A national centre for

Indian-Swedish Collaboration on Technical Research and Education (INSTEC)

December 2005

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Preface

In October 2002, a delegation from KTH, headed by the President Anders Flodström and the Vice-President for International Affairs Ramon Wyss, travelled to India in order to deepen academic ties with India. The delegation visited a number of government agencies, universities, institutions and enterprises in the public and private sectors of the Indian economy.

The delegation was i.a. received by the then Minister of Education, Professor Joshi, and the Secretary to the Government of India, Department of Science & Technology (DST), Professor Ramamurthy. The main result of that particular, very creative meeting was a broadly defined proposal by Professor Ramamurthy that India and Sweden conclude a bilateral agreement to promote a closer and jointly funded cooperation in the areas of research and technology.

KTH has followed up on the Indian proposal in a series of meeting, i.a. with the Swedish Ministry of Foreign and the Ministry of Industry, Employment & Communication, to review the concept and possible scope of an agreement along the suggested lines.

These preliminary discussions eventually culminated in a formal proposal, submitted in November last year, to the State Secretary of Industry, Employment & Communication, Sven-Eric Söder, suggesting the creation of a Swedish-Indian Centre as a possible organizational and administrative framework for the proposed expanded contacts and cooperative efforts between

Following Mr Söder s favourable reaction, KTH met in March this year with Mr Peter Strömbäck and Mr Stefan Kairen from the Ministry of Industry, Employment & Communication for further discussion and guidance. The project was also discussed with the Swedish Agency for Innovation Systems (Vinnova). KTH was thereafter commissioned to develop a detailed proposal for a Swedish-Indian Centre, which could achieve the agreed objective of blending talents and resources from governmental and academic circles with the research facilities and practical capabilities from the commercial sector.

KTH takes this opportunity to also thank all representatives from various Swedish universities who have contributed with valuable and much appreciated comments during the drafting stage of the attached Report.

Ramon Wyss Vice-President for International Affairs KTH

Introduction

Globalisation

The effects of the globalisation process are leading to the movement of people, capital, goods, services, information and technology across regional and national borders, resulting in a growing global competition. Investments in R&D are also becoming more and more internationally mobile seeking the regions and countries that offer the best conditions.

This means that not only production and services are outsourced, but also research. Companies that wish to carry out research can now establish facilities in any part of the world and they are more prone to base their decisions on available local capabilities, costs and availability of qualified researchers. The development of new knowledge and innovations is increasingly taking place in different partnerships between research organisations and enterprises in different countries.

Cross-border flows of research and development are now changing from USA, Europe and Japan towards emerging economies like China, India and Brazil.

The global competition has stressed the importance of how to promote growth and profitability in small and mid-sized companies by identifying areas where new knowledge can develop new ways of working, new products and new markets. The capacity of smaller companies to break into new markets should be strengthened in order to make use of the great potential that exists for new exports and operations in foreign markets. Increased exports are anticipated by offering smaller enterprises the opportunity to bridge initial barriers to participation in strategically important markets abroad.

Many small and mid-sized companies lack the resources needed to organise advanced training on their own. Universities, on the other hand, do not always have up-to-date knowledge about conditions in the business world. They need to improve their contacts with companies, both to get ideas for new research projects and to find new applications for on-going research. Universities, however, clearly constitute a very valuable resource in this regard, not only with respect to their research and development projects, but also in relation to their students who as part of their formal education, carry out research-project-related assignments, degree projects and dissertations.

Industry and the business community need incentives to collaborate in research networks and better information about how such collaboration can be brought about. If Sweden shall be able to continue to compete successfully in a knowledge- based economy, it is of fundamental importance that Swedish research and education are of world class. To maintain the strong international position of Swedish research continued efforts need to be made in research and postgraduate education. International cooperation with an emerging economy like India will bring opportunities to strengthen Swedish education and research. An effect of this will also be stronger demands placed on Swedish higher education institutions and research environments to be more internationally competitive.

