# Getting Drones Off the Ground in Africa

11

CTA Policy Brief

MONTH YEAR

**Unmanned aerial vehicles (UAVs), popularly known as drones, have flown out of the pages of science fiction and arrived in Africa. A rush of recent research, pilot and exploratory activities have evaluated the technology and identified sectors where it can best benefit the people of the continent. Now it is questions of national policy that will determine how far drones will go.**

## Policy action needed

- **Build a supportive framework for drone governance** that does not shut down adoption of the technology with extra costs
- **Involve all stakeholders in formulating policies that facilitate innovation** while protecting privacy, data and airspace safety
- **Harmonise policies** across countries
- **Promote early adoption of UAV technologies in priority areas** like agriculture and humanitarian response.

## A buzz of potential

In only a few years, UAVs have gone from a secretive military technology to one of the decade's most publicised innovations. The price and complexity of UAVs have dropped rapidly, and in an aerial repeat of the rise of personal computers in the 1980s, the lower barriers to entry are bringing in new users – and new uses – all over the world. It is estimated that 3 million UAVs will be shipped in 2017, and that the worldwide market will be worth US$127 billion in 2020.

The growing range of UAVs on the market are variously capable of collecting high-resolution data through image, infrared, thermal and chemical sensors, as well as delivering cargo. Some of the most exciting opportunities for these tools lie in improving the management of crops, livestock, fisheries, forests and other natural resources.

A drone's-eye view doesn't simply give a farmer a new angle on their fields, but whole new ways of seeing. Multispectral imaging allows drones to pick up on crop conditions that are not always clear to human eyes, like water stress, fertiliser needs, pest infestations and diseases. In one project in Mozambique, 14 extension workers are using UAVs to present information to 2,800 smallholder farmers, giving them informed advice on when to plant, fertilise and irrigate. Farmers have recorded a 41% increase in crop production and 55% better water productivity. Crop-watching like this is only the start of what UAVs can bring to farmers, herders and resource users. Hovering above research stations, they give scientists a wealth of data for crop improvement. They allow mapping and surveying of land at a fraction of the cost that African surveyors are accustomed to, accelerating the process of land registration and titling. Above larger farms, rangelands and forests, they can keep watch over livestock, fences, trees and wildlife. They help farmers document their farm and its productivity to improve their credit-worthiness, and allow insurers to carry out rapid crop insurance assessments, even after major disasters.

## Governing blue skies

All of this potential will unfold in the coming years, quite possibly allowing African producers to leapfrog ahead in multiple areas. However, immediate policy vision is needed to see the potential through. Some of the real barriers to the lift-off of UAV technologies are in the policy realm. For example, legislation that requires a high fee to register every drone will effectively kill off their use in low-return areas such as small-scale agriculture and natural-resource management. Policy-makers

need to see the wide-ranging opportunities in fostering, not hindering, use of UAVs. UAV governance is a multisector, multistakeholder issue. National civil aviation authorities, however, have the last word in the regulation of airspace. They hold responsibility for the development, enactment and enforcement of rules that will put drones in the sky or ground them for the near future.

