Support to Innovation and Innovation Systems
Within the Framework of Swedish Research Cooperation.
An undernourished child gets locally developed “Ready to Use Therapeutic Food” (RUTF) at the international health research centre icddr,b. The RUTF is made of locally available ingredients, and while the child is being treated its mother is taught cognitive training of children and how to cook nutritious meals.

Innovation Working Group, September 1st, 2015
Unit for Research Cooperation at Department of Partnership and Innovation
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1. PURPOSE OF THIS POSITION PAPER

There is a constant need for developing new ideas, forms of cooperation, partners and financing mechanisms in order to reduce poverty and oppression. Innovation and flexibility must therefore permeate all of Sida’s development cooperation and this position paper focuses on innovation within the framework of research cooperation.

Sida’s support to research cooperation is governed by the Strategy for Research Cooperation and Research in Development Cooperation 2015–2021 with the following results areas:

- Strengthened research of high quality and of relevance to poverty reduction and sustainable development:
  1. focusing on capacity-building for research, primarily in low-income countries and regions
  2. focusing on global, regional and national research of relevance to low-income countries and regions
  3. focusing on the promotion of research that, through innovation, can contribute to poverty reduction and sustainable development
  4. focusing on Swedish research of relevance to poverty reduction and sustainable development in low-income countries.

While Sida is responsible for the results areas 1–3, the Swedish Research Council is responsible for the 4th results area.

The objective of this position paper is to formulate some principles guiding Sida’s Research Cooperation towards a holistic approach in its work towards strengthening innovation and innovation systems at the global, regional and bilateral level, and in such a way contribute to the achievement of the results area 3 of the above mentioned Strategy.

A position on support to strengthen innovation and innovation systems within the research cooperation is described. The paper highlights some new possible areas where this type of support might be expanded in relation to the general innovation framework objectives of Sida’s development cooperation.

2. INTRODUCTION

Innovation has gained increased attention in the past decades and governments across the world are using innovation as a mean to boost economic growth and social development. Sets of incentives are developed at the state and regional levels in order to stimulate innovation. The build-up of innovation capacities has been central to successful growth experiences (OECD Innovation Strategy 2010). The OECD Innovation Strategy calls for a whole-of-government approach to foster an innovative environment for the private and public sectors, higher education and national research capacity. Innovation has been crucial for economic, social and political development in countries at all levels of income and a key challenge is to build formal and informal institutions that support interactive learning. Viewed in the context of developing countries, studies show that innovation may lead to socioeconomic transformation and rapid progress to sustainable development (Kraemer-Mbula and Wamae, 2010).

Innovation is usually stimulated by the mobilization of resources in networks, capacity to produce and use new knowledge, pooling financial investments to innovation systems and establishment of strategies and regulations.

Innovations take place in the entire society, and in low- and middle-income countries a large proportion of the innovations take place in the society and the informal sector. There are dozens of emerging markets at various stages in these countries, and embracing innovation strategies may generate real and lasting prosperity that is not necessarily based on patents. Although innovation capacity may seem low in many low-income countries (LICs), especially viewing the number of patents, innovation can and does occur in emerging markets (McCord 2011), both as products, services and as social innovations.

Theoretical understanding and useful concepts

The theoretical understanding of innovation systems framework has during the last decades developed from regarding innovation as a linear process whereby research and development leads to commercialization, industrialization, and growth to regarding innovation system as dynamic. Most important are the dynamic linkages and interactions that take place among actors such as firms, government departments, universities, civil society organizations, and science granting councils, which can result in systemic learning and the distribution of knowledge throughout the system leading to strengthening of capabilities. Co-evolving processes including feedback mechanisms are crucial for learning and outcome1.

To better describe innovation systems in a low-income context the concept of innovation systems should be extended to include learning, innovation development and competence building. It means that innovation processes should constantly be interlinked with knowledge.

production, competences building education and labour markets.

The national innovation system is, according to leading innovation researchers, an “open, evolving and complex system that encompasses relationships between and within organizations as well as institutions and socio-economic structures, which determines the rate and direction of innovation and competence building emanating from processes of science-based and experience-based learning” (Lundvall et al, 2009).

The innovation process is usually a long process that is based on the ability to combine new building blocks of experience-based and/or scientific ideas and knowledge, resulting in new products, processes and applications. Both the process and outcome depend on many different factors in society such as interactions between people, the presence of people who have the necessary knowledge on bringing products to the market, and the actual combining of knowledge from many actors, testing and retesting until a useful product or service is in place (Vinnova 2013:13).

The innovation chain involves adding value to an original idea through a series of development processes; from new ideas to commercial scale up. These processes may also be categorized as knowledge sourcing, knowledge transformation and knowledge exploitation (Love, 2008).

The concept “Innovations for the bottom of the pyramid” is an attempt to link business innovations and research-driven innovations to the needs of the poorest. A major problem with this perspective is that poor people often find themselves in a situation where they are hindered to articulate their needs. External interpretations of poverty situations are always precarious, as they tend to miss the crucial points. This means there is a need to have to intermediaries, facilitators, or fora, in which these needs can be articulated and reconfirmed by the users and beneficiaries of the proposed innovations.

Besides articulation of needs, another problem is how to finance the innovations encountering the needs of the poorest. For urgent needs we have to see this as assistance gifts. But a long-term solution needs driven innovations which must be marketable, and combined with innovations generating incomes for the poorest to give them the purchasing power.

The largest consumer group in the world today is the middle class in developing countries. The poor must be involved in the production for this growing market. This gives a direction to where innovations might become profitable and income generating also for the poor.

Technical transfer is still a dominant concept and practice within the western hemisphere universities. It is a concept of a linear paradigm - knowledge and technologies are produced at universities and research institutions, transferred with or without intellectual property rights to society with political approval if legislations or the political agenda require, and finally reaching the end user. Some of the impacts are frequently weak relevance to society needs, lack of efficiency, low level of trust within society actors, increased gap between different groups of society, weak capacity for evolving innovations and innovation systems (Troyer 2014).

The linear approach to innovation is criticised for its lack of sufficient feed-back mechanisms, which are crucial to the innovation process. In addition, increasing global competitiveness demands shorter product lifecycles, implicating that research and development must be fully integrated into the innovation process (Fischer, 2001).

Definitions
In this position paper, “innovation” is defined as: “the use of knowledge – ideas, technologies and processes – into products, procedures and services that bring added value and are new in a specific context.”

The “Oslo Manual”, which serves as a reference in much literature and was prepared by OECD in 2005, identifies four types of innovation: product innovation, process innovation, marketing innovation and organisational innovation. The definition stated here, builds on the definition provided by Sida's Innobis project (Rafiqui et al, 2011) which acknowledges the Oslo Manual. However, it has been further refined for the purpose of this paper.

In this position paper we emphasis innovation coupled to research.

As innovation occurs in the entire society, innovation is here taken to be an eclectic concept which includes the above four types of innovation that can have commercial or social values: product innovation, which can provide both technological, biological or medical solutions, such as an improved cook stove that reduces CO2 emissions, a new form of rice better equipped to sustain flooding, and a new malaria vaccine; process innovation, such as a new way of paying for solar power through mobile technology, and a new way to collect the views of young people through text messages; marketing innovation, such as a new agent system to allow for input suppliers in agriculture to sell to small holders; and organisational innovation, such as changes in management structures and new strategic partnerships.

