

# Thirty ideas shaking up Africa <sup>[1]</sup>

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By Ntaryike Divine Jr, Emilie Filou, Billie Adwoa McTernan, Nicholas Norbrook, Michael Omondi, Patrick Smith, Marshall Van Valen, Gemma Ware



Too often presidential politics, with its big egos and backroom deals, can feel like the only show in town. Policy plays second fiddle. But leadership is recognising the innovative, sometimes daring, ideas that need backing. Africa

has them in spades: from agriculture, healthcare and energy production to new policies to boost financial markets or create a continental standby force.

Africa's tech entrepreneurs have quickly become the vanguard of innovation on the continent. New networks such as Afrilabs – pulling together developer hubs in Nairobi, Lagos and Dakar – are besieged by Silicon Valley technology giants and mobile handset manufacturers. At the same time, the Maker movement is gaining traction on the continent: people using everyday materials to solve everyday problems, often in a sustainable way.

Maker Faire events in Africa act as a hub for inventors to showcase and share ideas, attracting creators – and hopefully investors – from engineering, design, arts and crafts. But innovators in Africa face stiff challenges – from poor intellectual property laws to a lack of angel investors, to poor research and development facilities.

Our 30-strong list embodies the pan-Africanist mantra of 'African solutions to African problems,' with the majority developed on the continent. We spoke to a range of different think tanks, research institutions, innovation hubs and award-givers to put it together.

Special thanks goes to the African Innovation Foundation, the team at Maker Faire Africa, IMANI, Cartier Women's Initiative Awards and the CGIAR. ●

## **Tax JusticeThe Zeal Of The Latter-Day Converts**

With all the self-righteousness that proponents of an idea whose time has  
come can muster, the



leaders of the G8 club of rich countries have been converted to the principles of tax justice. At the G8 summit in June this year, Britain's Prime Minister David Cameron urged fellow leaders to act against the \$21-32trn of untaxed wealth stashed offshore by opaque companies and trusts. The G8 leaders should have read Capitalism's Achilles Heel by Raymond Baker, who

now heads Global Financial Integrity in Washington DC, or Treasure Islands by Nicholas Shaxson. They have been campaigning for reform of the tax system and ending transfer mispricing for more than a decade. Voters in rich countries are outraged that public services are getting eviscerated while giant companies such as Google, Amazon and Apple exploit tax loopholes. But Baker and Shaxson point out that bigger injustices are perpetrated on developing economies, which lose about \$1trn per year from illicit outflows of tax-evading wealth. The latest research from the African Development Bank estimates Africa lost \$814bn in illicit outflows from 1970 to 2010, twice the level of

development aid in the same period.

### **HousingPre-fab is fab**

Making a global call for solutions to global problems can lead to results, as shown by the \$300 house design challenge in 2011. The international competition to find new kinds of ultra-low-cost housing looked for ideas that went beyond traditional bricks and mortar construction. A massive low-cost revolution has not yet followed, but prototypes from the competition are being developed in Haiti, India and Indonesia. In early July, the IKEA Foundation also announced that it had developed flatpack refugee housing to be piloted by the UN High Commissioner for Refugees. A few South African companies have developed ways to provide cheaper housing, as the government struggles to meet demand for inexpensive apartments and houses. Vela Steel Building Systems has seen so much demand for its prefabricated housing components that it doubled its production capacity in 2012. Vela is also active in Namibia, where it is developing a new housing complex. Using moulds and unskilled labour, Moladi's technology enables companies to build cement houses quicker and with lower costs. Meanwhile, in Nigeria the Developmental Association For Renewable Energies is working with recycled materials to build low- cost houses.





## Off-grid electricity

### An Electric Leapfrog

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## Coup makers beware

### Security, a top concern

Whether protection from marauding militias, authoritarian regimes or organised criminals. The idea of a pan-African force dates back to Kwame Nkrumah's calls for an African High Command at the Organisation of African Unity's founding congress in 1963. With coups and conflicts in Guinea-Bissau, Mali, eastern

hydropower. The second part of Africa's power revolution will be to leapfrog the model of a national electricity grid – with its large central power plants and miles of transmission lines, sub-stations and distribution lines – to create a dynamic and decentralised model of off-grid power providers, or mini-grids. These would increasingly use renewable sources of power as the technology gets better and cheaper. Currently, Nigeria spends as much as \$20bn per year on off-grid power – that is the use of private generators – because of its failing national grid. The IEA predicts that more than half of Africa's electricity will be off-grid by 2030. Technical innovation and the use of renewables will sharply cut the cost of lighting up Africa.

