seeks to empower female and young farmers in rural areas to escape from poverty through the introduction of new farming techniques. Efforts by the MFA to improve productivity of smallholder farmers could thus potentially benefit from the momentum provided by governmental investment commitments. This way, Initiatives to employ mechanization to promote the agricultural sector in Ethiopia can address inequality issues as well.

Mechanization creates new jobs

Provided the required investments and improvements are made, mechanization of farming could create job opportunities in stages both before and after usage of machines by farmers.²² The GIZ have provided an overview of all potential jobs that could be created in a spillover effect from mechanization. All these jobs have as added benefit that they can be located in rural areas and could thus aid in slowing rapid urbanization down.

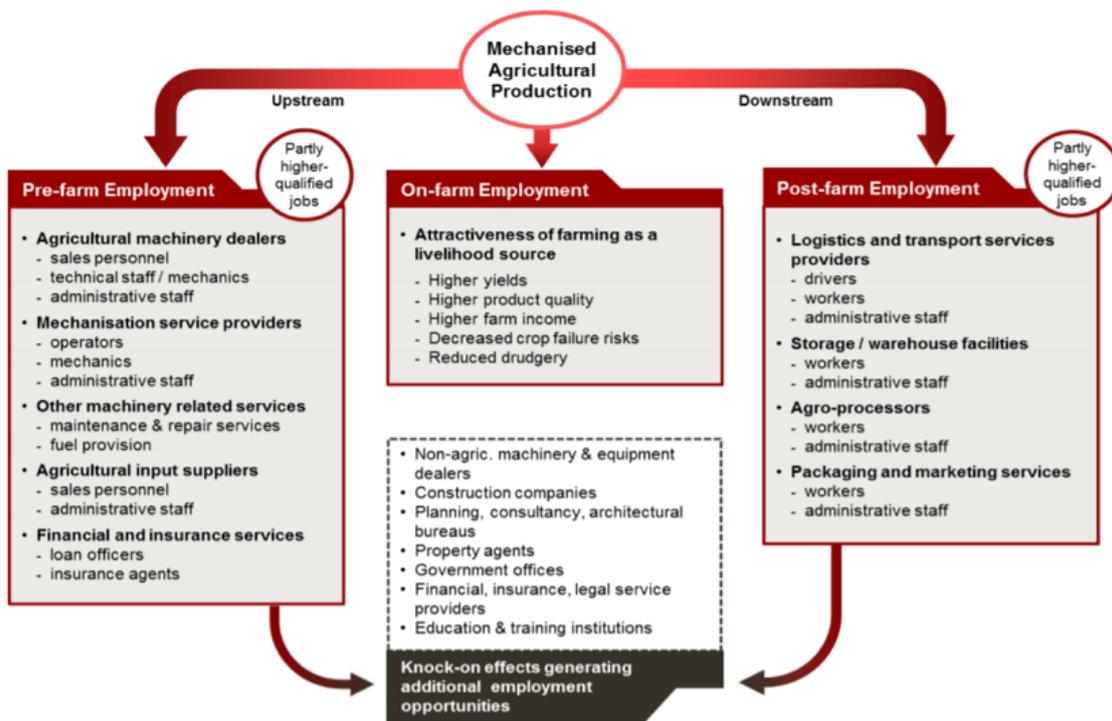


Figure 1 Direct and indirect employment effects of mechanized agricultural production ²³

²¹ Lie and Mesfin, "Ethiopia."

²² GIZ, "Agricultural Mechanisation & Rural Employment."

²³ GIZ.

THREATS

Gender inequality

In general, the agricultural sector in Ethiopia—smallholder farming in particular—is characterized by a strict and traditional division of tasks between men and women.^{24 25} Many of the economic benefits of introducing new methods in farming can simply bypass women altogether. Specifically in relation to machinery, there is traditionally a heavy reliance on the husband or male relatives to own and use machinery. Thus, while mechanization might increase productivity, if implemented with limited regard for this social reality, it could also exacerbate gender inequality.

Geology and climate

Ethiopia's geological layout makes it extremely difficult to adopt a *one size fits all*-approach in terms of mechanization, as there is great diversity in soil build-up. Soil build-up and specific terrain conditions are therefore already crucial to take into account when seeking to implement mechanization strategies.²⁶ The Ethiopian agriculture is moreover very dependent on annual periods of rainfall. Climate change is already causing more droughts in recent years.²⁷ Therefore, due to climate change, mechanization strategies will require water conservation and protection of soil build-up, which in turn will require even more investments over time.

²⁴ Bayeh, "The Role of Empowering Women and Achieving Gender Equality to the Sustainable Development of Ethiopia."

²⁵ Aregu et al., "Opportunities for Promoting Gender Equality in Rural Ethiopia through the Commercialization of Agriculture."

²⁶ Anrys, "Ethiopië boert goed, maar kiest helaas opnieuw voor extensieve landbouw." and Marleen Dekker, personal communication, 2019

²⁷ USAID, "Crisis in Ethiopia - Complex Emergency | U.S. Agency for International Development."



SWOT 2: Online platforms

The term *online platforms* is used here to refer to both online knowledge platforms as well as digital labor platforms.