A common view is that for innovation to occur, interaction between researchers, private sector, civil society and political bodies, along with effective communications,
networks and partnerships across organisations and channels are required. Innovations can best be understood within a systemic and dynamic framework, and we here use a definition of an “innovation system” as a network of organizations, people and rules as a framework for the creation, dissemination and innovative exploitation of technology and knowledge. This system approach for renewal and innovation is important as it puts focus both on the mobilization of resources to support innovation as well as on the formation and strengthening of linkages between different actors from a systematic perspective (Lundvall 2009, Djeflat 2011, Ecuru 2013).

By “innovation for inclusive development” and “inclusive innovation” we refer to development that marginalized groups take part in and benefit from. As marginalized groups may be unable to express what problems need to be addressed, representatives from non-governmental organizations (NGOs) or governmental organizations may be needed to identify the problem. It is hence important that also they interact with the potential problem-solvers, such as academic institutions (Trojer et al, 2015).

Innovation processes are fostered by cluster development. “Clusters” are often geographic concentrations of interconnected companies, specialized suppliers, service providers and associated institutions in a particular field (Sölvell 2009), and the clusters we refer to in this position paper include different actors in addition to the private sector unless stated otherwise. Clusters of interconnected firms in the same or related industries that locate within a particular geographical area are a common feature in the economic landscape across the world. They may arise spontaneously or be the result of a targeted initiative to boost the competitiveness of a particular country, or region within a country (see e.g. World Bank 2009). Clusters may also include other institutions than the business sector. The “triple-helix model” involves universities (knowledge institutions), industry (private sector) and society/government (on any level) (Etzkowitz 2005). Depending on the context other actors may be involved, creating “multi-helix” models. In this position paper we do not separate it and refer to “triple-helix” for simplicity.

“Knowledge Transfer” is defined as the process of transferring skills, knowledge, and/or technologies between universities and other institutions to ensure that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology to develop innovations i.e. new products, processes, applications, materials or services. The feed-back mechanism is crucial in this process.

3. THE IMPORTANCE AND RELEVANCE OF INNOVATION AND INNOVATION SYSTEMS IN LOW- AND MIDDLE-INCOME COUNTRIES

Specific challenges for innovation in low- and middle-income countries

The challenges in the innovation system of low-income countries are different from those in technologically leading countries. The resource base as regards economic and human capital is deficient and much more fragmented, and they need to meet these challenges in a situation of extreme unpredictability (Trojer et al, 2013, where specific challenges of emerging innovation systems in low-income countries are described).

One major challenge is lack of trust and understanding, weak networks and linkages between different actors such as private sector, university, society and government. In Africa the ten-year African Union Strategy “Science, Technology and Innovation Strategy for Africa (STISA) 2024” has succeeded the Africa’s Science and Technology Consolidated Plan of Action (CIPA), and highlights the need of transforming Africa into a Knowledge-based and innovation-led society. Two priorities are the eradication of hunger and achieving food security, and the prevention and control of diseases. Science, technology and innovation is stated as an important tool. A new paradigm for African agriculture is needed, i.e. one that can help address food and nutrition insecurity as well as spur growth, reduce poverty, create wealth and protect the continents natural resources.

In LICs the nature of innovative outputs is mostly informal and investments are low. Many innovations
are experience-based as opposed to research-based. The markets are usually large but unstructured with a low purchasing power, giving rise to weak domestic demand for technological innovations. In LICs a majority of the innovations take place in informal settings (economic and social activities outside of the pur-view of the government and legislation) and through informal interactions, which have until recently been largely absent from the research agenda in innovation systems. In order to understand where innovation comes from and how it affects development, the informal sector must be well integrated into the research agenda. This is crucial for the understanding of inclusive development. (Soremekum J, 2014). It is important to consider that the strength of the innovation system will reflect both the quality of its components as well as the quality of the linkages. Poorly developed innovation systems concerning policy and regulation hinder formal interaction between university, private sector and government, which in turn limits innovation activities. A combination of supply and push stimulation with capacity building and institutional design is important for productive policy design.

Another challenge is the weak capacity of the financial system to support domestic investment in innovation and new enterprise. Probably the most important barriers for establishing a coherent innovation system are infrastructure (such as roads and electricity as well as telecommunication), weak governance structures and finance, as well as the lack of capabilities in the public sector.

One more challenge for LIC innovation systems is to effectively meet the demand for knowledge that occurs since very few domestic companies have the capacity to do their own research and development, and companies that produce or introduce new innovations to the markets are scarce or too small to be able to effectively scale. The innovative companies tend to use experience-based knowledge instead of science-based and more often than not imported technology from other countries (ESBR1 2013). Furthermore, there are weak backward couplings from the users of knowledge to the producers of knowledge e.g. research institutions. This means that the producers of knowledge do not get enough feedback from the users to feed into their research.

The article on the “Relevance of University-Industry Links for firms from developing countries” (Albuquerque et al, 2015) concludes that there are reasons to doubt the widespread notion that relationships between universities and industry are less important to firms in low-income countries. Technological demand of firms to universities in low-income countries is different from that experienced in high-income countries, but not necessarily weaker or less relevant. At some stages the low-income countries are mainly importing new technologies and the firms then need to adapt, improve and adjust to local conditions. Helix strategies, involving university, industry and government, are especially important to low-income countries where research and development activities undertaken by industry are scarce. In these counties the major part of research and development takes place at universities and research institutions (de Mello et al., 2008).

For innovation to prosper in low income countries the demand for qualified personnel at universities, in society including farmers and health practitioners, in governments and in private sector remains a challenge. The qualifications needed are mainly – but not only – related to the specific thematic topics where they work. The absorption capacity is the ability to use and transform knowledge and competence that has been developed and is owned by other actors. The absorption capacity of firms in LICs is often limited and the level of scientific training is often low. Learning is mainly passive in firms and the main knowledge sources are foreign. (Soremekum J, 2014).

There may also be political or personal interests that hinder development, as well as the lack of incentive structures.

**Tackling the challenges and improving innovation systems**

As highlighted in the “Handbook of Innovation Systems and Developing Countries” (edited by Lundvall, Joseph, Chaminade and Vang, 2009) a main characteristic of innovation systems in developing countries is the difficulty in producing and exploiting knowledge. Investments in building capability to increase absorptive capacity are absolutely crucial; both for growth and for distribution. Households and individuals should be the first to invest in, continuing with high quality education for everyone and capacity building of local firms.

The weak backward couplings from the users of knowledge to the producers of knowledge described above implies that identification of effective ways to increase linkages built on trust between users and producers could be one way to stimulate the demand and supply for knowledge. Co-production is one way to tackle the limitations of feed-back mechanisms, and is used in e.g. triple-helix clusters.

Innovation intermediaries are proposed to be important in filling the gaps in innovation systems in developing countries (Chaminade et al, 2009). Linking different actors is not enough, however, as the intermediary often
also needs to translate between the actors to match supply and demand. One such intermediary can be an NGO or a cluster organisation. Facilitators in clusters can many times be university teachers or researchers, being trained and experiences in mediating between different interests and brokering with new partners (Trojer et al, 2015).