DRC, Sudan and the Central African Republic, there is no shortage of demand for the African Standby Force. After years of debate, countries are still two years away from a 2015 deadline. Sivuyile Bam, who heads the African Union (AU) Peace Support Operations Division, argues for a continental organisation to deal with these crises. That leaves some tough negotiations ahead. How will the force be financed? Will the AU be able to override the concerns of regional organisations? How tough will the AU force's mandate be? Would it really intervene to stop mass killing in areas such as Darfur?

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### **Coup makers beware** Throughout Africa security is citizens' top

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### **Sanitation** Waste not, Want not



Local authorities have traditionally seen sanitation and waste management as net costs –something that had to be done and bore little or no economic return. A number of brave entrepreneurs have turned this received wisdom on its head. In Accra, Waste Enterprisers built a pilot wastewater treatment plant this year that turns the city's sludge into a highly efficient biomass fuel. The fuel can be used in industrial boilers, thereby turning wastewater treatment into a profitable business. Clean Team – a partnership between Unilever and non-profit partnership Water and Sanitation for the Urban Poor – has developed Uniloo, a high-end portable toilet that

can be installed in households that cannot be connected to the sewer system or have a septic tank. The toilet's holding tank is emptied every few days, and the service in Kumasi has proved so popular there is a waiting list of several months to get one. Wecyclers in Nigeria also saw a gap in the market. Entrepreneur Bilikiss Adebisi and her team have devised special cargo bikes that could handle the small lanes of the city's informal settlements to offer recycling collection. Residents who recycle receive phone credits or vouchers for basic food items; Wecyclers sells the waste for recycling. In less than a year, the company generated more than \$20,000 in revenue and has a team of 16 workers.

## TelecomsWeb-Surfing in The Bush

Plug in your laptop at a hotdesk in one of the tech hubs springing up across Africa and it seems like the age of cheap and fast internet has arrived. But internet connectivity in rural areas remains very low, held back by poor infrastructure and the high price of smartphones and tablets. A cluster of innovations could help. Using TV 'white space' – the unused broadcast spectrum in analogue TV bands – tech giant Microsoft and Kenyan firm Indigo Telecom are experimenting with a pilot in the Rift Valley to get schools online. Their solar-powered base stations can push out Wifi signals over a 10km radius. The Village Telco project in South Africa is also helping entrepreneurs bring cheaper mobile and internet connectivity to rural communities using a Mesh Potato, a hardware box used to create cheap internet or mobile phone networks in unconnected areas. Back in Kenya, Ushahidi has developed a prototype for a sturdy modem designed to keep internet connectivity steady even in rugged and low-power environments. A small, grey and black box, BRCK is being marketed as a 'back-up generator' for the internet, able to switch between networks and run without electricity.





### **cellphone pollingAfrica texts back**

The Democratic Republic of Congo has plenty written about it, but rarely do the people of the country get a chance to speak for themselves. In 2011, Geopoll, a US company, linked up with the World Bank to convince mobile phone operators to send out 10 text messages to 150,000 phones across the country, with free replies for respondents. It was the country's first massive poll using text messages. The replies provided a look at the standard of living and preoccupations of people in the east of the country. Such initiatives are the first step in a new race to find out what Africans are thinking. With real-time responses and accurate location of respondents through triangulation of cellphone base stations, the possibilities are endless. In May, the African Development Bank used Geopoll to survey Tunisian youth to get their perspectives on life since the 2011 revolution. Such tools could be used in a gamut of other applications, from political campaigning through to retail surveys mapping out price points. Multinational companies are already hiring



consumer pollsters to help build marketing plans. This could go some way in banishing the narrative of the poor African with no discretionary spending and attract new investment into the continent.



