Connectivity for All in Rural Areas – Improving Agriculture, Food Security and Employment

Joachim von Braun

President, Pontifical Academy of Sciences, Vatican City

I think the challenges of implementation which Molly Burhans just referred to are particularly big in rural space, in rural areas, and being in an academy, I think we probably need to focus more on what we don't like to do, which is implementation research, a science and research issue. I will talk about improving agriculture food security and employment in rural areas and starting with a map. In a recent research project we attempted to do a map on marginality, where are people marginalised in different dimensions of economic infrastructure access, access to services, government and natural environment ecology is becoming a part of it (Figure 1). Where the map is darker red, marginality is bigger, so it is a multidimensional marginality concept, and when you look later at where people are lacking connectivity, you sense an overlap with where people today tend to also be more marginalised, so we're talking about a poor-people-in-rural-area problem, and one of my messages is that we need to highlight that. The great majority of the unconnected 60% in the world live in rural areas, in developing countries. Like it was mentioned before today, we need to think these 3 Cs – Connectivity, Content, and Capability – together: capability to use it, and need to address those including the rural poor and the more marginalised people. The human rights issues cut across these three Cs, not just the connectivity issue.

We have talked about fibre optics cables, and I do acknowledge we shouldn't get carried away simply looking at that aspect of the heavy lifting infrastructure, but it does matter. (Figure 2) What is yellowish here is live, the reddish is under construction, and it's getting more dense. In Africa, just compare the South African net, or the Kenyan one, with most of the other areas, so there's a lot of catching up to be done.

In Rwanda, in 2010, I happened to be around when the fibre optics cables were laid. A lot of excitement in the country seven years ago, a few times the cables were sabotaged, but they seemed to work, but what is more important was that more than 200 busses were travelling around the country training young people to use laptops, and also to address last-mile issues. Again there were connectivity problems there, but all in all it made a big difference, so I want to highlight, these are pretty hefty investments in a country fully committed to get digital, and it brought together connectivity with capability.

Broadband is too expensive (Figure 3). Where it is red, middle red, not dark red, it's more than 25% of annual per capita income, what a subscription to broadband internet costs in these countries; unaffordable for people in rural areas. Mind you, these are average per capita incomes of the countries, rural incomes tend to be a quarter of the average. Unaffordable. Download speed is often far too slow, especially in Africa but also in parts of Asia.

Young people, 15-24, are more or less completely connected in so-called developed countries, two-thirds in emerging economy, but in the least developed countries, only about one third. So young people are not having the happy situation that we heard from Uruguay, in general in Africa and large parts of South Asia. Earlier this year there was a survey done of about 15 thousand young people in Africa through cell phone. One of the questions that relates to our topic today is "where would you like to be in the next five years". Mind you, these are boys and girls in rural areas, not in general, *in rural areas*. So the large majority, 52%, said "it depends, if I stay on the farm", 7%. "It depends if I move", "it depends on the employment situation, the educational opportunities, infrastructure development and support for agriculture". Infrastructure development and further, more detailed questions very much focused on well-functioning internet and cell phone, so half of the rural users leave their options open currently and say "it depends", and the investment in connectivity will make a big difference for that half in rural users in Africa.

Let me now come to a set of slides and points, after this general introduction, and I will stick to these points mainly then on agriculture. We are about to see a major change of how agriculture will be operating everywhere in the world. Connectivity and content is changing farm services very quickly, with sensors, positioning systems, big data feeding into seed and fertilizer marketing and application services, agriculture insurance; the Uberisation of farm machinery has started, not only in India where it is already quite wide spread, but also in Kenya and Tanzania.

So these changes have deep impacts that are relevant for the whole of the operation of labour in rural areas, labour market and employment, and these techniques facilitate downscaling, machines get smaller. The Internet of Things connects things such as irrigation or solar, or peri-urban LED technology. These are all pictures from India, so not from the US or Germany. The whole system is changing. Not just labour-saving technology, and just taking burdens especially from women and agriculture, which should be applauded, but robotics, machine learning, vertical farming, solar energy. Grid systems combined where you switch energy collection and you feed into the grid, if you use it yourself for pumping or spraying water. Those are drastic and big changes, and once more, machines of this nature and technologies are becoming more and more scale-neutral and therefore can also be applied to small farm agriculture.

However, if we do a reality check, what is currently going on with these new techniques and opportunities? Many small initiatives are disjointed and diverse in usability. The content is often delinked from providers of agriculture information and the mobile solutions don't regard user capabilities, and the training as missing. So to tap the huge potentials, we need not only to strengthen connectivity, that's really number one, and that's why I very much applaud this workshop, but we need to establish platforms that cover the comprehensive needs of farmers, the diverse needs of farmers comprehensively, and engage more farmer organisations and not just target the individual farmer.

We have had various interventions already on the risks in general, but risks for farming communities, and mind you the farming community around the world are the majority of poor and hungry people, that's why I focus on this here, with opportunities to be used and to be tapped from ICT, but we have a problem to deal with regarding farming job losses, inequality effects, risk of monopolisation of content by few providers controlling the information and the potential of political misuse also in rural networks. I highlight a few options for addressing these risks.

Most contentious is probably the last one, not only public goods subsidies but rethinking the whole question of taxation of labour vs. taxing IT. Currently most countries tax labour, or low-income countries tax trade, higher income countries tax income from labour, but maybe we need to reconsider what should be an appropriate tax base, under the new circumstances.

I close with two slides: policy approach for the rural connectivity agenda, I want to highlight three of many, many, points that need to be considered. The first one I consider the most important. We need to define the connectivity agenda from the poor people's rights perspective and with attention to content, so not technology down but up from their capabilities and therefore I think that there will be many connectivity agendas to get meaningful connectivity, meaning for the masses of poor people, which I think is important. We need to talk about the mobilisation of investment which we have started and strengthen the ICT capabilities.

As we are an academy, let me close with some points of where I see a research agenda, and I highlight four points. Basic science with problem-solving orientation; we need to turn to our colleagues in mathematics and computing science to work with us on advances for connectivity, content and learning. The experiments which are going on are extremely relevant and interesting, but algorithms will change quickly and maybe we can get in touch more with those who develop futures-orientated algorithms that are tailor-made to needs for poor people. Secondly, technological and systems research, the robotics agenda, ex ante assessment of their effects on human employment and wellbeing and so on. Third, sustainability research; connecting digitization with biologization for transformations toward a sustainable industrial urban and rural system, so the whole ecology of industry will change including in rural areas. We better start looking at that. And lastly, institutional research on risks, legal aspects, including the human rights approach, which brings us together here. Thank you for your attention.