Indo-Swedish cooperation

With its emerging economy and a rapidly growing technical base, India is becoming an increasingly interesting potential partner for developed economies in the area of education, research and joint ventures. The traditionally good technical educational level, neutral geopolitical positions and more recent significant technological advances in the two countries, point to many potential areas for active and fruitful collaboration between India and Sweden.

In spite of this potential, direct interaction, collaboration and joint ventures between Sweden and India have been of limited success over the past decade. Also the academic contacts have been

rather limited, given the importance and size of Indian research activities. In this context it is of particular importance to point out that collaborations within science and technology are based on long term interests and can act as doorways for contacts between industries.

Expansive and knowledge-intensive industries, traditional industries and the public sector all need access to new knowledge in order to develop technological innovations and modernize their operations. Research provides the basis for developing new knowledge.

Proposal

In order to take better advantage of this potential for both countries, and significantly expand the collaboration over the next decade, we propose the **creation of a national centre** - **Centre for Indian-Swedish Collaboration on Technical Research and Education (INSTEC)**. It should be a network of partners from Swedish universities and industry cooperating with Indian partners. The centre is proposed to be placed at one of the partner universities. It is assumed that the host university provides all infrastructure required including office space and equipment, data support, basic administration to the centre.



Figure 1: INSTEC as a focal point for Indian-Swedish collaboration. Exchanges between Indian and Swedish academic and research institutions are the prime activity with the goal of enhancing the direct contact and partnerships with and between industries in both countries.

Mission and objectives

The mission of INSTEC will be:

To provide a long-term basis for expanding exchanges of human resources between India and Sweden on technical/engineering research as a platform for joint ventures and expanding industrial collaboration.

Joint ventures and collaboration that could develop from the exchange platform provided by INSTEC would ultimately benefit both countries by strengthening their respective technical/economic competitiveness in the global market.

The three specific objectives of INSTEC will be to:

- Promote and support collaboration between Indian and Swedish academic/research institutions and industry in *research* (development of joint research projects, exchange of researchers/ post-graduates, etc).
- Promote and support exchange between Indian and Swedish academic/research institutions and industry in *education* (MSc, continuing and distant education programmes, exchange of students, teachers and teaching materials)
- Stimulate and help establish *industrial contacts* and promote *joint ventures* between interested Swedish and Indian enterprises and research institutes in all areas of technological and natural resource development.

Role of the centre

On December 9, 2005, Mr. Leif Pragrotsky, Minister for Education and Culture and Mr Kapil Sibal, Minister of State for Science & Technology and Ocean Development signed a Memorandum of Understanding regarding research cooperation between Sweden and India.

The role for the centre is to be a creative meeting-place for researchers and companies in order to create strong environments for Indo-Swedish collaboration. In particular, the centre can initiate that Swedish funds are matched by corresponding Indian funds and can be allocated for joint Indo-Swedish collaborations.

At present, there are few structures for advice or meeting places where creators of ideas, entrepreneurs and financers can meet in order to develop the possibilities of the Indian market and research community. They may need both advice and help to turn good ideas into successful products. Working in networks will give rapid access to a broad and extensive knowledge base and play an important role in promoting commercialisation of research results and ideas.

Ways of collaboration

INSTEC is a platform for cooperation between Swedish and Indian academic research and education, industry, SME:s, government and non-government organisations, funding agencies and private sector foundations within strategically important technologies. Collaboration may take place through:

- Joint research programmes
- Tailor-made courses for industrial training
- Joint development of academic courses e.g. distance education

- Prototype/pilot/case studies in different areas
- Academic exchanges at various levels
- Joint-ventures between industries and research institutes
- Networking and dissemination of information

Tasks and services

INSTEC provides professional services and assistance to partners, programmes/projects and other stakeholders through the following activities.