**vocational training****Made-to-order skills** There is a jobs paradox in Africa. Numerous positions remain open for technicians, welders, mechanics, engineers, plumbers and electricians, but the number of qualified locals is low. The UN Educational, Scientific and Cultural Organisation (UNESCO) says that less than 5 percent of Africans enrol in formal technical or vocational training programmes. The result is that skilled foreigners come in to do the job or a company limits its activities. This is a handicap to Africa's growth aspirations. Some countries are taking matters into their own hands. Morocco, for example, is attempting to launch an industrialisation plan that depends on specialised manufacturing in the auto and aeronautic sectors. To get around traditional failures in vocational training, Morocco's government asked French car manufacturer Renault to design an auto skills school – the *Institut de Formation*

*aux Métiers de l'Industrie Automobile* (IFMIA) in Tangiers, which opened in April 2011 – and then bankrolled its creation. A further three IFMIA centres are on the way. The same method is being applied in different sectors. The critical innovation of the Moroccan government has been to allow the private sector to design the training in order to produce graduates who have a factory-ready skill set. Because it has been funded by the government, the whole auto sector has access to the school.

**Financing Pay as you go, everywhere** The instalment plans of 1920s America helped fuel a white goods revolution. Now the future of energy in rural Africa could be driven by a similar financing method. In western Kenya, households are dumping paraffin for solar power. M-KOPA, a mobile- technology start-up, offers a pay-as-you-go solar kit that is otherwise out of reach for low- income families in rural Kenya. The pre-paid solar-powered system comprises a four-watt rooftop solar panel, a control box that attaches to the wall, three lamps and a phone charger. Under M-KOPA's payment plan, which uses Safaricom's M-PESA mobile-money system, users make a downpayment of KSh2,500 (\$29) and then pay KSh40 a day to pay off the total cost of KSh17,000. Jesse Moore, the managing director of M-KOPA, says that 22,000 homes now have solar kits. "We are upgrading our system to bigger systems to power a radio, a television and small businesses," says Moore, adding that consumers are saving money and improving their health by avoiding paraffin smoke. Azuri Technologies also offers instalment plans for solar panels, using weekly scratch cards to pay back the upfront costs. It is operating in East, West and Southern Africa.

**Local government Piggy banks for local authorities** Most local authorities across Africa are largely dependent on the central government for cash:

devolution has long been a political football politicians are scared to kick off. A United Nations-backed initiative is handing out \$200,000 grants to local governments to build properties they can then lease to private operators to enable the authorities to start managing their own funds. In Sembehun, southern Sierra Leone, a market with 40 open stands and 10 lockable stores opened in February, while in Kenema, a slaughterhouse and cool room opened in July. The UN is already running similar projects in Senegal, Tanzania and Lesotho. It has plans to begin others in Uganda, Guinea and Mozambique. Strong state governors in countries where power is more devolved, such as Nigeria, have long sought local funding. Lagos launched a N80bn (\$496m) local currency bond in 2012 to fund infrastructure. Now, 47 new Kenyan governors brought in under the 2010 constitution are also marketing their counties as investment destinations and seeking independent sources of finance.



**Local content** Homegrown Uganda's television industry is set for a major transformation the government provides families with money when they ensure that children are vaccinated or attend school regularly, for example – African governments are rolling out their own. A World Bank



**Literature Written and read** Many generations in Accra, Lagos and Nairobi have grown



**Technology Apps fight back** When the Egyptian regime shut down internet networks

study from 2012 identified some 120 such programmes in sub-Saharan Africa between 2000 and 2009. The bank hopes that programmes such as the Hunger Safety Net Programme in Kenya and similar programmes in the Horn of Africa and the Sahel will provide financial help for families. Developing cash transfer programmes like this could also transform the relationship between state and society. when a directive that requires stations to offer 70% local programming takes effect in January 2014. The local content will include talk shows, soap operas and music. The directive is meant to boost the growth of the arts industry and create employment for screenwriters, videographers and producers. It is also expected to support Uganda's film industry and eventually push it to the level of Nigeria's and South Africa's. Critics of the directive, however, complain that as all content must be funded by advertising it's going to be a tough target to meet. In the meantime, Uganda's film industry is establishing