Online platforms allow people to connect (Facebook), to share information (Reddit), and even exchange services and goods with one another (Uber). With over 4 billion internet users worldwide, online platforms have already fundamentally changed societies across the globe. Online platforms have also entered the global labor market, allowing employers and employees to find one another through an application such as LinkedIn. Countless other websites exist where employers place advertisements that employees can respond to.

ONLINE PLATFORMS IN ETHIOPIA

In Ethiopia 4% of the population is active on social media, translating to a total of 3.8 million social media users.²⁸ Of these users, the vast majority (82%) are young Ethiopians between the ages of 18 and 34. Furthermore, various startups already make use of the internet to spread knowledge on online platforms and facilitate the linkage of different stakeholders, including youth, women and farmers. This includes initiatives such as *blueMoon*, a highly competitive incubator program,²⁹ or *Digital Green*, which spreads instructional videos enabling farmers to share knowledge with one another.³⁰ Online platforms such as these facilitate knowledge-sharing within and between communities. Different digital labor platforms exist for both the public and private sector, as well as for freelance work, where employers and jobseekers can post and respond to job offers (e.g. employethiopia.com, jobwebethiopia.com, ezega.com, esework.com). These platforms are frequently visited (Ethiojobs.net for instance ranked 8th in the most visited websites by Ethiopians in 2018).³¹

STRENGTHS

Facilitate best practice sharing more effectively

Online platforms are already connecting consumers and suppliers, and facilitate information sharing in the agricultural sector in Ethiopia. If online platforms for agricultural information would be widely accessible to smallholder farmers it could greatly improve best practice sharing initiatives. Various initiatives already exist to improve best practice sharing in the (smallholder) agricultural sector. The MFA itself, for instance, is part of such a project in collaboration with the Wageningen based CDI.³² Online platforms could vastly improve the scale, speed, and efficiency of best practice sharing: a larger group of smallholder farmers would be able to share their knowledge instantly, while beneficiaries could be rapidly identified and supplied with relevant information.

²⁸ Kemp, "Digital in 2018."

²⁹ "BlueMoon: About."

³⁰ "Digital Green: Homepage."

³¹ Kemp, "Digital in 2018."

³² "CASCAPE - Capacity Building for Scaling up of Evidence-Based Best Practices in Agricultural Production in Ethiopia."

Online platforms aid formalization

Online platforms bring formalization to sectors of the economy by storing all information regarding transactions and labor online.³³ Storing such information transparently can be a big help in enforcing labor or land rights sectors where transparency or information is still missing. If we use labor platforms as example: they make regulating labor much easier. Working conditions, such as salary and working hours, can be kept track of much easier.³⁴ By facilitating formalization, online platforms can also help foreign businesses operate in Ethiopia by decrease information deficiencies they face.

Complements governmental internet access ambitions

Online platforms can function for the labor market as long as internet access is available. They do not (necessarily) require high entry costs or maintenance costs from their users, in contrast to mechanization. They also do not necessarily require a certain threshold of users to be functional, in contrast to big data and AI (to be discussed later). Online platforms' reliance on internet access makes this manifestation of the Future Work complimentary to already existing governmental ambitions. In GTP II, the government has expressed the ambition to improve internet access to 56 million internet service subscribers and 100% use of internet through mobile devices by 2020.³⁵ A big benefit from online platforms is therefore that the government's current ambitions will already support this manifestation taking shape in Ethiopia.

WEAKNESSES

Benefits will not extent to rural smallholder farmers

Despite online platforms already existing, their benefits do not extent to rural smallholder farmers. Due to lacking internet access in rural areas, online employment advertisements, for instance, are often geographically limited to Addis Ababa and the surrounding area, and rarely include rural job offers, let alone in the agricultural sector. Furthermore, despite the government's ambition to improve internet access, it is unclear to what extent improved access in rural areas is realized. This complicates smallholder farmers enjoying from the benefits of online platforms at all.

Existing online platforms underused

In addition to online platforms not extending to rural areas, their presence alone does not guarantee their use. A study in Ethiopia's banking sector demonstrated that only 61% of investigated commercial banks possessed a webpage on which job offers could be advertised, and companies make little use of the opportunities of social media.³⁶

³³ Janine Berg, "Digital Labour Platforms and the Future of Work."

³⁴ "Realizing Human Potential in the Fourth Industrial RevolutionAn Agenda for Leaders to Shape the Future of Education, Gender and Work."

³⁵ (Dr.) Yinagre Desie, "Growth and Transformation Plan II (GTP II) (2015/16-2019/20) Volume I: Main Text."

³⁶ Kebede, "Adoption of E-Recruitment in the Ethiopian Banking Industry."

OPPORTUNITIES

Role Models

The overrepresentation of young people as social media users does not only suggest online platform usage will grow over time, but will also provide young role models a platform to reach their peers. Role models could play a key role in promoting young entrepreneurship. They could also play a key role in inspiring young women and change societal wide held conceptions on gender roles, or change perceptions about other marginalized groups through online platforms.³⁷

Lifelong learning programs

By continuously allowing participants to share information, online platforms could potentially play an important role in providing lifelong learning opportunities for smallholder farmers. To empower smallholder farmers and particularly marginalized groups in being able to benefit from the Future of Work, lifelong learning opportunities are needed update (online) skills and digital developments.³⁸ The UNESCO Institute for Lifelong Learning has already setup programs focusing on connecting skills with the generation groups. An example is the Advancing Mobile Literacy Learning Project in 2015, in which adults were taught basic computer skills.³⁹ Online platforms could enlarge the scope of such projects.