Mode 1 and Mode 2 knowledge production
The concepts of Mode 1 and Mode 2 knowledge production are useful in the LIC context, where Mode 2 makes up an important and large share of the knowledge production. Mode 1 refers to “traditional” disciplinary knowledge production by higher education institutions, and Mode 2 refers to the knowledge production in the context of application and in an inclusive and participatory manner. The premise of Mode 2 knowledge production is that knowledge is created in a broader, trans-disciplinary social and economic contexts. It can for example include collaborative learning in farmer communities or of small firms. Mode 2 researchers have been proven to publish research of the same quality as Mode 1 researchers, and anchoring research questions and methods in social relevance does not hamper scientific productivity but rather transforms it to the benefit of both the society and academia, stated in the book “The Role of Universities in Inclusive Innovation” (Rydhagen and Trojer, 2014). A combination of both modes can also be very fruitful. Interesting reading about the combination of the two is given in the same book.

The Mode 2 knowledge production and innovation systems approach have in common that they emphasise interaction and learning among actors as the source of innovation. Societal influence is important, implying that cultural and social sensitivities of the community must be taken into account when diffusing innovation activities (Ecuro, 2013).

Clusters are successful ways to develop innovation systems
Mobilising human and financial resources in clusters have proven to be a successful way to develop the innovation systems in low- and middle-income countries where these systems are still weak. When the cluster works well, it should offer a neutral space for the actors to exchange ideas, experiences and develop new solutions to challenges. By combining stakeholders’ respective perspectives and mutual trust innovations can be developed. The dominant form of response to the need of innovations can according to the 2013 UN report on Africa be found in cluster formation in connection with natural resource based sectors.

Innovative clusters have capacity for renewal and innovation that spur competitiveness and growth. Triple-helix based collaboration creates a policy framework that stimulates joint vision and joint action (Etzkowitz, Leydesdorff 1997). Trust among cluster firms and other cluster actors creates a social capital, which is an important cluster asset. An important condition for an innovative cluster is the conscious attempt to organize key actors in a cluster by engaging government, academia and the private sector in what is commonly referred to as the triple-helix configuration for collective action (Saad, Zawdie 2011). In cluster initiatives other aspects than money are central in order to measure business success, such as self-esteem, women’s empowerment, collaboration and social networks, increased mobility and capacity, and environmental protection (Rydhagen and Trojer, 2014).

The innovation process is characterised by interactive experience sharing and development of learning among diverse agents, which is one of the reasons for the success of triple-helix initiatives, where stakeholders interact and work jointly towards the same goal.

Clusters in LICs must be relevant to the local context, and should include both formal and informal institutions in order to optimize for success. People are central in the innovation process by creating the links between different actors in the society, and people with different skills are a requirement. Cluster initiatives may help to solve structural problems but they tend not to evolve standing alone. There is a parallel process going on in cluster formation. At the same time as the cluster is developing a local innovation system is evolving. This is a bottom-up process reaching the regional and sooner or later the national level. In Bolivia, for example, the bottom-up (supported by Sida) and top-down development process of innovation systems has been very efficient. The national innovation system has an important role in strengthening the knowledge base and institutions, which makes cluster formation even more efficient.

Incubation and scaling up
Incubation has also proven to be successful in the creation of jobs, revitalisation of neighbourhoods, commercialisation of new technologies, and strengthening of local and national economies (The National Business Incubation Association, 2015). Scaling up innovations and research results can be defined as the process of increasing the reach, breadth, scope and sustainability of the changes, benefits and solutions that innovations bring to people. For development in LICs it is interesting to scale up innovations that are particularly beneficial to poor rural
populations, for example those targeting women and small-holder farmers.

Achieving impacts at scale involves moving from pilot testing and modest innovation, dissemination and communication activities to aggressive and sustained thrusts that promote meaningful and sustainable positive changes at large scales. Scaling up may occur when an innovation is used by an increasing amount of people in different geographical areas, countries or even continents. It also occurs when innovations provoke meaningful changes in livelihoods, in organizations and businesses, in market relations, and in policy configurations at the local, regional and/or national levels.

Partnerships are essential for scaling up innovations and research results; research organizations acting alone or leading scaling up are not effective in scaling up innovations. Business firms, service providers and not-for-profit organizations are key partners that can make the process effective, as they bring fresh, and often unique insights, and well-honed business capabilities. Civil Society as well as public sector organizations may also be included in scaling up partnerships to achieve lasting, meaningful changes at scale.

Business incubators have been tried in Uganda, but according to a doctoral thesis on the subject (Mutambi, 2013) this has not yet been done in a successful way. The research findings of the thesis indicate that open innovation incubators combined with entrepreneurial oriented strategies can effectively support start-ups and SMEs, but that this requires strong mutual trust amongst actors. Industrial transformation, needed in Uganda, can be stimulated through public-private partnerships and open innovation incubators.

**Universities can be key players in the innovation system**

In many LICs some important institutions involved in innovation, such as innovation agencies and hubs are weak or sometimes non-existing. Universities can be key players in the innovation process both as 1) providers of human capital, 2) as providers of scientifically validated knowledge through research, and 3) as incubators or hubs for new entrepreneurs and as a relatively neutral platform to create trust among all the needed actors. Linking universities closer to users of new knowledge is fundamental for their role in relation to economic development. Curricula for problem-based learning, teaching material based on research on the local context and training for the interaction are some measures mentioned. The ability of countries to grow and prosper will thus critically depend on the ability of their universities and university systems to adjust to their role in innovation development.

In addition to this, universities play key roles in the production of new knowledge, in being the hubs for global knowledge networks and international Diasporas and as “neutral” meeting ground for academics, industry and governments (Brundenius et al., 2009). Education and research can be seen as key to the innovation system, when including different levels of education such as pre-graduate training, postgraduate training, and continuous professional development of people engaged in society, academia and private sector. There is also the strongly held view that higher education should respond in and through all three core function areas of teaching, research and community engagement, through the development of new curricula and qualifications to address new education and training needs, through developing appropriate research themes to address new knowledge needs, and through forging new partnerships and joint ventures with industry, small- and medium-sized enterprises (SMEs), government departments, community organizations and other stakeholders” (Singh and Manuh, 2007: 12).

Knowledge in all of its forms is one of the most important factors for individual fulfilment and success in society. Education and research play a decisive role in the creation, dissemination and use of knowledge. They form an important foundation for innovation at all levels, which in turn drives the economic, social and cultural development of a country.

Graduates are considered to contribute to economic growth and innovation through their relatively higher ability to exploit new technological opportunities in the economy. Importantly, universities contribute to innovation through the formation of graduates with good problem-solving skills. One way to address this issue is to promote problem-based learning (PBL). Another crucial action is to develop curricula at universities that are relevant to the society. An important step toward inclusive development is the upgrading and modernising of the education of experts and researchers in the field of industrial policy, innovation policy and development strategies.

It is crucial to start with the local challenges. Universities can be excellent partners in improving innovation systems, especially since it has to be coupled to academic training. Instead of creating new innovation hubs, which do not have the same transformation potential as the universities usually do, it is important to explore the possibilities to involve universities in the process.