up reading Shakespeare and Dickens, but a couple of initiatives are supporting homegrown story-writing for young readers. By targeting people aged between 13 and 25 in South Africa, the FunDza Literacy Trust commissions authors to write books that reflect the lives of young South Africans, creating characters they can identify with. Using mobile phones and an online library of novels, non-fiction books and news articles, FunDza aims to reach out to black youth from disadvantaged backgrounds. In Accra, the Golden Baobab Prize aims to produce African literature for children and young adults. In a bid to promote local talent, the Golden Baobab team launched a series of prizes for African children's literature in 2008 and also organises workshops and programmes

during the 2011 revolution, Mohammad Omara started thinking about ways to communicate during an uprising. His solution is to boost Bluetooth wireless capabilities from their usual 10-20m range to cover 300m<sup>2</sup> and allow phones to 'pass on' phone calls through the Bluetooth network. The XoneBee application is the latest in a series of smartphone applications that are being used by activists in Africa and beyond. The cyber fightback against implacable political regimes has only just started. Kenya's Ushahidi may have kickstarted the genre in 2008 by allowing activists to map information and events using open-source software, but the growing ubiquity of smartphones means that political organisation has gone mobile. A new app from Salvatore Iaconesi of Art is

structures to produce higher-quality content. Whether it is TV content or contracts in the oil and gas industry, moves to boost African content are making their way onto statute books. Countries with nascent sectors, such as Uganda and Ghana, are developing strategies to bring local firms into the value chain. Production in the Nigerian cement industry has grown strongly after the government started controlling imports based on the amount each company produced in the local market. Similar plans are afoot for rice production.

for budding writers and illustrators. Publishing houses targeting the African youth market have sprung up all over the place. In Togo, Ago Editions publishes comics with African superheroes, while Bakame in Rwanda focuses on Kinyarwanda-language publications for young people. The International Assembly of Independent Publishers hosted a workshop in March to help African publishers establish stronger networks and improve the representation of literature for Africa's youth in the local market.

Open Source network will help those in riots find a path to safety, with localised maps showing red and green areas of safety and danger. The application is currently only available for activists. Another tool, Vibe, works as a kind of selective Twitter, sending regular updates only to the people that you want to reach. Gibberbot provides secure communications via instant message, something useful in these days of state snooping.

**cash transfers** Money for the masses





It may be the simplest innovation, but it seems that the best way to improve a person's livelihood is just to give him some money. That is the conclusion of a study conducted by Christopher Blattman, Nathan Fiala and Sebastian Martinez in northern Uganda in May. They traced the activities of about 2,500 people who received a grant of \$400 from the government and found that capital constraints, rather than a lack of education or some other factor, are the main obstacles to fighting poverty and reducing unemployment. With the success of conditional cash transfers in Brazil – where the government provides families with money when they ensure that children are vaccinated or attend school regularly, for example – African governments are rolling out their own. A World Bank study from 2012 identified some 120 such programmes in sub-Saharan Africa between 2000 and 2009. The bank hopes that programmes such as the Hunger Safety Net Programme in Kenya and similar programmes in the Horn of Africa and the Sahel will provide financial help for families. Developing cash transfer programmes like this could also transform the relationship between state and society.



## VisasOne Passport for one people    Conflict mineralsKnow what you buy

Applying for a visa can be a headache. After the heady days of the pan-African post-independence movement, African countries returned to more nationalistic border controls. Apart from the Economic Community of West African States and more recently the East African Community, a majority of countries require visas for visiting Africans. Rwanda's decision on 1 January to allow all citizens of African countries to get their visas on arrival may trigger a rethinking of attitudes, opening up possibilities for greater trade and migration. The African Union is also considering proposals for a continent- wide 'uni-visa'. Opening borders opens minds.