THREATS

Cultural/ethnic based inequalities: model farmers

Just as online platforms could potentially offer role models the opportunity to decrease inequalities in Ethiopia, it could also backfire. Model farmers are chosen by the national government to reach local communities in their area. However, these model farmers are often originating from dominant ethnic majorities that already have access the political networks to become such a model farmer. To make matters worse, they can limit their information sharing activities to their dominant network. This would entrench inequalities and defeat the purpose of role models.⁴⁰

Crowding out local businesses

Online labor platforms such as Uber have been met with resistance in some Sub-Saharan countries as they threaten the incomes livelihoods of other employees in that sector. In Kenya, Uber drivers have reportedly even been attacked and had their cars set on fire.⁴¹ By moving the labor market for a specific type of employment online, the inflow of new labor can crowd out those already active in the profession. When carelessly introduced, online labor platforms can cause more harm than good.

³⁷ Gella and Tadele, "Gender and Farming in Ethiopia."

³⁸ Janine Berg, "Digital Labour Platforms and the Future of Work."

³⁹ "Advancing Mobile Literacy Learning | UIL."

⁴⁰ Leta et al., "Social Learning in Smallholder Agriculture."

⁴¹ "Africa's App-Based Taxis Battle Uber over Market Share | Africa Renewal."



SWOT 3: Big data

Big data is defined as 'large volumes of digital data capturing the physical world, which can be combined and analyzed in order to reveal patterns, trends and associations'.⁴² Big data presents one of the major IT developments expected to have considerable impact on the labor market of the future, including the agricultural sector.

Data for big data analyses in the agricultural sector can be collected through various technological mechanisms, such as GPS, sensors, geo-mapping, assisted and automatic guidance steering systems, electronic communication, drones and satellites.⁴³ In literature, big data solutions for Agricultural purposes is referred to as 'smart farming'⁴⁴ or 'precision agriculture'.⁴⁵ Access to analyses offered by big data applications allows farmers to make more informed decisions.⁴⁶ An example of Big data being applied in agriculture in Ethiopia is the Wageningen University & Research based project 'Innovation Mapping for Food Security (IM4FS)', which helps Ethiopian farmers in isolated areas select their crops with big datasets on climate risks, markets and financial capabilities of the farmer.⁴⁷ The untapped potential of big data analysis in developmental agriculture is widely acknowledged in academic literature, as most existing research on big data in agriculture is focused on developed countries.

BIG DATA IN ETHIOPIA

In Addis Ababa, small organizations and companies in computer technology and IT that can provide digital products such as big data applications, are starting to emerge. In 2015, the Ministry of Trade and Industry identified more than 700 computer technology companies and 95 software businesses, which are generally active both domestically and abroad.⁴⁸ These companies will be of vital importance for the further development of the IT sector in Ethiopia, including big data applications for the agricultural sector.

STRENGTHS

Big Data improves agricultural productivity

The use of big data mechanisms to reform and optimize agricultural processes is based on assessments of large-scale datasets of agricultural information. An example of such a coordinated, large-scale project is The Ethiopian Soil Information System (EthioSIS), that has mapped up-to-date soil fertility data since 2012, which can be used to advise regions on for example fertilizers.⁴⁹ Furthermore, when provided datasets are formatted adequately, the possibility to integrate different datasets can amplify its effects. Hypothetically, a practical example of this could be to combine weather statistics with the aforementioned Ethiopian Soil Information System to assess the effect of different weather environments on fertility rates.

⁴² This definition is partly based on OECD, "How Digital Technologies Are Impacting the Way We Grow and Distribute Food."

⁴³ Pham and Stack, "How Data Analytics Is Transforming Agriculture."

⁴⁴ Kamilaris, Kartakoullis, and Prenafeta-Boldú, "A Review on the Practice of Big Data Analysis in Agriculture."

⁴⁵ Pham and Stack, "How Data Analytics Is Transforming Agriculture."

⁴⁶ OECD, "How Digital Technologies Are Impacting the Way We Grow and Distribute Food."

⁴⁷ "Ontwikkelingsprijs voor Wageningen project in Ethiopië."

⁴⁸ Galbraith, "Artificial Intelligence Catches Fire in Ethiopia."

⁴⁹ CGIAR, "The Ethiopian Soil Information System (EthioSIS)."

WEAKNESSES

Lacking internet access

Big datasets are most commonly established, grown, and distributed with the aid of the internet. Access to such datasets, therefore, is almost exclusively dependent on internet access. This requires both internet penetration and devices to enter the internet. Although mobile devices are rapidly spreading, internet penetration is severely lacking, especially in remote areas in Ethiopia. It is therefore difficult for smallholder farmers to access big datasets. Furthermore, Internet freedom in Ethiopia is not self-evident: NGOs have reported the Ethiopian government at times shuts down the internet in certain areas for certain periods of times.⁵⁰ Such lacking freedoms makes improving internet access all the more difficult.