Neither lack of natural resources nor geographical marginality are main obstacles today in Africa, but the lack of skilled individuals to produce added value, make use of existing technology and develop context-specific
Innovations and solutions (Fellesson and Mählck, 2013). Countries where the tertiary education enrolment is low face a true challenge and one could argue that universities play an important role for innovation as producers of skilled individuals. Tertiary education is increasing in several parts of the developing world, accompanied by privatisation without much quality control. Another response to the lack of resources has been to strengthen university-private sector linkages. The linkage may influence both the university and private sector in different ways, but a main value for business seems to be that the universities are “factories” of creative people. It has been shown that hiring of well-trained graduates has an impact on the innovativeness of firms. The recruitment may especially be important in low-income countries where the absorptive capacity in relation to new technology is a major bottleneck. One way to move forward is the “developmental university”, defined in the Handbook of Innovation Systems and Developing Countries as “open and interacts with different groups in society, including industrialists, but it does not operate according to the logic of making profit. Its major aim is to contribute to social and economic development while at the same time safeguarding a certain degree of autonomy”. (Brundenius et al., 2009).

The focus on one of the Sida-funded thesis was on the dynamics, challenges and opportunities of developing innovation systems in low resource settings with a particular focus on Uganda (Ecuru, 2013). The findings emphasise the need for greater interaction and learning among actors in the emerging innovation systems in Uganda and eastern Africa. A closer interaction between the university and public research organisations and firms would be positive, and the university could be promoted as a locus for research and innovation. Four enabling conditions are proposed: 1) Specific policies and strategies with clear goals and incentives to promote growth of particular innovation systems; 2) A clear national policy for financing research and innovation, including core funding and competitive grants; 3) Business incubation services; and 4) Institutional reforms to make administrative processes less bureaucratic, more cost-effective and efficient.

Regarding innovation for sustainable intensification in Africa a big challenge in agriculture appears to be the separation between agriculture, research, teaching and extension. One way to address the challenge is to build a new generation of agricultural universities that combine research, teaching, extension and direct farmer engagement. The Nelson Mandela African Institute of African Science and Technology (NM AIST) in Arusha, Tanzania, is one such example.

**Research results are important sources for innovation**

Research may generate important results that can be used in different ways in society, but the link between the researchers and the implementing partners may be weak or even non-existent. As described in the Introduction, innovation is not a linear process and collaborative arrangements between involved actors including constant and timely feedback mechanisms are necessary. Many universities, especially in high-income countries but increasingly across the world, now have Innovation Offices or Knowledge Transfer Offices dedicated to identifying research of potential commercial interest and providing competence and strategies for how to exploit it.

Research on innovation and innovation systems has proven successful in creating an understanding of the interplay between the different stakeholders and in promoting evidence-informed policy-making.

Research on the role of universities in innovation and economic development is lacking in Sub-Saharan Africa (Albuquerque et al., 2015).

The Global Innovation Index (GII) provides interesting insights in the development of innovation worldwide. The large variety of indicators included in the analysis show the complexity of parameters that influence innovation, such as political stability, expenditure on education, ICT access and ease of getting credits.

GII 2014 highlights the importance of the human factor and the importance, in part, of advanced degrees. The authors of the preface state that creative and critical thinking often matters at least as much as technical qualifications. Putting the right environment in place that will nurture, promote and enable the human factor is critical. There are many actions to achieve this, and they point out education, training, and skill formation; collaboration; and the diffusion of knowledge (Global Innovation Index 2014). Sub-Saharan Africa is the region which has improved most significantly in GII rankings in 2014. Out of the 33 measured, 17 have climbed in the rankings this year. Emigration rate of highly skilled persons from Africa is substantial in Africa, 10.6% in comparison to the world average of 5.4%, which might impact innovation. Building favourable environments in order to retain highly skilled people is of relevance if one wants to improve Africa’s innovation potential (Global Innovation Index 2014).
4. SIDA’S RESEARCH COOPERATION SUPPORT TO INNOVATIONS: CURRENT PORTFOLIO AND RECOMMENDATIONS

Current support
Sida’s Research Cooperation takes a broad approach to innovation support

Sida Research Cooperation regards the innovation framework as not only related to science and technology, but takes on a broad approach as defined in the initial section of this paper. Sida recognizes the necessity for broader participation in the process of change and embraces the concept of innovation for inclusive development, engaging citizens as consumers as well as workers in processes of innovation.

Sida has identified the innovation systems concept as useful for the framing of its research cooperation activities, not least with regards to the use of research results. Sida has also recognized the necessity to involve different stakeholders from the early stages of innovation development.

Sida’s Research Cooperation innovation portfolio can be divided into two main types:
- a. Support to innovation systems, processes and/or innovations
- b. Support to research on innovation systems, processes and/or innovations

Current portfolio includes support at different levels
- a. Support to innovation systems, processes and/or innovations

Sida’s Research Cooperation initiated its support to innovations in 2003 when a need and clear potential to transfer results from the supported research programs was identified. The national innovation systems in Sida’s partner countries and regions were, if existing, in need of improvement, as well as the capacity in both the research and innovation systems.

Within the current Research Cooperation programs Sida channels support to innovation through the bilateral, regional and international systems, to universities, research and innovation councils, research and innovation institutions, ministries and international organisations.

The support to innovation systems includes support to innovation cluster initiatives within the bilateral agreements with Tanzania, Uganda, Mozambique, Rwanda and Bolivia. The co-evolving processes are taken into consideration from the start. Previously innovative university program in Nicaragua has been supported. In the external evaluation of these programs (Rath, 2012) the innovation systems concept was found to provide a useful framework for Sida’s support of research cooperation. It is a natural extension of research capacity building at the universities. In Bolivia the support was also used for the development of a technology transfer hub, which is now used as a national reference and the starting point for the national business incubators. In Tanzania there is a seed funding mechanisms for the financing of the first steps of innovative ideas.

Support to the development of innovations is included in the bilateral cooperation research support. Research projects are defined by the partners and mostly concerns issues of high relevance for development within areas such as agriculture, health, energy and habitat. Knowledge Transfer of research results is often an integrated part of the projects, although to a limited extent so far. Sida has supported Scandinavian Institute for Collaboration and Development (SICD) in research collaboration with East Africa since 2004 and Bolivia since 2007 for the development of innovation systems and triple-helix cluster development, as well as research in the area. The distinctive roles of the involved actors in the triple-helix clusters are supposed to complement each other in the innovation process and also generate a co-evolutionary learning process that would mobilise the adequate resources to spur product development and work processes, policy formation and new academic research (Trojer et al, 2015).

TECHNOLOGY TRANSFER UNIT (TTU) AT UNIVERSIDAD MAYOR DE SAN SIMÓN (UMSS), COCHABAMBA, BOLIVIA

The TTU has worked hard to increase trust between society, villages, researchers and industry: the Innovation Team consists of 35 researchers across faculties at UMSS. They gather expertise in order to enhance fruitful connections between researchers, society and industry. One of the activities includes entrepreneurial training of students, where students are involved in solving practical challenges identified by industry.

The TTU is now evolving into an Innovation Centre with increased capacity. Central issues are to build trust, understanding, experience sharing and so called “co-option” (cooperation and competition). The innovation activities at UMSS (including two successful clusters) now serve as a model for the national innovation system.
MOROGORO METAL WORKS CLUSTER, TANZANIA

The production among member firms increased by 5% over three years while in member artisan groups, it increased by 30%. The turnover in firms increased by about 30% while in some groups it increased by 240%. Trust among Cluster members, as demonstrated by joint procurement of raw materials, has grown and in the Morogoro region the cluster is known as an example of fast track economic growth.