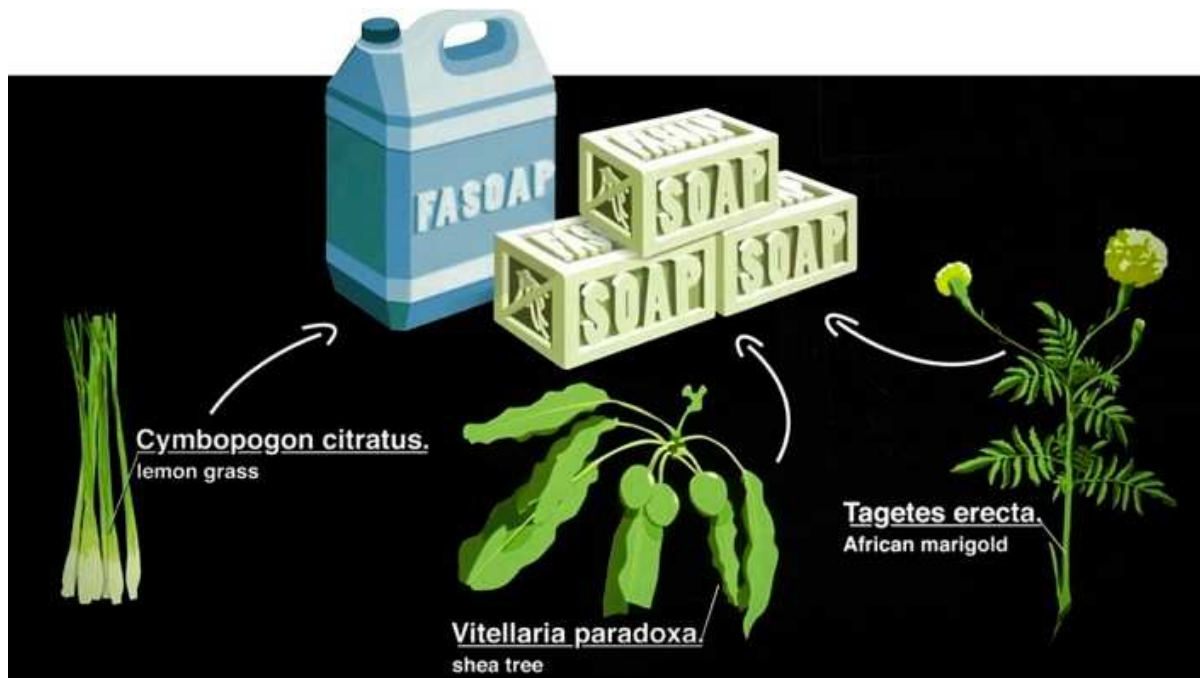
Typically a source of exploitation and human rights abuses in conflict areas, minerals coming out of countries like the Democratic Republic of Congo are the subject of new tracking efforts. The Dodd-Frank regulations in the US, which put a legal onus on companies to assure their suppliers are not supporting conflict, is focusing minds. The European Union has completed its own consultation on a similar law. Companies are trying their own pilot programmes – such as Solutions for Hope, launched in 2011 by Motorola to source conflict-free tantalum, which Nokia and BlackBerry have now joined. The ITRI Tin Supply Chain Initiative uses a system of barcoded tags at extraction and processing points.

## InfrastructureUnited we spend

Africa is rich in minerals, certainly, but it also has more cash than many realise: Algeria has more than \$200bn in foreign exchange and Nigeria more than \$50bn. Pension funds are groaning, and government reserves are stacking up. At

best they are being conservatively managed, at worst they are a missed opportunity. At the same time, the continent's infrastructure deficit is estimated to be \$100bn a year for the next decade. The African Development Bank (AfDB) has come up with a plan: use African reserves as a guarantee for investors in African infrastructure. The instrument through which this will happen is called the Africa50 Fund, which will pool more than \$50bn of these savings, managed by the AfDB, and focus on some of the largest and trickiest regional infrastructure deals. This project, under initial discussions in May, will help the continent to move beyond its handicap of small and fragmented markets. The bank will work with the African Union Commission and the United Nations Economic Commission for Africa to establish a firm timeline for the fund's launch.