Limited data collection

Since big data applications require structural long-term data collection on a large scale, a proper infrastructure for such data collection is essential. The Central Statistical Agency (CSA) of Ethiopia collects data on a structural basis, through censuses and surveys. However, the data collected by the CSA is severely limited and insufficient for usage in big data applications as it suffers from inadequate resources, limitations in methodologies, use of outdated data, lack of coherence in data related principles and standards, and data verification.⁵¹

Financial barriers and increasing inequities

Given their scale and the time needed to make them effective, big data applications are expensive investments to set up. As datasets increase in size and collected from various different sources, the process of data cleansing and analysis becomes very complex and thus even more costly.⁵² Due to this financial barrier, big data applications are mostly designed for large scale farmers, and financially unfeasible for smallholder farmers. Consequently, big data applications are not only expensive, but can also increase existing inequities. To allow single smallholder farmers to benefit from big data analyses, farmers would need to engage in large collaborations.

Societal and governmental focus on 'traditional farming'

Farmers in Ethiopia are not yet significantly incentivized to transform to more advanced, 'smart farming' production techniques. Ethiopian officials expressed that traditional farming is held in high regard in society, and new agricultural technologies are rarely adopted on a large scale, as they can be seen as a potential threat to the current way of farming.⁵³ Particularly the older agrarian population tends to be less actively involved in the implementation of new technologies and technological innovation.

⁵⁰ Taye, "Old Habits Die Hard."

⁵¹ Melka, "UNDP: Ethiopia's Data Ecosystems: African Data Report."

⁵² 'Data cleansing' refers to the process in which parts of datasets which are unfinished, unreliable, inaccurate or irrelevant are identified and removed.' McGuire, "4 Ways Big Data Will Have an Impact on Future Workplaces."

⁵³ Comments gained in conversation with Ethiopian officials at the embassy in The Hague.

OPPORTUNITIES

Reducing environmental degradation

About 15% of the land in Ethiopia is arable and used by a large number of smallholder farmers, currently characterized by its low productivity.⁵⁴ In addition, one of Ethiopia's largest agricultural challenges is environmental degradation.⁵⁵ For example, soil erosion poses a significant risk to smallholder farmers and their livelihood. Big data could play a key role in reducing overall environmental degradation as a result of agriculture, by mapping its effect on large scale ecosystems. With this information, Ethiopia's agricultural commons can be more sustainably managed.

Improving cooperation in the agricultural sector

Big data's high implementation costs could serve as a catalyst towards greater cooperation among farmers in Ethiopia. Whereas larger mechanization tools would require farmers to be collectively responsible for sharing and maintaining them, big data applications do not necessarily require to be present as a physical tool. By using platforms for big data in agriculture, farmers would only have to combine funds, and thereby maintaining the possibility to practice small-scale farming.

THREATS

Smallholder farmers outcompeted

Big data are increasingly prevalent in the daily practice of large agricultural firms in developed countries. This might decrease the competitiveness of smallholder farmers in developing countries, due the high entry costs and the required infrastructure. Consequently, larger farmers, both domestic Ethiopian farmers as well as foreign competitors, who can afford such technologies might threaten the livelihoods of smallholder farmers. This may further increase economic inequality between farmers in Ethiopia and the rest of the world.

Misuse of data

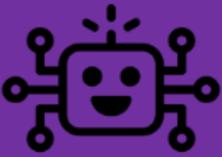
The large-scale use of data sets in agriculture poses legal and ethical questions and threats regarding data protection rights. Particularly pressing are questions regarding data ownership, the obligations of agricultural companies as data processors, the rights of individuals as data subjects whose personal data may be included in big data sets, and the enforcement mechanisms through which to ensure that sufficient respect is paid to the security of data processing mechanisms and privacy rights.⁵⁶ Big data applications developed by companies and organizations outside the EU are not obliged to ensure that the rights of people whose data might be processed are taken into account.⁵⁷ Privacy rights could be threatened, for instance, by collecting individual farmers' production or sales statistics. Such information falling in the hands of competitors could negatively influence the livelihoods of (smallholder) farmers.

⁵⁴ World Bank, "Arable Land (% of Land Area) | World Bank Indicators."

⁵⁵ Gebreselassie, Kirui, and Mirzabaev, "Economics of Land Degradation and Improvement in Ethiopia."

⁵⁶ Articles 7 and 8 of the European Charter of Fundamental Rights protect the right to privacy. The General Data Protection Regulation 2016/79 (GDPR) further regulates the right to privacy, i.e. the protection of natural persons with regard to the processing of data, and composes the most comprehensive and far-reaching privacy legislation in the world.

⁵⁷ Pursuant to article 3(1) of the GDPR, the rights and obligations enshrined in the GDPR apply to the processing of personal data in the context of the activities of an establishment of a controller or a processor in the Union, regardless of whether the processing takes place in the Union or not.



SWOT 4: Artificial Intelligence

Artificial Intelligence (AI) can be broadly defined as intelligent software that uses large data sets to develop algorithms autonomously. These algorithms become increasingly effective at their task as more data is added. Well-known examples of AI applications are self-driving cars, voice recognition software and advertisement algorithms.