The research supported in the regional and international programs has the potential to lead to important innovations. Bio-innovate is one example of this, where funding is given to bio-scientific innovations in agriculture, environment and process industry that are easily adopted and used by farming communities, agro-processing actors and other stakeholders. The feedback mechanism is taken into consideration from the start of the process. The funding of the BecA-ILRI hub is another example where new crops are being evaluated for the specific conditions of Eastern and Central Africa and where farmers have been involved since start.

ZANZIBAR SEAWEED CLUSTER INITIATIVE

The production of seaweed has increased by 150% in three years. One reason for the increase is the improved farming techniques provided by the Institute of Marine Sciences at the University of Dar es Salaam.

Production of seaweed soap, juice, pastries and oils has started as part of value addition. The turnover from spice soap production has over three years’ time increased by 72%, and the quality of seaweed has improved through the use of better species and drying techniques.

The cluster involves researchers from the Institute of Marine Science, the state through the Ministry of Agriculture, local and district governments and COSTECH, and small family businesses – they started with 20 members from one village in 2006, and increased to 3,000 members from eleven villages in 2013. The results include both product and process innovation, which has led to economic and social development and the main beneficiaries are women.

When seaweed farmers were trying new deep water cultures on floating rafts, they added basket traps under the rafts to catch fish. The farmers were very happy to now get fish without major efforts.

Sida has previously supported the Pan-African Competitiveness Forum (PACF) in coordinating cluster development in Africa by applying a systematically designed process intended to accelerate the pace of establishment of cluster initiatives as foundations for innovation and knowledge based economic development on the continent. PACF continues to be an important forum for the interaction of African cluster managers.

b. Support to research on innovation systems, processes and/or innovations

Sida supports research on innovation systems through the Global Network for Economics of Learning Innovation and Competence (Globelics), a global network of scholars who apply the concept of “Learning, Innovation, and Competence Building System” as their analytical framework. The network is especially dedicated to the strengthening of research capacity in innovations research, as well as learning, innovation and competence systems in the South.

In addition, Sida has provided support to a project with Innovation Higher Education and Development (IHERD–OECD), which focuses on innovation, higher education and research policies; the UniDev project which focused on the role of universities in innovation and development; and the AU/NEPAD initiative ASTII (African Science, Technology and Innovation Indicators) that in 2010 launched the first ever African Innovation Outlook and its second edition in 2014. Furthermore, Sida funded in 2001–2009 the UNESCO Forum on Higher Education, Research and Knowledge that brought together researchers from the field of higher education, research policy, and innovation and innovation systems. At present Sida funds UNESCO Natural Sciences where support to the sub-program Go-Spin focuses on science, technology and innovation indicators.

In addition to the above mentioned programs, Sida supports programs that are not labelled as “innovation”. For instance, research in many of the supported organisations working with global health has resulted in a number of innovations and procedures and new mechanisms for engaging decision makers (examples TDR, HRF, EDCTP),
SET-UP OF THE BIO-RESOURCES INNOVATIONS NETWORK FOR EASTERN AFRICA DEVELOPMENT (BIO-INNOVATE) PROGRAM

The Bio-Innovate Program was established in 2010 to support multi-disciplinary biosciences and product oriented innovation activities in the eastern Africa countries. The program emphasizes the use of modern biosciences to improve crop productivity and resilience to climate change in small-scale farming systems, and to increase the efficiency of the agro-processing industry to add values to local bio-resources in a sustainable manner.

Bio-Innovate is employing an innovation systems approach (Public-Private Partnerships, PPP), engaging new and existing actors in and outside the eastern Africa region (South-South–North Network) in bio-resources innovations, laying the foundation for up- and out-scaling approaches for development. Currently, the Program comprises nine innovation and policy consortia projects involving 57 institutions. The aim is to ensure packaging and translation of innovations into forms easily adopted and used by farming communities, agro-processing actors, and other stakeholders in the economy. Bio-Innovate implements this approach by creating innovation platforms through effective partnerships that spans the innovation value chain.

Guiding documents

Sida views Research Cooperation and development of innovation capability as key and strategic to sustainable development objectives, addressing environmental, social, and economic challenges in developing countries and regions. The support to innovations is guided by the following documents adopted by the Swedish Government:

- Sweden’s policy for global development (Sweden’s policy for global development, 2003), specifically as related to economic growth which is fundamental to development, and the fight against poverty, to which knowledge systems and innovation is mentioned in relation to the goal of ensuring poor peoples’ access to sustainable health systems and basic medicine.
- The Strategy for Research Cooperation and Research in Development Cooperation 2015–2021 (Strategy for Research Cooperation and Research in Development Cooperation 2015–2021; 2014) states that Sida has a mission to promote research which can contribute to poverty alleviation and sustainable development through innovation.
- The governmental platform for development cooperation (Biståndspolitisk plattform, 2014) states that development cooperation shall promote innovation and entrepreneurship; and that support to high quality research can promote the development of a country’s innovation system where researchers, business and society meet. Innovations are encouraged and innovation processes shall be promoted.

Evaluation and views from Sida’s partners

In preparation of this position paper Sida has consulted partners and performed an evaluation on Sida’s support to innovations (Rath, 2012). The recommendations are summarised below.

Selected recommendations from the evaluation on Sida’s support to innovations (Rath, 2012):

1. Maintain and expand the cluster/triple-helix programs to additional countries where Sida provides support.
2. Link different initiatives between bilateral and regional/international programs for increased impact and effects.
3. Include on-going assessment and models for incentives for improved performance in programs.

SORT IT – IMPROVING HEALTH SYSTEMS THROUGH RESEARCH: A programme of TDR bringing research for countries to address current health system challenges

SORT IT (Structured Operational Research and Training Initiative) is an operational research training model aimed at working with WHO regional and country offices and ministries of health to identify the health system challenges, train national public health officers to work with their data and develop solutions.

Ten structured research and training programmes were completed or ongoing in 2013, resulting in more than 118 research studies/trainees in 43 countries addressing critical health issues such as multidrug-resistant tuberculosis, malaria, neglected tropical diseases, maternal and child health and HIV/AIDS.

The areas for research are developed in close cooperation with the World Health Organization’s regional offices, where staff in Ministry of Health offices identifies the health system challenges and then work closely with the WHO office to develop and complete a research project within a year in order to address more quickly their constraints.
Recommendations from the Maputo workshop, 2013

On December 5th 2013 Sida hosted a workshop in Maputo, Mozambique, for a consultation with invited stakeholders on their views of the roles of private sector, government, academia and donors/funders in relation to innovation. Participants from academia, governmental institutions and private sector from Africa, Europe, and Latin America actively shared their experiences and challenges in supporting innovation. Many suggestions were brought forward by the attendants and the following list are some selected key opinions regarding the donor’s role in relation to innovation that can be taken into consideration. Importantly, the participants highlighted some of Sida’s principles, such as ownership and working across the entire innovations systems.

1. Donors should be seen as catalysts of innovations. Showcasing success stories and picking the “low-hanging fruits”3 is a good way to engage more actors such as the ones from national government, society and private sector.

2. Donors can work directly with governments, and support them in becoming enablers without intervening or controlling the innovation process.

3. The donor could advocate for the development of policies stimulating innovation and the empowerment of universities to play a more significant role in the innovation process. There is also a need to create national institutes for quality assurance and standardisation, as well as mechanisms for seed funding and loans for up-scaling.