- Function as a gateway for cooperation
- Acting as a research broker
- Development of a website as a tool for collaboration, communication and information for the network partners and stakeholders
- Initiation of projects in close cooperation with partners and funding agencies
- Supporting fundamental and needs-driven research, with the aim of stimulating new innovations for growth and sustainable development
- Establishing close cooperation and partnerships funding agencies
- Involving private sector research into the programmes
- Enable SME:s to access research in both countries.
- Providing professional services to partners regarding projects and activities
- Issuing planning grants for research applications
- Promoting student, teacher and researcher exchanges
- Involving people with strong competence and experience from industrial projects and business development into research projects
- Increasing the mobility between academic institutions and industry for researchers, postdoc programmes
- Initiating, stimulating and supporting cooperation through conferences, workshops, visits, information, meetings, seminars and other networking activities
- Coordinating consultations and exchange of information between researchers and industry, governments, foreign ministries, aid directorates, other public institutions, media, private business, and NGOs in both countries

Areas of collaboration

INSTEC aims at collaboration between India and Sweden in all areas of mutual interest and benefit, creating competitive cross-boundary research environments taking advantage of the international competitiveness of Swedish industry to create value for users. Examples of possible areas are:

- Conventional and advanced materials (including nano-materials)
- Information and communication technologies
- Biotechnology
- Food science and technology, functional food
- Water and natural resources in sustainable development
- Energy
- Aerospace technology and remote sensing
- Chemical technology including polymers, paper, cellulose and textiles
- Automobile and production engineering
- Industrial management and organisation
- Technologies for medical science
- The Millennium Development Goals, water supply, sanitation and health
- · Strategically important environmental problems and environmental technologies
- Urban and rural infrastructure development, operation and maintenance

During the start-up phase the initial project areas will be further discussed and evaluated by the partners. There are presently a number of existing research collaborations between India and Sweden and some of these co-operations can be further developed into joint research projects.

The priorities set forth by both governments will govern this process through the respective funding agencies assuring that mutual interests are satisfied.



Organisation of the centre

Institutional affiliation

INSTEC is affiliated to one of the partner universities, but it will constitute a national entity. Administration and overall management will be located at this university, while the different activities (programme coordination etc) will be located with the cooperation partners.

The Board

INSTEC will be supervised by a board of directors consisting of members from partners, funding organisations, external experts and international representatives. The board will have decision-making powers, concerning the operation of the centre, within the framework of the plan of operation.

Composition

The board shall consist of nine members including the chairperson. The Manager acts as secretary (without voting power). The members of the board will be selected in consultation with partners and funding organisations and appointed by the president of the host university.

A possible constellation of the board could be (very much open to discussion):

One Chairperson Two representatives for Partner universities Two representatives for Swedish Research Funding community (Vinnova/Sida/VR/FORMAS) Two representatives for Swedish Companies working in India Two external experts

Deputy members may be appointed for each category. The president appoints the chairperson, the members and deputy members for a mandate period of three years. At the time of elections for a new board, the board will appoint an election committee with a majority of members from outside the board. The election committee will put forward candidates to the president.

Function of the board

The board will direct all activities including decisions about the distribution of grants to various activities and networking programmes in accordance with the aims of the centre. Larger grants are to be distributed after due applications and assessment by an evaluation group of established scholars in the field.

Based on processed applications the board will select and propose to the president of the host university suitable candidates for the posts as manager, secretary, and research programme coordinators. The board will select all the employed persons in the programmes on merit and in open competition.

The board will discuss and decide upon activity plans submitted by the centre. It will decide on the annual and the long-term budgets and assess the performance against clearly stated objectives

The board shall establish a written agenda for its work including regulations for how notice of the meetings of the board shall be given. Decisions will be made by simple majority and in case an equal number of votes; the chairman shall have the casting vote. The board comprises a quorum when a majority of the members are in attendance at a properly called meeting.

Board meetings will take place at least two times a year. Suitable times for meetings would be May and December.