AI is likely to replace much of the routine work in the future labor market. It also has the potential to enhance the capacity of workers in their non-routine tasks, which is expected to increase productivity. The agricultural sector is already benefiting from AI applications and the first AI solutions in Sub-Saharan Africa are rapidly emerging. AI solutions currently developed for the agricultural sector in Sub-Saharan Africa are based on visual recognition software. At the individual crop level, smartphone applications can detect crop diseases and deficiencies based on photos.⁵⁸ At a larger scale, companies offer analytical products based on AI software that use satellite and drone imagery to map whole regions and crop rows with stressed plants, which helps to identify irrigation priorities.⁵⁹

AI IN ETHIOPIA

The first AI research space is called iCog Labs, which started with four employees in 2013 and currently employs dozens. They helped to develop Sophia, the first humanoid robot.⁶⁰ Besides developing AI solutions, the company functions as an outsourcing company for international clients. Unfortunately, as indicated by the CEO of iCog Labs, the company has not yet been able to do local projects.⁶¹ In most African nations, most of the necessary conditions (e.g. high internet penetration, abundance of data gathering tools) for AI applications to be effectively implemented are absent. However, low price levels and low labor costs could allow these countries to compete against developed countries and their higher labor costs in AI application development, as well as the IT sector as a whole.

STRENGTHS

Increasing competitiveness for Ethiopian smallholder farmers

AI has great potential in the agricultural sector. An advantage of AI applications over, for example, mechanization improvements is that this technology is rather affordable. As a rule, algorithms become better at what they are programmed to do when more data is added. Consequently, an increase in the number of users and data contributors of AI applications equates to an increase in the quality of AI applications. AI developers thus have an incentive to, initially, bring their product on the market at a low price to allow for as much data input as possible, thereby improving the product over time. Affordable technological improvements that become more cost-effective as more people use it are especially an advantage in Ethiopia's case due to its large share of smallholder farmers in the agricultural sector: these are all potential users of AI applications. Such applications could allow for better crop quality, improving overall competitiveness of smallholder farmers in Ethiopia.

⁵⁸ Samuel, "EskaeCrop: High-Tech Agriculture."

⁵⁹ Aerobotics, "Aerobotics."

⁶⁰ Lewton, "Futurists in Ethiopia Are Betting on Artificial Intelligence to Drive Development."

⁶¹ Yohannes, "Ethiopia."

Compatibility with Dutch businesses

Aside from agriculture, agrifood and agribusiness being Dutch business strongholds, the Netherlands is also currently one of the global market leaders in the development of AI solutions and applications. An increase in the demand for AI applications in the agricultural sector will therefore open up even more opportunities for cooperation between Dutch and Ethiopian businesses.

WEAKNESSES

Deficient internet access

For AI applications to become more precise and affordable, its user group needs to be as large and representative as possible. As noted before, internet penetration is low and mainly confined to urban areas. If AI applications for smallholder farmers rely on internet connection, they will be unusable. The current internet infrastructure outside of urban areas is thus insufficient, and even provides a difficult environment for AI applications which can function offline and only occasionally require internet connection.

Current research focused on developed countries

Current research and development in the field of AI focuses almost exclusively on the developed world. As a consequence, most of the data for these applications is collected exclusively in developed countries. Since AI applications' algorithms are based on the data they are provided, they cannot simply be exported to a developing context; the process of data collection will have to start from scratch. This makes it more challenging for potential Ethiopian AI users to adopt this innovation.

Relevant education levels are low

One reason the agricultural sector in Ethiopia does not have sufficient capabilities to instigate research and development in AI by itself is the lack of knowledge on programming and other relevant skills. Without these skills, combined with continued high demand in R&D in developed countries, it is unlikely this demand from the Ethiopian smallholder agricultural sector will be met any time soon.

OPPORTUNITIES

Spillover effects

AI applications can have a significant spillover effect beyond the agricultural & IT sector. In other words, the introduction of AI for agriculture in the developing context could open the door to many more applications and benefits in different areas of the economy. Examples include the use of online platforms as employment matchmakers; offering delivery services via applications that will be able to efficiently calculate the most efficient routes, thereby offering more smallholder farmers to join supply chains; and the generation of revenue by outsourced orders from developed countries, increasing the availability of capital in Ethiopia.

Increased competitiveness of the Ethiopian IT sector

Low labor costs in Ethiopia have already caused businesses from developed countries to outsource IT activities to Addis Ababa. The company iCog, mentioned above, presents an example. If the younger part of the Ethiopian labor market were to receive training in programming and other relevant skills, their large number would keep labor costs low enough for Ethiopia to have a competitive edge over other potential outsourcing countries. In addition to the aforementioned potential of AI applications to improve smallholder farmer competitiveness, AI could also improve productivity further up in the supply chain.

THREATS

Entrenching inequalities

If internet penetration is not extended to rural areas, existing inequalities between rural and non-rural areas will grow. When AI applications can only draw on a specific input of data—e.g. from farmers of a specific geographic region—it will be less widely applicable. Not deploying AI technologies inclusively could then further entrench existing inequalities. Moreover, inequality between Ethiopia and competing economies will increase if other agricultural economies around the world adopt AI applications and become more efficient quickly, without Ethiopia being able to easily copy their technology later on.