## **HealthLow-tech cures**



Research can take years to produce results, but cheap and simple methods are helping to save lives now. After decades of initiatives to curb malaria, the disease continues to be endemic in sub-Saharan Africa, home to 90% of the world's 219m cases, according to the World Health Organisation. Inesfly Paint, the invention of Spanish doctor Pilar Mateo Herrero, contains micro-encapsulated insecticide. Mosquitoes that fly within one metre of a wall painted with it will not grow fully, and the paint does not have a harmful effect on humans. Interplast Africa, the Ghanaian manufacturers of the paint, plan to open a production facility in Ghana in October and then establish subsidiaries in countries including the DRC, Angola, Tanzania and Morocco. Another malaria-repellent product – which is also antibacterial – is Fasoap (pictured). Developed by Burkinabé Moctar Dembele and Burundian Gérard Niyondiko – two students from the Institut International d'Ingénierie de l'Eau et de l'Environnement in Ouagadougou – the soap contains only natural

ingredients grown in Burkina Faso. Transporting medicines to rural areas remains a challenge. Simon Berry, founder of ColaLife, noticed the effective distribution network used by drinks company Coca-Cola in remote regions of Zambia. He saw an opportunity to keep drugs cold in the gaps between bottles. ColaLife has also developed Kit Yamoyo, an easy-to-use treatment containing a dose of oral rehydration salts and zinc pills to combat diarrhoea.

### Coup makers beware Security is citizens' top concern



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## Stock exchanges A home away from Home



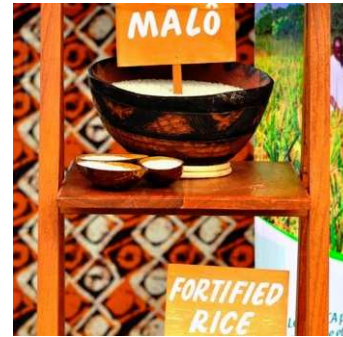
While 15% of Nigeria's GDP comes from the petroleum sector, it represents only 3% of the market capitalisation of the Nigerian Stock Exchange (NSE). As governments try to keep more of the profits from their natural resources, politicians are nudging foreign players to list on local bourses. NSE chief executive Oscar Onyema has proposed to ministers that companies should get a "substantial discount" on their tax payments if they go to market. Tanzania is taking a firmer stance. In June, the finance ministry indicated that regulators were in the process of forcing foreign telecoms and mining companies to list. Some already have. London-listed African Barrick Gold established a secondary listing on the Dar es Salaam bourse in 2011. Earlier this year Australian-listed hydrocarbon explorer Swala Energy announced plans for an initial public offering (IPO). One of the biggest multinational cross-listings was by Irish oil firm Tullow, which sold 3.5m new shares in an IPO on the Ghana Stock Exchange in July 2011. Meanwhile, innovation has come in the form of depositary receipts – a financial tool to sell listed stocks in foreign locations. Toronto-listed First Quantum launched them in Zambia in July 2011 and was followed by B2Gold in Namibia in 2012.

### Agricultural innovations

#### **Malô's fortified rice**

Two Malian brothers are preparing new homegrown

rice with a vitamin kick. For-profit company Malô's trick is a grain of rice flour that can be boosted with nutrients such as vitamin A and iron. It can then be added to rice from a local cooperative. When cooked, the flour grains – called Ultra Rice, developed and licensed by the not-for-profit PATH – dissolve. "Our goal is to make fortified the standard," says Salif Romano Niang, who founded Malô with his brother Mohammed Ali in 2010. The company is building a storage facility in Bamako, where its rice should be on shelves by October. The Ultra Rice grains are imported from India, but Malô's plan is to begin processing them in Mali. In June, the team met US president Barack Obama, who invited them to bring a bag of rice to the White House. "I intend to take him up on the offer!" says Salif.



### **The Farmking processor**

Nigeria's Sulaiman Famro is a resilient engineer and businessman. Three years ago, he started work on a tool to make cassava processing easier. His portable Farmking machine has the capacity to chip, grate and mill 2.5tn of cassava, maize and other root crops and grains that produce starch as a by-product, each day.

### **The Babban Gona franchise model**

Nigerian firm Doreo Partners is bringing the franchise model into the farmer's universe. The Babban Gona scheme ('great farmer' in Hausa) – sees a group of farmers form a trust group. This group



becomes a franchisee.

Doreo Partners then gives its members training and inputs.