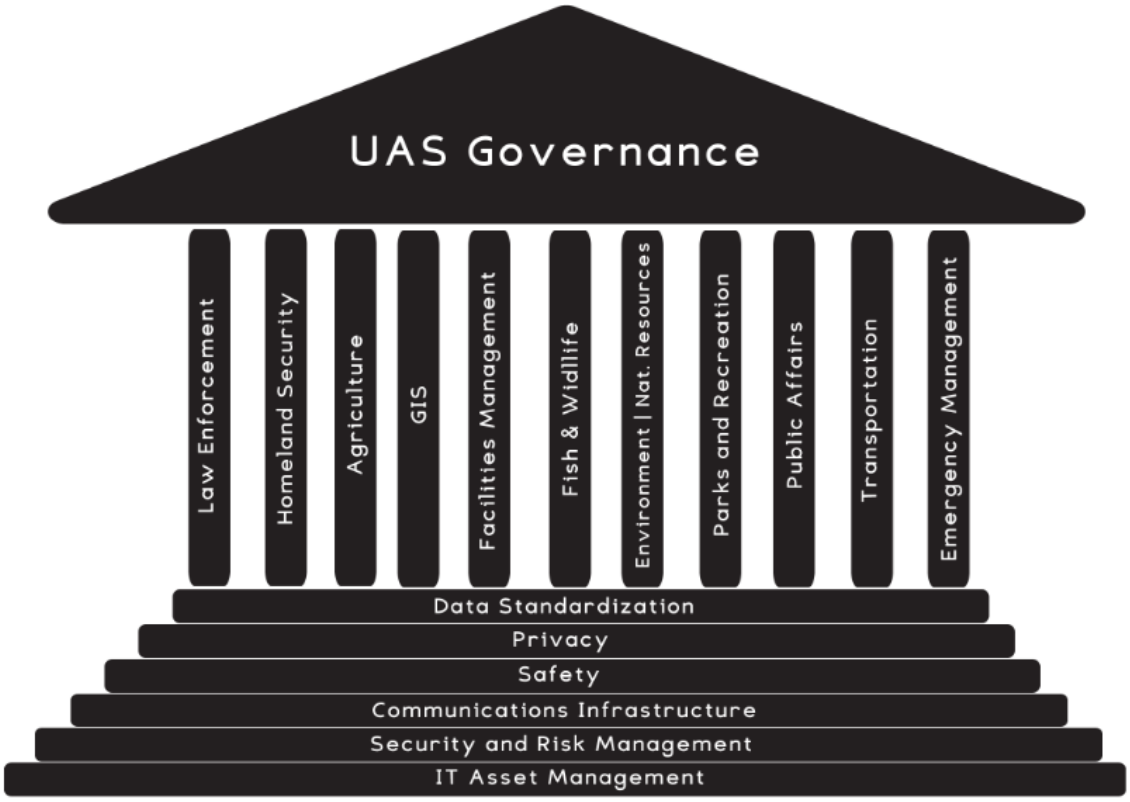
***The worldwide market for unmanned aerial vehicles is expected to be worth US$127 billion in 2020***

The influx of UAVs into already crowded airspace will place demands on national air traffic control systems, and UAV regulations, both existing and under development, have been motivated by safety concerns. These regulations publicise no-fly zones and oblige operators to insure their UAVs against personal injury and property damage. Harmonised regulations for UAV operators should also cover safety and training, and facilitate cross-country recognition of aircraft and pilot certification. Further provisions are needed for data protection and the development of technologies to prevent hackers from taking control of devices or data. Guidance materials, customs procedures and readily available online forms and information like digital maps of no-fly zones could all help and protect operators.

Along with safety, the greatest public concerns over UAVs have to do with privacy. Regulators are wrestling with how to deal with UAVs' capacity to observe private property and capture sensitive information – a capacity that develops with the technology, year by year. Best practices and protocols should encourage transparency and engagement at the local level. For example, in two recent mapping projects in Tanzania, teams went back with printed copies of the aerial maps to work with communities on issues ranging from flood planning to land usage. This proved useful in itself, and helped participants appreciate the purpose of the UAVs and the collected data.

To truly cultivate the potential of the technology, policies should go beyond mitigating fears and risks to supporting complementary investments. The rich streams of data generated by drones are only useful if they can be stored and analysed. Data storage

Building blocks for the development of a UAV governance strategy with a solid policy foundation



UAV regulations by country in Africa, surveyed by CTA in May 2017

| | |
|---|---|
| Regulations in place | Botswana, Cameroon, Côte d'Ivoire, Gabon, Ghana, Kenya, Madagascar, Nigeria, Rwanda, South Africa |
| Regulations pending or being developed | Benin, Namibia, Tanzania, Uganda, Zimbabwe |

facilities; analysis software and the computing power to run it; fast internet connectivity where analysis is done in the cloud; and accessible power supply are all components of the technology. So, too, is a workforce of flight planners, pilots, analysts and advisers.