Risks to democratic values and privacy rights

A report by the World Wide Web Foundation indicates that Ethiopia's state operator Ethio-Telecom has a monopoly on internet access and intermittently shuts down internet access, mobile phone connections and social media sites and "used evidence from these channels to implicate and charge dissidents and critics". Governmental control over the internet thus poses a serious risk to democratic values and privacy rights. AI applications threaten to exacerbate this risk, as there is evidence to suggest "intelligence services are using machine intelligence techniques to break encryption and find patterns in social media quotes and that can be used to identify dissidents."⁶²

Foreign control over infrastructure and data storage

Despite the fact that AI is not commonly accessible in Ethiopia now, the government has reportedly begun integrating it in its security apparatus. Reports indicate that the government has started to collect facial imagery from CCTV cameras in Addis Ababa.⁶³ Furthermore, most of Ethiopia's telecom network has been built by ZTE and Huawei; two Chinese telecom giants.⁶⁴ China is already offering its AI surveillance technology to other Sub-Saharan nations.⁶⁵ Not only do such technologies raise serious ethical questions, but foreign control over paramount security apparatus infrastructures also raises concern of an unhealthy increase of foreign influence in Ethiopia. AI applications should, upon release, not be dependent on any form of foreign aid. For applications of AI to be applicable and affordable in Ethiopia for Ethiopians, and specifically for smallholder farmers, it is crucial for Ethiopian farmers and citizens to be involved in the development process themselves.

⁶² Panori, "Artificial Intelligence: The Road Ahead in Low and Middle-Income Countries."

⁶³ Panori.

⁶⁴ Dalton, "Telecom Deal by China's ZTE, Huawei in Ethiopia Faces Criticism."

⁶⁵ Hawkins, "Beijing's Big Brother Tech Needs African Faces."



POLICY RECOMMENDATIONS

Main Policy recommendation: Internet Access

With the exception of mechanization, every manifestation of the Future of Work in the Ethiopian economy, requires access to internet. Access to internet is no longer a luxury but is a basic necessity for growth and development. It is a powerful tool, with great benefits to all sorts of actors in the economy. Not just for large multinational corporations or the government, but also for rural smallholder farmers. Internet can play a crucial supporting role in increasing smallholder farmer productivity. It moreover allows for increased transparency and spillover improvements in governance, healthcare, education and services. For Ethiopia, ensuring internet access for its entire population is crucial in harnessing the benefits of the Future of Work. This is why this policy paper recommends the MFA to support relevant stakeholders in increasing inclusive, sustainable and open internet access for all Ethiopian citizens.

Further Policy Recommendations

The main takeaway is that internet access is required to benefit from the trends of the Future of Work, but various other recommendations can also be made. In making these policy recommendations, we kept in mind the aim of our policy paper: *having the Ethiopian agricultural sector, with a focus on smallholders, profit in an inclusive way on the long-run from technological developments related to the Future of Work*. The recommendations are categorized in six themes, in line with issues outlined in the introduction. These themes are: rural-urban divide, education, gender, employment and the informal economy, youth and (digital) infrastructure. All recommendations follow logically from one or more of the SWOT analyses.



1. IMPROVE THE POSITION OF WOMEN IN SMALLHOLDER FARMING		
<p>Issues:</p> <ul style="list-style-type: none"> -Gender -Education 	<p>Relevant SWOTs:</p> <ul style="list-style-type: none"> -Mechanization -Artificial Intelligence -Big Data -Online Platforms 	<p>Involved actors:</p> <ul style="list-style-type: none"> -Local schools -Local firms -Ethiopian Government
<p>Description:</p> <p>There is a cultural division in Ethiopian (rural) communities that can make improving the position of women more challenging. Every policy that is implemented to improve the position of smallholder farmers should take into consideration that it should also apply to women. There might be strong cultural objections to women performing certain work or attending schools. In implementing the policies, special attention has to be paid to make sure that the benefits are equally accessible to men and women, and do not aggravate gender inequality. For example, only support schools that are open to women, in places where women do not have access to schools, alternatives will have to be sought.</p>		



2. ORGANISE BEST FARMER COMPETITIONS

Issues:

-Education

Relevant SWOTs:

-Artificial Intelligence
-Big Data
-Online Platforms
-Mechanization

Involved actors:

-Dutch Embassy
-Dutch firms
-Smallholder Farmers
-Local NGOs
-Role models

Description:

To put utilization of Future of Work at Ethiopian farms in the spotlight, the Netherlands could organize a best farmer competition as the Dutch embassy in Uganda does, themed around the aspects of the Future of Work. For instance, a competition could be organized in which farmers are challenged to apply one or multiple digital tools to increase their productivity. Not only might the competition give the incentives to farmers to push beyond their current limits, it will also create awareness among smallholders regarding the potential for these developments and can stimulate knowledge exchange between the Netherlands and Ethiopia. Role models could play an important role in inspiring, educating and stimulating the farmers.