Management

Manager

INSTEC will be led by a Manager, who shall be an experienced researcher, teacher and programme builder, and who has well-established contacts and familiarity with India and the South Asian region. The role of the Manager is to lead the daily activities, take initiatives to new activities and support ongoing programmes. He/she will also stimulate and facilitate network interaction. The president of the host university, advised by the board, will appoint the manager for a period of three years. The appointment may be renewed. The position should be part time and not more than 50 %.

The manager will report to the board and organise its meetings. The manger will plan and carry out various activities in close collaboration with the board, the research co-ordinators of INSTEC supported programmes, as well as Indian, Swedish and international network partners. Granted the idea of an open and dynamic network of activities, the manager's main role should be that of a broker, connecting people and resources, starting up new activities and supporting the research co-ordinators in their work.

Secretary

The main task of the secretary is to handle the administration of the centre and be responsible for the network's communication system through the webpage. This position is also part time and not more than 50 %. The secretary should be a person who is well acquainted with India and who has the skill to manage a webpage.

Management support and reference groups

The manager, secretary, and the research programme co-ordinators will form **a policy group**. This group can also include some international representatives for network partners.

The centre will have a minimal administration with a manager and a secretary working 50%. **A management committee** should therefore be considered in order to support and assist the manager on a yearly appointment.

A reference group will be established with members from partner universities and industries, government agencies, NGOs, international organisations.

A research evaluation group will be established to evaluate research applications having both Swedish and Indian members.

INSTEC will establish an **Indian reference group** consisting of Indian Research Councils, Universities and Industry, with whom the board will consult about INSTEC's aims and activities. The reference group will function as an advisory and evaluative body and should have at least five but not more than ten members. The communication between the members of the reference group and INSTEC should primarily take place through modern communication technology.

The role and function of the centre in relation to the collaborating Swedish and Indian partners and other stakeholders are important issues to be further developed during the phase of establishment. The final mode of operation will be formulated by the future Management and Board.

INSTEC support

The aim of the centre is to be able to support:

- Three year programme grants for research (including Post-Docs and Ph-students from industry)
- Two year grants for education
- Planning grants
- Support to Swedish participation in Indo-Swedish EU-research projects.

Support may also be given for workshops, seminars, conferences etc.

Contracts and rules for grants provided by INSTEC will be developed in accordance with existing procedures applied by Vinnova, Sida and others.

Financing

In order to promote and explore collaboration areas, establish academic as well as industrial links and enable mobility, INSTEC must have an independent, long-term financial platform. A yearly <u>initial budget</u> of 2 MSEK, installed for three years, would be sufficient to sponsor start-up scientific

projects in the areas of interest mentioned above as well as exchange and networking activities. After an evaluation a new three-year period is anticipated, which might in turn be followed by two additional periods making up 12 years in all.

It is expected that Indian authorities will co-finance the Indian counterpart research activities as well as Indian exchange programmes to Sweden. This was confirmed by Mr Kapil Sibal, Minister of State for Science & Technology and Ocean Development at a press conference after signing a Memorandum of Understanding regarding research cooperation between Sweden and India on December 9, 2005..

Operational costs for the centre will be financed by grants from the partner universities and industrial partners, which also will contribute in kind to the activities. An annual contribution of 100000 – 200000 SEK from each partner should be sufficient for baseline operational costs.

Specific joint projects can be co-financed on a case by case basis by industrial and/governmental sources concerned. After the start-up phase, we expect that this part of the programmes will grow.

Other organisational issues

Research management

The different research programmes/projects developed through assistance by the centre and involving several partners will be managed by a coordinator at the university taking on the leading role for this specific programme.

Reporting

INSTEC will submit an annual work report and issue a newsletter at regular intervals.

Evaluation

INSTEC's activities are to be reviewed at the end of each three-year period (the mandate for the board and the director). A monitoring system will be developed.