When this whole supportive environment comes together, African countries hold many advantages in UAV adoption and innovation. Free, high resolution and up-to-date satellite imagery, which is necessary for efficient UAV flight planning, is available across most of the African continent. As more countries pass UAV regulations that require pilot licensing, and more training institutes are established to award these, many young Africans are likely to take up the opportunity to start careers as licensed drone pilots.

Furthermore, international bodies and development agencies are showing a surge of interest in testing and eventually supporting the adoption of these technologies. The New Partnership for Africa's Development is considering providing governments and other stakeholders with evidence-based policy choices for the promotion of UAVs, part of the African Union's Science, Technology and Innovation Strategy for Africa. Among outside entities, the European Commission, UNICEF, USAID, the World Bank and the World Food Programme have undertaken projects with drones on the continent. CTA is currently supporting UAV start-ups in the agriculture sector.

## Ensuring safety, enabling innovation

The ability to send a miniature aircraft into the sky, with an ever-increasing degree of autonomy and ever-sharpening senses, is opening up previously unimagined possibilities down on the ground. But capturing the benefits of this revolution requires a transparent and easy to understand UAV regulation and governance framework in every country.

Such a framework must be flexible enough to allow for innovation and research, and clear enough to give the private sector confidence to invest, while ensuring public safety and the integrity of airspace. It is up to governments and civil aviation authorities to ensure that the industry can flourish, especially in priority areas like agriculture and humanitarian action.

African countries need an environment that encourages innovation and investment in new game-changing technologies like UAVs. This can only be achieved when all stakeholders come together to put in place a regulatory environment and governance structure that is agile, open and informed enough to make the right decisions.

Unmanned aerial vehicles – or drones – come in all shapes and sizes, and can be adapted to a wide range of uses

© senseFly

© 67photo / Alamy Stock Photo

## Further reading

de Klerk, M., Droogers, P., Simons, G. and van Til, J. 2016. *Change in Water Productivity as a Result of ThirdEye Services in Mozambique*. Report 166. FutureWater, Wageningen, Netherlands. http://bit.ly/2ri8M1J

FSD. 2017. *Global Drone Regulations Database*. Swiss Foundation for Mine Action (FSD), Geneva, Switzerland. https://droneregulations.info

Gilman, D. 2015. *Unmanned Aerial Vehicles in Humanitarian Response*. Policy Development and Studies Branch, United Nations Office for the Coordination of Humanitarian Affairs (OCHA). https://bit.ly/1qwWSJW

Jeanneret, C. and Rambaldi, G. 2016. *Drone Governance: A Scan of Policies, Laws and Regulations Governing the Use of Unmanned Aerial Vehicles (UAVs) in 79 Countries*. CTA, Wageningen, Netherlands. http://bit.ly/2lXnWmQ

Mbuya, F.E., Rambaldi, G. and Chaham, H.R. 2017. *Unmanned Aerial Systems (UAS): Status of and Opportunities for the Technology on the African Continent*. CTA, Wageningen, Netherlands.

UAViators. March 2017. *Humanitarian UAV Code of Conduct & Guidelines*. https://bit.ly/2ry6LeH

Authors: F.E. Mbuya, G. Rambaldi and H.R. Chaham

## About the series

CTA Policy Briefs provide a concise summary of a particular issue of relevance to the Centre's activities, the policy options to deal with it, and some recommendations on the best option. They are aimed at policy-makers and their technical advisors, academics and educators working in the policy field and others who are interested in formulating or influencing policy.

Technical Centre for Agricultural and Rural Cooperation
P.O. Box 380 - 6700 AJ Wageningen - The Netherlands
Tel: +31 (0) 317 467 100 | E-mail: cta@cta.int | www.cta.int