3. BUILD LOCAL KNOWLEDGE

Issues:

-Employment and the informal economy
-Education

Relevant SWOTs:

-Artificial Intelligence
-Mechanization
-Online platforms
-Big Data

Involved actors:

-Dutch firms
-Local firms
-Local education sector

Description:

Ethiopia should not completely rely on import for digital driven products, but investments should be made into building digital knowledge locally. High-tech digital skills are starting to develop and investment in local human capacity for this is necessary. If this is not done reliance on foreign firms or actors can impede efforts to develop capacity and products independently. Examples of how this can be done are setting up business incubators, exchanges, and aiding Dutch firms in building foreign research facilities, which in the coming years can work together with local entrepreneurs and thereby contribute to creating local capacity. This will help the local population to increase self-sufficiency on the long run, increases their ability to create local solutions for regional problems and provides a talent pool that will make increased knowledge exchange with the Netherlands possible in the future. Furthermore, localized versions of (digital) products could be developed, so that a larger share of the Ethiopian population can make use of these products. Knowledge of local terrain is vital for successfully implementing mechanization schemes as well. It is therefore highly recommendable to work locally with experts on the ground.



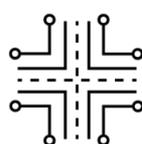
4. CONSIDER (DIGITAL) LITERACY		
<p>Issues:</p> <ul style="list-style-type: none"> -Gender -Education -Youth 	<p>Relevant SWOTs:</p> <ul style="list-style-type: none"> -Artificial Intelligence -Online Platforms 	<p>Involved actors:</p> <ul style="list-style-type: none"> -Local schools -Local firms -Ethiopian government -Local NGOs
<p>Description:</p> <p>In Ethiopia illiteracy continues to be a big problem. Providing tools or techniques for which people have to be literate to work with them will increase the divide between these two groups. One solution to this would be to work with visuals rather than words, so that also those not able to read or write can understand. Local firms could play a role in this process.</p> <p>A similar issue applies to understanding digitalization. Depending on age and education as well as other factors, some groups might have more difficulties understanding digital techniques. In some cases, people might barely be familiar with digital techniques at all. It should thus not be assumed that everyone knows equally well how to work with those developments, as this could put those that do not have that knowledge only further behind.</p>		



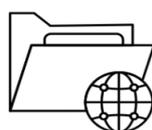
5. SUPPORT ONLINE EDUCATION		
<p>Issues:</p> <ul style="list-style-type: none"> -Education -Gender -Urban-rural divide 	<p>Relevant SWOTs:</p> <ul style="list-style-type: none"> -Artificial Intelligence -Big Data -Online Platforms 	<p>Involved actors:</p> <ul style="list-style-type: none"> -Dutch education sector -Local students
<p>Description:</p> <p>The Netherlands has some of the best AI & data analysis knowledge and education available. Supporting universities to create easily accessible MOOCs (Massive Open Online Courses) about these topics and translate them to languages spoken in Ethiopia which enables people to enhance their digital skills. This complements the already existing (online) courses available in Ethiopia. Top students can be supported with scholarships to pursue further study on this topic in the Netherlands. This supports fruitful knowledge exchange and insights and solutions from a local perspective. Dutch knowledge can then be used in supporting the local agricultural sector. To not further enlarge gender inequalities, extra attention should be paid to participation of women in such programs. It also offers a high level of education to regions far from any university, as long as internet access is in place. By educating people through online platforms, diverse groups in age, gender and in geographic locations will be reached.</p>		



6. SUPPORT FORMAL EMPLOYMENT THROUGH ONLINE PLATFORMS		
<p>Issues:</p> <ul style="list-style-type: none"> -Employment and Informal Economy -Youth -Gender 	<p>Relevant SWOTs:</p> <ul style="list-style-type: none"> -Online platforms 	<p>Involved actors:</p> <ul style="list-style-type: none"> -Ethiopian Government -Role models
<p>Description:</p> <p>The Ethiopian government should stay involved in online platforms, to stimulate job creation in the formal sector. Work facilitated through online platforms often comes in the form of freelance work. Freelance workers usually have a bad social welfare coverage and are prone to operate completely in the informal sector. Governments have to support financially rewarding options for formal freelance work, to avoid that people are pushed back into the informal economy. Also, the visibility of role models on online platforms is important to accelerate emancipation, inspiration, and career opportunities for youth and women in particular.</p>		



7. FOCUS ON AREAS WHERE THERE IS NO INTERNET ACCESS		
<p>Issues:</p> <ul style="list-style-type: none"> -Rural-urban divide -(Digital) infrastructure 	<p>Relevant SWOTs:</p> <ul style="list-style-type: none"> -Mechanization -Artificial Intelligence - Online Platforms 	<p>Involved actors:</p> <ul style="list-style-type: none"> -Local firms -Dutch firms -Ethiopian government -State governments
<p>Description:</p> <p>Focusing only on developments that require internet access will increase the inequality between areas that have and do not have internet access. Therefore, it is very important for the short- to mid-term to also keep attention for the aspects of the Future of Work that can be developed without internet access. Investments in mechanization have a relatively high potential in the absence of internet, compared to the other areas of the Future of Work, but also some AI applications can operate without internet access and can work through local computing (i.e. on a smartphone).</p>		



8. PROMOTE THE USE OF OPEN DATA		
<p>Issues:</p> <ul style="list-style-type: none"> -Digital infrastructure 	<p>Relevant SWOTs:</p> <ul style="list-style-type: none"> -Artificial Intelligence -Big Data 	<p>Involved actors:</p> <ul style="list-style-type: none"> -Local firms -District governments & institutions -Ethiopian Government -Dutch firms
<p>Description:</p> <p>Open data makes more data accessible and it increases competition because it lowers entry barriers. Not having access to data is more and more often an entry barrier for new entrants in the tech market that try to compete with established firms that already had time to collect data. This will aid local firms as well as Dutch firms trying to enter the Ethiopian market. A great example is the Dutch 'satellietdataportaal'⁶⁶ that gives free access to both raw satellite data and pre-processed satellite data and is being used by farmers in the Netherlands and (tech) firms providing services to farmers.⁶⁷ All government supported programs that gather data should aim to make their data open access. However, data should be anonymized when privacy issues come into play.</p>		

⁶⁶ Netherlands Space Office, "Satellietdataportaal."