Partners

Sweden's business sector, the research community and the public sector have extensive international networks, knowledge exchange and business relations. These should be developed and used effectively to strengthen and consolidate our strong Swedish profile areas in cooperation with our Indian partners.

Swedish academic institutions and companies together with their Indian counterparts can, by joining efforts and through cooperation, influence the development in both countries. INSTEC will facilitate this interaction, while the partners provide basic support and serve as resource centres for ongoing activities and projects.

The partner universities together with industry, both Swedish and Indian, are the primary parties for the activities supported by INSTEC.

Stakeholders

Apart from the networking partners involved in research and other types of cooperation there will also be a number of other stakeholders that will interact with the centre in different ways. Some will be seeking information only and/or partners for industrial cooperation and trade, while others will merely participate in conferences and other activities.

Cooperating Networks and gateways

There are a number of existing networks both in Sweden and India working with dissemination of information, coordinating research and university exchange as well as within different industrial sectors and trade. INSTEC aims to cooperate with these networks in an open and respectful manner promoting collaboration rather than competition. Examples of networks are:

The Sweden-India Business Council (SIBC), <u>www.sibc.se</u> Spider (Swedish Programme for ICT in Developing Countries), <u>www.spidercenter.org</u> SASNET (Swedish South Asian Studies Network), <u>www.sasnet.lu.se</u> The Swedish Trade Council, <u>www.swedishtrade.se</u>

WebISTAD, <u>www.csirwebistad.org</u> IBEF (India Brand Equity Foundation), <u>www.ibef.org</u> And others

Research and Education

Research

Attention will focus on areas in which Sweden already is, or has the potential to become a globally recognised leader.

R&D projects that are adopted shall be at the absolute cutting-edge of knowledge and technology in close collaboration between the business sectors, higher education institutions and research institutes in both countries. In Sweden there already exits several good examples of jointly financed research programmes, where academic research is collaborating with the business and public sectors, for example the Competence Centres Programme. The importance of the cooperation between higher education institutions and the business sector will be enhanced by a strong focus on the commercialisation of research results.

The research has to rely on interaction and cooperation between researchers in both countries. A number of multidisciplinary programmes with the participation of senior researchers and research students will be developed within the network. The programmes shall be based on research themes capable of mobilising researchers and doctoral students across Sweden and India and also actively promoting research training and multidisciplinary work in various ways.

Each programme may involve several universities and researchers as well as industrial partners from both countries, but will be led by a programme coordinator from one of the institutions participating in the programme. The coordinator will bring researchers together in workshops, serve with information, and help with applications for additional research money.

In the process of project/programme initiation, the aim of the centre is to be able to provide planning grants.

In applying for research funds from various agencies, the research programmes should be assisted by the centre.

The selection of projects is made on a competitive basis by an evaluation group with representatives from India and Sweden, representing industry, public sector and the scientific

community. The Indian government, research institutions and /or corporations will contribute to the development of individual projects initiated through INSTEC.

A successful joint research programme including several Swedish and Indian partners will:

- Offer industry an attractive and concentrated research environment for collaboration, problem-solving and long-term competence development
- Enjoy sustained participation from industry in the management, implementation and financing of a research programme of mutual interest and attracting resources from industry
- Renew and expand its circle of interested parties in Swedish and Indian industry, including small and medium-sized enterprises
- Promote the mobility of personnel between the academic and corporate R&D environments, e.g. by

encouraging active cooperation between industrial and academic researchers.
 involving R&D staff from the enterprises which actively participate within the centre's academic environment as researchers or students

- Contribute to the undergraduate and postgraduate educational programmes of the participating universities
- Receive increased external funding for activities that reinforce the competence profile and base of the programme
- Produce results of practical value to the business community and which can stimulate further academic studies, reports in international journals etc.

Swedish research priorities

The bill, presented by the Swedish government, entitled "Research for a better life" (2004/05:80) targets three areas considered to be critically important, medical and technological research and research in support of sustainable development.