### **AgriProtein animal feed**

Working in South Africa, British-born Jason Drew and his team have discovered a new cost-efficient and renewable way to produce animal feed. Feeding off waste food, flies lay eggs – 1kg of which metamorphose into 380kg of larvae in 72 hours, ready to be fed to livestock. The company is setting up a plant that will produce 100tn per day. It plans to set up 11 plants in Africa, Europe and the Americas.

### **Green water credits**

Green water is rain that soaks into the soil. African farmers know water conservation techniques can improve soil quality, but have few incentives or the money to implement them. A new mechanism, piloted by the International Soil Reference and Information Centre in Kenya's Tana River Basin, includes compensation for farmers upstream with money from downstream water users.

### **Inventors**

**Julian Ingabire** When many teenage girls in Africa start menstruating, they stay away from school. "Most of them can't afford sanitary pads," says Rwanda's Julian Ingabire. As COO of Sustainable Health Enterprises (SHE), Ingabire and the company's founder Elizabeth Sharpf have invented a sanitary pad made out of banana fibre, sourced from local farming cooperatives. The pads cost 50% of the price of imported products. From September, SHE will start small-scale production in Rwanda, accompanied by an education campaign. "We hope to keep girls in school for longer," says Ingabire. Interest has grown from across Africa and India since Ingabire and Sharpf won a Cartier Women's Initiative Award in October 2012. SHE's patent application has been provisionally approved in the US.

**Eugene Cloete** Professor Eugene Cloete, deputy rector of research and innovation at Stellenbosch University, South Africa, is the creative force behind a new mechanism to

**Justus Nwaoga** A common weed, *Mimosa pudica* or the 'sensitive plant', was an inspiration for Justus Nwaoga. A chemist at the University of Nigeria in Nsukka, he noticed the plant's leaves opened at sunrise and folded at sunset. He started searching for the compound responsible for this and found 'black silicon'. He has built a prototype system using extracts from the weed to light 0.9V solar panels. "It's a natural phenomenon," says Nwaoga, who explains that the weed is widely available and cheap. He was one of 10 finalists in the 2012 Innovation Prize for Africa. His patent has been approved in Nigeria, and he has interest in his invention from China and the UK.

**Njokikang Faustinus** Cameroonian innovator Faustinus Njokikang has finished the prototype of a

purify water, the tea bag water filter. Cloete and his team developed the filter from biodegradable material coated with electrospun nanofibres that prevent bacteria passing through. The tea bag, which can only be used once, is placed inside the lid of a reusable one-litre bottle that can then be filled with water.



**Anthony Mutua** Kenyans can now charge phones from the soles of their shoes

manual brick press with the capacity to produce 1,000 interlocking bricks per day. Bricklayers' output is often limited by the use of wooden or metallic boxes that yield only a single brick per fill. The innovation creates bricks made from soil and a cement stabiliser that are left to dry for three weeks. After studying in Italy, Njokikang returned to Cameroon to found his construction company Novatech Construction Systems.

**Ahmed El-Wakeel** In 2011, El-Wakeel and his classmates from Cairo University – Ahmed Swelam, Mazen Shawky and Omar El-Masry – invented a means to drive a car remotely. The system, Drive over Internet Protocol, uses a 3G mobile network and software they created. It requires a removable mechanical system to be installed in the vehicle. El-

through a technology entering mass production. Kenya's 25-year-old Anthony Mutua developed an ultra- thin chip that generates electricity when put under pressure. The chip charges the phone when placed 10cm from a shoe taken off after walking or running. With funding from the National Council for Science and Technology, Mutua is now selling the charger and his branded shoe dubbed Am-utua, which retails at between KSh1,800 and KSh4,200 (\$20-50). "I have sold 912 pairs of my own branded shoe and fitted about 2,200 shoes with my chips," says Mutua, whose idea is patented in Kenya though the shoes are made in India."Eventually I will transfer the production of the shoes to Kenya," he says. He has turned to GoFundMe, a fundraising website, to raise KSh16m to establish a plant in his own country.

Wakeel says the project could be used for fire fighting, landmine detection and the disabled.

Next

SA Women and the struggle for justice <sup>[2]</sup>

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1.

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2. <http://www.theafricareport.com/Frontline/south-african-women-the-struggle-for-justice.html>
3. `javascript:open_login('Login now');`