4. Donors can introduce new concepts and create awareness in the country. The donor can also promote exchange between programs world-wide, showcasing different ways to stimulate innovations, as well as to create neutral arenas for stakeholders from academia, private sector, society and governments to interact. Policy-makers should be involved in workshops and seminars.

5. It is important that the donor never imposes its own innovation strategies, but supports the partner country/region in the implementation of their own strategies.

6. Additional roles of donors:
   a. Support knowledge sharing and support pilot projects.
   b. Support dialogue on national issues and facilitate linkage with international partners.
   c. Support establishment of innovation funds.
   d. Encourage investment.
   e. Encourage brain circulation – exchange of people (faculty, students and more…).
   f. Facilitate technology and knowledge transfer.
   g. Coordination among the donor community.
   h. Coordination within individual donor/same country.
   i. Revise project requirements/conditions – especially regarding procurements.

NEW MEDICINES TO THE MARKET

Swedish research cooperation has supported the development and testing of an oral cholera vaccine (marketed as Dukoral or Shanchol) all the way from basic research performed at Gothenburg University in Sweden to the field testing and scaling up of production performed at the International Vaccine Institute, Seoul, Korea. The vaccine received WHO prequalification in 2011 and is currently used in endemic and epidemic areas in countries around the world.

Globelics view on the donor role, 2014

Researchers and members of the Sida-supported global network Globelics view the role of donors in the provision of support to knowledge production in the public sector (research and education), in combination with building bridges and establishing platforms for interactive learning. Bengt-Åke Lundvall, one of the front researchers in innovation systems and the Secretary General of Globelics, recommends that innovation programs should respond to specific needs in the society such as infrastructure, communication, health, environment, water, energy etc; and be a combination of investments in science and education with establishing technology standards and creative public procurement. The programs should aim at linking activities with market-driven industry and service enterprises.

Graduates contribute to economic growth by being innovators. Learning can be seen as the most important process in today’s economy, where learning refers not only to people and organizations getting access to more information but where the core is people becoming more skilful in what they do. Learning results in explicit knowledge about the world as well as in tacit knowledge about how to do things. An important task for donor organization is hence in supporting learning mechanisms.

SICD view on the donor role, 2015

SICD has a special responsibility to link universities and micro-, small and medium-sized enterprise (SME) in appropriate innovative clusters. This reflects much more how the industrialization processes in the poorest
countries will take place. Increased cooperation between and with support to micro-financing and research efforts would be very interesting. A stronger link between research and innovation within the framework of the aid sector program would give better results. Post-2015 targets SDG clearly demonstrate increased cross-references between the sectors, which means an increased need for integrative science in cooperation with the actors, who will implement SDG objectives i.e. water-energy-food nexus.

ICDDR, B - THE INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH

Implementation is a strong focus of icddr,b’s work, and the institute works closely with the Government of Bangladesh on the implementation and evaluation of reproductive health services. Another strong focus is disseminating information on evidence-based practice, and they also carry out research to understand the factors accelerating or inhibiting the uptake of evidence-based practice.

One of icddr,b’s main emphases is reproductive health. The single most common cause of maternal mortality is excessive blood loss after delivery. Most births in Bangladesh take place at home without specialist in birth support, and icddr,b is looking into how simple measures such as a “birthing mat” to identify excessive blood loss may be able to minimise maternal deaths.
5. ANALYSIS OF AND SIDA’S POSITION ON INNOVATION SUPPORT WITHIN SIDA’S RESEARCH COOPERATION – THE WAY FORWARD

Analysis

The analysis takes into account the above guiding documents, literature, the results from an external evaluation on Sida’s support to innovations (Rath, 2012), consultations with partners (especially from the workshop in Maputo described above), and discussions in Sida’s Working Group on Innovation within Sida’s Research Cooperation. Sida is one of the pioneers amongst development cooperation actors in the strategic work with innovation systems in low-income settings, and we have seen a good response to the activities performed so far.

Sida’s experience to date informs us that systems of innovation may have varied scope (international, regional, national or local) and may have different organizational and institutional components: we have provided support to Research and Innovation Systems through for example:

- Provision of R&D investment to create new knowledge, primarily in engineering, medicine and the natural sciences.
- Research Capacity-building to create a highly skilled group in the labour force to be used in R&D.
- Establishment of new product markets.
- Quality assurance mechanisms.
- Encouraging creative organizations which promote entrepreneurship and enhance the infrastructure to boost innovation.
- Networking through markets and mechanisms with interactive learning amongst the institutions involved.
- Creating enabling institutions which facilitate innovation [such as Intellectual Property Rights (IPR) and tax laws, R&D investment, sound environmental and safety regulations].
- Incubation activities to foster innovative projects.
- Financing of innovative processes to facilitate the commercialization of knowledge using innovative funding mechanism within Sida.
- Consultancy services for technology transfer (including the legal and commercial aspects of innovative activities).

Sida Research Cooperation main partners are universities and research institutions, who are shown to have a crucial role in the emerging innovation systems in low-income settings and provide us with a very relevant entry to the challenges regarding innovation.

Revisiting the objectives of result 3 as stated in the Strategy for Research Cooperation and Research in Development Cooperation 2015-2021: “Strengthened research of high quality and of relevance to poverty reduction and sustainable development focusing on the promotion of research that, through innovation, can contribute to poverty reduction and sustainable development.”

1. More interfaces, networks and cooperation established between actors from research institutions on the one hand, and the business sector, public authorities and civil society on the other
2. Improved conditions for researchers to develop innovative ideas with the potential to contribute to the emergence of new products and services that contribute to poverty reduction and a sustainable society.
3. Reinforcement of the role of universities and their contribution to innovation processes and systems.

Sida Research Cooperation Unit concludes that the current portfolio is in principle well balanced but can be strengthened in some important areas.

Based on experience in previous research cooperation involving innovation development among Sida’s partner countries and regions, we will also take into consideration the following components in the analysis:

- **Capacity** – for the production of new knowledge, to manage innovative ideas, to manage innovative firms, and to bring in new ideas into firms. Education of skilled professionals and support to managers of innovations, such as context sensitive knowledge transfer, incubators, experts along the innovation development stages;
- **Financing structures** – different kinds of financing for research, the pilot stage, the introduction into the market and for up-scaling;
- **Interaction** – interfaces, networks and cooperation to achieve mutual understanding, to develop new ideas, to promote effective co-evolving processes including feedback mechanisms and to test innovations in an accurate environment;
- **Structures, policies and mechanisms** – to facilitate, enable and stimulate innovation and entrepreneurship, standardization, intellectual property rights, regulatory frameworks.
The current portfolio is in principal well balanced but can be strengthened in some important areas

Following the consultations with actors in partner countries and regions and the evaluations and results from supported programs, we can conclude that the current portfolio of research-coupled innovations is in principal well balanced and includes important areas of support. More can be done in similar ways, always being aware that the field is in constant development and new tools and ideas emerge along the way. In order to find synergies and increased impact, it is important to look at the research cooperation portfolio as one part of Sida’s overall portfolio.