In Sweden there is presently a focus on the need for strong research environments to maintain the position of the country on the global science and technology arena, i.e. how to boost our future competitiveness. Strong research environments are usually part of an extensive international network and research environments that have developed a critical mass often have close contacts with the business community including SMEs.

Sweden has high skills levels and competitiveness in many industries and some of these date back many centuries, being the backbone of Swedish exports, such as forestry, paper and pulp, vehicle manufacturing, mining, steel, telecommunications and pharmaceuticals.

Other industries have grown out of new technological advances, such as information technology, microelectronics, biosciences, equipment and assistive devices for use in health care and vehicle and traffic safety. Sweden has also become a leader as a developer of holistic solutions in the environmental and energy sectors.

In the last ten years a large number of research centres have been established at the technical universities and these complement existing departmental research by working across established boundaries. These developments have been supported by industry and research institutions, which have been very interested in participating in university research, either as a commissioner or with their own research competence. The competence centres supported by the Swedish Agency for Innovation Systems (VINNOVA) at different universities are shown in Appendix 7.

The technical focus in Swedish research can be exemplified by the 18 growth areas which, according to VINNOVA are likely to pave way for future growth. These growth areas extend

across boundaries and break down the traditional barriers between industry and other sectors of society:

Telecom systems Micro- and nanoelectronics Software products E-services in public administration IT in home healthcare The experience industry Pharmaceuticals and diagnostics **Biotech Supply** Biomedical engineering Innovations in foods Complex and assembled products Wood manufacturing Intelligent and functional packaging Light materials and lightweight design Materials design, including nanomaterials Green materials from renewable resources Innovative vehicles for different transport modes Innovative logistics and freight transport systems

Potential areas of growth and collaboration for India

The Indian research priorities can be exemplified by the Indian Science and Technology Policy from 2003 (enclosed in appendix 5) and by the Address to the Nation held by the president of India on August 15, 2005. Reflecting on the past fury of nature and its management, the president stressed on the need for development and research in the broad area of "Earth Systems Science" consisting of earth, climate, ocean, environment, instrumentation and computer sciences.

The main topic in the speech, however, dealt with India's future energy independence as being the first and highest priority of the nation. The strategic goals for energy independence by 2030 will focus on a shift from fossil fuels towards renewable energy sources (solar energy, bio fuels etc) and energy conservation. The existing potential for energy generated by hydro and nuclear power should be utilised.

Potential areas for cooperation according to the 2003 policy are:

Biotechnology and Bio Informatics Healthcare and pharmaceuticals Telecommunications. IT and software development Environment technology Heavy engineering E-Commerce and Internet banking Waste management Infrastructure development including transport and ports Power sector and renewable sources of energy Pulp, paper and packaging industry and technology transfer Dairy development Forestry and low cost housing Joint R&D Sports goods Automotive parts and components Third country marketing and JVs, especially between India, Sweden and the Baltic countries

Steel R&D & JVs Inland waterways Research & Shipyards & Ship building

By distributing research funds on a competitive basis in cooperation with Swedish resources, agencies responsible for financing research in both countries will be able to strengthen national priorities and help concentrate national efforts.

Education

Higher education in India has grown at a rapid rate and during 2004 approximately 11 million students were in engaged in the higher education system. Out of these about 20% were distant students. Distant education is considered an important tool and the world's largest university, the Indira Gandhi Open University, with 1.2 million students in 2004, has been a motor in this development. Every year many students also leave India for studies abroad and in 2003/2004 about 80 000 studied in USA.

There is a well-developed cooperation between Indian universities, research institutions and the commercial community sector. Industry and companies participate in educational programmes while the universities provide skills development for industry. Companies have even been given the opportunity to open a university e.g. Apptech Limited and the Apptech University.

If Sweden aims to increase the number of foreign students studying here, we can benefit from the cooperation with Indian universities and educational companies which already have practical experience. Trade in education is becoming an important export industry for many countries and if Sweden wants to participate in this market, and attract e.g. Indian students, an improved marketing of Swedish universities becomes fundamentally important.