⁶⁷ Van Miltenburg, "Overheid gaat aangekochte satellietdata openstellen voor precisielandbouw."



9. INVEST IN EXISTING DATA		
Issues: -Digital Infrastructure	Relevant SWOTs: -Big Data	Involved actors: -State governments -Local institutions
<p>Description: Policy makers should invest in making use of existing data and analytics to comparatively assess the costs and likely outcomes of different potential transformation programs. The quality of existing data and databases needs to be checked and where possible better organized or improved. Policy makers can be supported in learning how to use data and analytics to set reasonable targets and redirect programs where outcomes are not meeting targets. In addition to this, government institutions, such as the Central Statistics Agency (CSA), can be supported in building more capacity so that data collection is of higher quality, more reliable and better accessible. Better quality data will make it easier to use this data in various processes.</p>		



10. CREATE A DATA MARKET		
Issues: -Employment and the informal economy -Digital infrastructure	Relevant SWOTs: -Big Data -Online Platforms	Involved actors: -Local firms
<p>Description: Provide a platform where smallholder farmers can gain access to data collected by local firms or other farmers. Farmers and firms can buy a subscription to continuous new data or through a one time purchase buy an existing data set. Other farmers and firms can make a business model out of collecting and thereby providing this data. Together this creates a local marketplace for data, making collection and use of this economically viable in the long run. Of course, privacy and data protection issues should at all times be taken into account.</p>		



11. PROTECTION OF PRIVACY		
Issues: -Digital infrastructure	Relevant SWOTs: -Artificial Intelligence -Big Data	Involved actors: -Ethiopian Government -Dutch firms
<p>Description: With more data collection and data analysis, protection of privacy is getting ever more important. Tech firms knowing too much of a farmer through data collection could put the farmer in a disadvantaged position. Warranting good privacy and data protection rights should be a requirement for sharing knowledge on AI. The Netherlands could support Ethiopia and other developing countries in gaining a so-called adequacy decision from the EU on the level of data protection.⁶⁸ This will not only protect local citizens better but will also allow for better and secure sharing of information between countries and thus increase business opportunities.</p>		

⁶⁸ European Commission, "Adequacy Decisions."



FUTURE OF WORK IN CONTEXT



The recommendations made based on the four SWOT analyses make meaningful contributions to Dutch development policy as formulated in *Investing in Global Prospects* and the Ethiopian Growth and Transformation Plan II (GTP II) policy goals, as well as to progress on the Sustainable Development Goals (SDGs). Improving access to technology and digital infrastructure, the most important being internet, is in line with the Ethiopian GTP II 2015/16 and 2019/20. While doing this, continuous attention should be paid to decreasing already existing inequalities. More decent jobs can be created by making proper use of the opportunities the Future of Work has to offer, but close attention needs to be paid that this involves all different groups in society. The position of women and girls as well as youth should be strengthened, so that (economic) growth and poverty reduction is inclusive, which is an important goal in Dutch development policy.

The increasing prevalence of online platforms can have a positive impact on access to online knowledge and decent jobs. Both women and youth should have access to these platforms by having access to internet through mobile devices. Increased usage of the online platforms is consistent with the GTP II and the main points in the Dutch development policy such as sustainable, inclusive growth, digitalization and poverty reduction.

The usage of big data and AI in the agricultural sector can increase agricultural output and is therefore consistent with the main theme of Dutch development policy, such as sustainable, inclusive growth, digitalization and poverty reduction. However, an important pitfall with regards to big data and AI is that it can also increase inequality within Ethiopia. Government intervention is needed to provide equal access to AI applications in rural areas, so that it contributes to sustainable and inclusive growth.

Mechanization is very distinct from the three above mentioned aspects of the Future of Work as for mechanization, internet access is not a necessity for successful implementation. The policy advice to support the Ethiopian government to increase mechanization efforts, is in line with the GTP II 2015/2016-2019/2020.

With all the risks, opportunities and points of attention outlined, we were able to make several policy recommendations. These policy recommendations aim to include smallholder farmers in the opportunities that the Future of Work can bring to the agricultural sector in Ethiopia. In the long-run, it is expected that technological developments related to the Future of Work can offer inclusive growth of the Ethiopian economy and society. Using the Future of Work, development of the Ethiopian agricultural sector can contribute to progress on several SDGs, the most important ones being: SDG 2 *Zero Hunger*, SDG 8 *Decent Work and Economic Growth* and SDG 10 *Reduced Inequalities*. Altogether, with support from The Netherlands, the abovementioned aspects of the Future of Work can have a positive effect on the social and economic development of Ethiopia to make another step in reaching the 2030 Sustainable Development Goals.



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