There is sometimes a tension between local orientation of research and establishing elite research in order to get access to global networks. There is a corresponding dilemma between local innovation initiatives, such as clusters, and global value chains initiatives. We have chosen to address various levels, from local to global, and strive towards finding synergies between the different layers. This is also reflected in the Strategy for Research Cooperation and Research in Development Cooperation.

a. Support to innovation systems, processes and/or innovations

In general, Sida’s analysis points to the fact that Sida’s support to innovation systems, processes and/or innovations is well-thought-out and based on previous experiences. Research of relevance often leads to innovations that have an impact on the society, and research of relevance will continuously be supported. Support to innovative clusters is assessed as a successful way to promote innovation systems and this support mechanism should be spread both in connection to university support and within Swedish support as a means for development. Private-public partnership set-ups are equally important and can be further explored within Research Cooperation.

Some additional actions, described below, would strengthen the portfolio. In particular we would like to point out the following:

i. Systems and processes for innovation

When universities are mature it is highly appreciated to establish capacity for knowledge transfer and/or interaction with private sector and society. People who have been capacitated can either form a network or a hub, depending on the local conditions and identified needs, and would offer expertise in areas such as national legislation, intellectual property rights (IPR), agreement conditions and business plans, in order to complement the researchers’ skills. As stated in Rath’s evaluation of Sida’s support to innovations, innovation structures in LICs are very fragile and need larger efforts in order to succeed compared to high-income countries.

Incentives for innovation are often lacking at universities in LICs, and the development of such should be considered. As this is not only a challenge for LICs, exchanges of ideas and experiences could be shared between universities’ partners across the world. One could also imagine exchange programs for innovation and challenge-driven education as ways to move forward.

ii. Capacity building of people involved in innovation systems in partner countries and regions

The capacity strengthening of professionals in the public sector in innovation systems, business management and financial systems, including persons working both at the policy level as well as at grassroots level (researchers, cluster managers, SMEs, Knowledge Transfer officers) could greatly enhance the innovation capacity of Sida partner countries. A strong recommendation is to build business capacity among persons involved in the national and regional innovation systems, including those involved in incubator and cluster activities, and in addition structured approaches to enhance the capacity building of professionals involved in the innovation systems would strengthen the portfolio.

Sida has a number of instruments that can be useful for stimulating innovation and improving innovation systems, such as the previously offered International Training Programs (ITP) in innovation systems in cooperation with Vinnova, and the ITP in intellectual property rights in cooperation with the Swedish patent office (Patent- och registreringsverket, PRV). These activities provide interesting training possibilities for policy makers in partner countries and regions, and novel set-ups could be considered. Enhanced cooperation with Vinnova, SICD, Chalmers University of Technology and other Swedish actors could also be of interest in the strengthening of innovation systems.

In addition to this, it is important that Sida’s officials continue discussing with authorities involved in the different aspects of innovation in partner countries and regions, e.g., research and innovation councils and ministries, in order to stimulate and catalyse the implementation of innovation policies, and possibly to contribute to the development of innovation funds.

iii. Strengthening training programmes for local researcher and academic staff

Innovation in LICs would benefit from enhanced training in innovation-related areas. Education related to innova-
tions should be taught at the universities, such as entrepreneurship and management training. The training should be available for both students and academic staff. The aim should not only be to educate more entrepreneurs, but to enhance the understanding amongst academics about innovations and the potential use of research findings, of innovations in the context of national development as well as of co-production with stakeholders outside academia for relevant knowledge and technology production. Our experience shows that both researchers and students at different levels can be involved in the innovation system, such as in the case of Bolivia where both researchers and undergraduates participated in solving challenges jointly with small firms.

iv. Cluster support
The innovation support in the bilateral and regional cooperation has been highly appreciated by our partner universities and the society as such. Based on the success of existing clusters, researchers working in fields that are different from existing triple-helix clusters are eager to be engaged in clusters focused on their field of research, in order to spread their results and accept new challenges. As in the external evaluation (Rath, 2012) Sida also recommends future support to clusters, and our analysis also shows that Sida should continue to support those initiatives and expand whenever possible. However, it is strongly recommended to take small steps, as each thematic cluster must be locally analysed.

The evaluation (Rath, 2012) points to the fact that the innovation systems and cluster approaches provide additional co-benefits of increased trust and social capital, important factors that promote growth, and also contribute to improved governance.

v. Business incubation
Business incubation is a business support process that accelerates the successful development of start-ups and fledgling companies by providing entrepreneurs with an array of targeted resources and services. These services are usually developed or orchestrated by incubator management and offered both in the business incubator and through its network of contacts. A business incubator’s main goal is to produce successful firms that will leave the program financially viable and freestanding. Graduates of these incubators have the potential to create jobs, revitalize neighborhoods, commercialize new technologies, and strengthen local and national economies. Adopting a regional approach to the development of business incubators (i.e. as advocated by Bio-Innovate) will help to ensure that there are sufficient promising technologies within the pipeline.

vi. Connecting partners – exchange of successful initiatives
There is a great potential in connecting partners from different supported initiatives, both nationally and internationally. For this purpose Sida can promote and finance meetings, seminars and conferences of this kind to a larger extent.

As a large proportion of innovations in LICs occur through informal connections, it is important to include support to networking in the contributions in order to build trust and understanding.

The above mentioned instruments could also be used for the purpose of connecting partners. Experience from successful initiatives is important to spread both South-South, North-South and South-North.

vii. Monitoring of innovation
The development of systems for analysis, policy-interaction, indicators and similar tools to support innovation are important tools to be developed in the portfolio. Sida has supported the African Innovation Outlook, which has proven to be a great tool to understand the development in Africa. It has been used by African countries to put in place policies aimed at developing science, technology and innovation.

General principles to include in Sida Research Cooperation programs:

i. Support to a variety of organisations, based on the specific needs of the region
The evaluation (Rath, 2012) points out that no single “exclusive model” or “way of working” was identified as the best way to link education, research and knowledge use with enhanced growth and poverty reduction. Thus, it is considered relevant that support to innovation systems within Research Cooperation ought to be open for all relevant promising programs supported via national universities, research councils, Swedish and Nordic universities, as well as other relevant Swedish agencies engaged in conducting research on innovation, and which are working towards developing enabling policies that encourage and support innovation economic development in LICs.

ii. Include innovation from all areas
Innovations in LICs should not only focus on technology-intense processes, but also include social innovations, traditional local knowledge, and new processes/products, novel in the specific country or context but maybe not to the rest of the World.

Within Research Cooperation the aim is to continue to focus on supporting research that merges the fields of innovation studies with various disciplines already sup-
ported, such as health research, natural sciences and technology, social sciences, as well as within interdisciplinary research and Information Communication Technology (ICT).

Certain new technologies offer opportunities for cutting-edge research which can have tremendous social impact such as studies in genetics which can lead to, e.g. more productive and resilient crops and livestock breeds as well as prevention and treatment of diseases that disproportionally affect the poor.

**iii. The need for a systematic view of innovation funding – mobilising innovation funding**

Innovation processes are complex and financing needs to evolve with the different stages of the innovation. The entire innovation chain needs to be considered; from new ideas, proof of concept, technology development, application development, pilot testing to commercial scale-up. Within Research Cooperation funding is possible up to the pilot stage, and the implementation should preferably be financed by other mechanisms. For example, at Sida there are a number of possible funding schemes, including the so-called “Challenge Funds” open to innovators from across the globe for early funding for development of their innovations in defined areas. The “Global Health Investment Fund” which encourages innovation and product development is supported by Sida through loans and guarantees and has provided opportunities for the development of orphan drugs/interventions. The “Global Innovation Fund” provides funding schemes at three different stages of development. At some Swedish Embassies financing and support for market introduction is possible, and for companies there are possibilities to use loans and guarantees as means to grow. These funds are still difficult to obtain for researchers and small and medium enterprise (SME) in LICs. Therefore, new set-ups are necessary in order to stimulate innovations in Sida’s partner countries and regions and to benefit society.