Educational programmes

In order to strengthen the competitiveness of Swedish and Indian higher education it is important to encourage and support student and researcher mobility.

The centre will actively initiate and promote the development of undergraduate and graduate courses at Swedish and Indian universities and, if possible, in partnership with industry. The courses will be at a Master's level, and will wherever possible, be Internet based and use the latest technology in distance learning. An international network for Masters' courses can be built with the participation of centres of excellence in India, Sweden and Europe.

To start with the work with educational programmes will consist of seed money to develop various initiatives from university institutions. Initially, it is believed that one or two internationally recognised Master's programmes could be launched quite soon.

EU programmes

In November 2001 the EU-India Science and Technology Agreement was signed with an aim to facilitate cooperative research and development activities in fields of common interests for the EU and India. Through the EU-India collaboration the aim is to have a cooperation building on synergies in science and technology and India is already participating in the Sixth Framework Research Programme. The Euro-India ICT cooperation initiative helps bridge the gap between research and exploitation.

EU has also put in place instruments to facilitate academic contacts and exchanges with India through e.g. a scholarship programme worth 33 million Euros. It also funds a European Studies Programme at the Jawaharal Nehru University in New Delhi and the **Asia Link** Programme is providing for contacts between universities.

A high level of participation in international research collaboration, both within and outside the EU, is important for Sweden since it strengthens our industrial competitiveness as well as our own R&D base. Sweden should make use of the opportunities offered by the EU membership to negotiate with third party countries, in this case India, to reach trade agreements and establish research cooperation with an interesting market.

Work-plan for the period up to 31 December 2006

Present work group

This proposal is prepared by a working group from KTH consisting of:

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The present work group will be complemented by members from other partner universities.

Activities up to 31 December 2006

The first one and a half year (up till the end of December 2006) will be an open process aiming to establish a sustainable structure for the centre and for the promotion of research, education, exchange and the other tasks defined in the forth-coming plan. In this work, both short-term and long-term activities will be identified and implemented. A gradual build-up will enable and facilitate interaction between the centre and other parties interested in the network (partners). It also implies a gradual commitment of funds for research programmes and other activities.

The current working group will lead the work until a board has been appointed and a manager and secretary for INSTEC appointed. The present chairperson of the working group will continue to work as interim manager. A management committee will be established in order to give support to the development of the centre during this phase.

The aim is to nominate and constitute a board and work out its task during the spring of 2005. The centre, its tasks, and staff will be fully operational during the autumn of 2006 and not later than the end of December 2006. The board will be responsible for the recruitment process of a manger and a secretary and to propose suitable candidates to the president of the host university for appointment (three years).

Work carried out during this period will A/ focus on establishing a sustainable structure for the centre and B/ focus on more direct activities :

- <u>Establishment of the partnerships through Letters of Intents</u>
 An initial start-up workshop with interested university partners will take place in the end of February 2006.
- <u>Development of and maintaining of an informative and interactive website</u>
 The centre shall have its own web pages as soon as possible. The working group, together with a web designer, will be responsible of defining the layout and content.
- <u>Nomination and constitution of the Board.</u>
 Building the functions of the board and finding suitable members will take place during March-May, 2006. Conduct the first board meeting in the end of May 2006.
- <u>Securing a funding base for future joint research</u> Meetings will be held with potential funding agencies and applications made.
- Building and strengthening an appropriate organisation, i.e. management, staff, tasks etc.
- Promotion of the centre
- Developing national and international reference groups
- <u>Creating Indian networks</u> Creating a network of research institutions and companies in India with an aim to be able to act as a broker between these institutions through an Indian partner.
- Organizing an international workshop
 A workshop on how to develop and operate INSTEC in a sustainable future collaboration
 shall be conducted with specially invited participants from Sweden and India representing
 present and future stakeholders. [a) Basic ideas b) Organization c) Building the network d) Budget]
- <u>Developing research themes for the joint research programmes</u> The development of research themes for the joint research programmes will be supported by issuing planning grants. The aim is to get some programmes initiated during 2007.
- International Groundwater Conference in New Delhi February 1-4, 2006.
- Arrange conferences /workshops in related areas of common interest, ITC, Bio-Nano, and others to be defined by the commissioners.