Early funding: Research of relevance is and will continue to be funded through the Research Cooperation, and advice and financial support is to a certain degree given through innovation funds and Knowledge Transfer offices at bilateral and regional levels. An enhanced support at this stage is considered necessary. Current Sida funding for innovation is mainly directed to private firms, organisations and institutions and not to researchers or individuals with innovative ideas/products. Pilot testing can be supported by different sources, and a common knowledge about these possibilities and specific challenges need to be spread within Sida, Embassies and partner organisations.

The funding possibilities of innovations after the pilot stage are still weak. In Europe business angels and risk capitalists here play an important role. One possible funding scheme could include so called “revolving funds”, where small innovative companies can lend money in order to realise their ideas and repay the loan when the product has been developed and provides income.

The possibilities to create partnerships with private sector needs to be further explored, as well as connecting Swedish small- and medium-sized enterprises (SMEs) with SMEs in partner countries for capacity building as well as market sharing. Possible cooperation with Swedish innovation actors could also be explored.

Middle and late funding: Sida’s competitive grants (“Challenge Funds”) are an interesting tool for financing innovations at the next stage, and the possibility to set up innovation funds as well as competitive funds at the Embassies should be further explored. The Innovation Workgroup put emphasis on the need to build capacity in our partner countries, such as setting up international evaluation committees for national and regional innovation funds.

The Bio-Innovate program now enters a new stage where loans and guarantees are considered as a second step, and experiences gained can be used in additional programs.

Sida needs to take a more systematic approach to the entire innovation process and innovation chain and its so-called “death valleys” in order to improve its support to innovation. In order to do so, further coordination within the organisation is desirable.

**iv. Learning from successful initiatives**

Sida-supported research often results in potential innovations, and although there are initiatives to bring these results to the society a more structured approach is possible. Examples are public-private partnerships, cluster initiatives, knowledge transfer hubs, business incubators and seed funding mechanisms. To reach this objective, Sida’s staff needs capacity to embrace these ideas and to exchange experiences and learn from other initiatives (internal and external to Sida).

**b. Support to research on innovation systems, processes and/or innovations**

In order to foster understanding of the specific challenges in innovation processes in low- and low-middle income countries, Sida Research Cooperation will continue to support research on innovation systems, processes and/or
innovations in LICs, as well as how to effectively exploit research results in countries with weak innovation systems.

It is equally important to promote training of researchers in these countries on innovation and Knowledge Transfer in order to make full use of universities’ third mission to serve society in various ways, as well as the exchange of experiences and ideas amongst these scarce researchers in LICs.

The current support to Globelics and the connected Africalics provides good insights for Sida to promote its support to innovation systems, processes and/or innovations, and also provides an arena for researchers to interact.

**Enhanced synergies within Swedish support to innovations**

Synergies can be improved at Sida by the active participation of the Innovation Workgroup in Sida’s Innovation Network where experiences can be shared and the programs better adapted to different needs. The research funding will in certain areas be part of the recently launched USAID cooperation.

There are a number of potential synergies to be promoted by connecting the innovation support at Sida’s Research Cooperation with other initiatives at Sida and the Embassies, such as the public-private partnerships (PPDP), ICT for Development (ICT4D), Innovations Against Poverty (IAP), and Private Sector Collaboration. Through openness to possible joint financing mechanisms, to hold joint conferences and workshops, and to make sure to involve relevant partners in relevant activities we can accelerate partner-driven projects, as well as Sida’s way to support Innovation programmes and communicating the results within these programs.

**Cross cutting issues and synergies**

Sida’s Research Cooperation’s support to innovation systems aims at creating possibilities that support the development of new frameworks and methodologies applied within the innovation context in all areas, which can improve livelihoods as well as to contribute to inclusive economic development. The support shall be focused on creating these possibilities in Sida’s partner countries and regions.

The support to programs shall, if possible, include climate change and environment, a gender focus (gender balance) such as the impact of the research and innovation programs on women (girls), as well as on general impacts on public health or public benefits essential to the improvement of quality of life and livelihoods, such as improved public health systems, improved natural resources and the environment; improved transparency, public services, as well as possibilities for creating local entrepreneurialisms (clusters). It is also important to include interdisciplinary research and ICT.

Even though a lot of the funding will be directed towards organisations working with different aspects of innovations, Sida will also make efforts in enhancing support from other actors in society and promote meetings and exchange between programs and stakeholders.

**Sida’s position on innovation support within Sida’s Research Cooperation**

In order to achieve Result #3 of the Strategy for Research Cooperation and Research in Development Cooperation 2015-2021 “the promotion of research that, through innovation, can contribute to poverty reduction and sustainable development”, resulting in 1) More interfaces, networks and cooperation established between actors from research institutions on the one hand, and the business sector, public authorities and civil society on the other, 2) Improved conditions for researchers to develop innovative ideas with the potential to contribute to the emergence of new products and services that contribute to poverty reduction and a sustainable society, and 3) Reinforcement of the role of universities and their contribution to innovation processes and systems, Sida’s position is to focus on inclusive innovation with the following outcomes:

a) Improved capacity to develop and identify context-specific research results and solutions, that, through innovation and innovation systems, can contribute to significant social impact and sustainable development (connects to Strategy result 3.1, 3.2 and 3.3)

b) Established and improved financing structures and systems in partner countries and regions, as well as linkages to other innovative funding mechanisms where Sida contributes directly (connects mainly to Strategy result 3.2)

c) Established and facilitated interfaces, networks and cooperation between different stakeholders involved in the innovation ecosystem (connects mainly to Strategy result 3.1)

d) Developed and improved structures, policies and mechanisms to facilitate and promote innovation and transfer of knowledge (connects to Strategy result 3.2 and 3.3)

In order to achieve all of the above we need to promote research and analysis on innovation and innovation systems in low- and low-middle-income settings.
6. SUMMARY

This position paper highlights the importance and relevance of innovation in development, and especially its relevance for sustainable development in low- and middle-income countries in the context of research cooperation supported by Sida. It also provides a general description of Sida's support to different innovation initiatives within Research Cooperation, and gives some selected examples of programmes supported at the national, regional, and global levels.

Sida's Research Cooperation has the strategic position to look at innovation from a holistic perspective. The support given today is efficient and has an impact on society. The portfolio is balanced and experiences from more than ten years of support are integrated into new programs. Areas of additional support have been identified as well as the role of the donor.

Sida’s Research Cooperation focuses on research of relevance and the use of relevant results, feeding into the initial steps of innovation. A systems-approach to innovations should be promoted within Sida, Embassies and partners, resulting in enhanced synergies and cooperation. The cluster model should be spread across the organisation.

Enhanced capacity-building of stakeholders would benefit the society and possible action points include education and training, workshops and greater possibilities for interaction.

Although financial support is not provided to all components of the innovation process, the different components should be taken into consideration when agreeing on funding a programme.

As pointed out in the Innovation Cluster Development Guidebook for Emerging Clusters, “donor funds can speed up the process, but they cannot replace the initiative, energy, creativity, and commitment that must be in place for innovation to thrive and for the seeds of prosperity to grow.”
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