Activities during 2007-2008

In 2007, the organisation shall be fully established and the emphasis on research and education programmes fully implemented. Activities will partly as described above and to:

- Broaden the funding base
- Keep the webpage updated and promoting communication in all possible ways

- Develop education programmes in close collaboration with teachers and researchers interacting with INSTEC. One aim is to get some planning groups started during the autum of 2006.

Appendices

Appendix 1 - Partners and stakeholders –descriptions

Swedish Partners

The back-bone of the Swedish partners is, initially, a number of Swedish universities out of which some have so far given written confirmations.

Swedish universities and research institutes.

Royal Institute of Technology, KTH, <u>www.kth.se</u> Chalmers, <u>www.chalmers.se</u> Karolinska Institutet, KI, <u>www.ki.se</u> Linköping University, <u>www.lu.se</u> Lund University, <u>www.lu.se</u> Luleå University of Technology, <u>www.luth.se</u> Uppsala University, <u>www.uu.se</u> Swedish University of Agricultural Sciences, SLU, <u>www.slu.se</u> Blekinge Institute of Technology, <u>www.bth.se</u>

Swedish Companies

Over 100 Swedish companies have operations in India out of which several are potential partners, such as ABB, Accenture, Alfa Laval, Astra Pharmaceuticals, Atlas Copco, Barracuda Technologies, Capgemini, Electrolux, Ericsson, Gunnebo, Haldex, Hoganas, IBS, Intentia, IKEA, Oriflame, Perstorp, SIGMA, Svedala, Portwise, Sandvik, SCA, Skanska, SKF, Swedish Match, Telelogic, Tetrapak, TietoEnator, Volvo, WM-data,etc.

There are about 67 Swedish related companies established in India according to the Swedish Trade Council, information is available from <u>www.swedishtrade.se</u>.

A close cooperation with the Swedish Indian Business Council is envisaged as a link to its member organisations and exchange of information.

Indian partners

Indian universities and research organisations

Indian Institute of Technology Bombay, <u>www.iitb.ac.in</u> Indian Institute of Technology Delhi, <u>www.iitd.ernet.in</u> Indian Institute of Technology Bangalore, Indian Institute of Technology Roorkee, <u>www.rurkiu.ernet.in</u> Indian Institute of Science Banglaore, <u>www.iisc.ernet.in</u>

Indian National Science Academy, <u>www.insaindia.org</u> Council of Scientific & Industrial Research, <u>www.csir.res.in</u> Science and Engineering Research Council, New Delhi, <u>www.serc-det.org</u> International Commission on Irrigation and Drainage (ICID) Indian Council for Agricultural Research (ICAR)

Centre for Science and Environment (CSE). One of the leading NGO:s in environment

Indian companies

John F. Welch Technology Centre, Bangalore TATA Energy Research Institute (TERI)

Appendix 2 - Call for project application – Guide for submission (draft)

This will be further developed together with rules for evaluation of applications, contracts etc.

INSTEC Project Funding 2006-2008

Swedish Universities are invited to submit applications for planning grants to develop joint research programmes or pilot projects. The amount applied for may be in the range of 100,000 to 300,000 SEK. Funds may be used for material expenditures and for financing of activities within the projects both in Sweden and India (such as travel costs and equipment).

Criteria for project evaluation

Projects will be evaluated according to the set of criteria listed below. A working committee including members of the INSTEC Board will assess the applications. When required, applications may also be sent to external reviewers.

Relevance: The application must address a problem that is considered important within the area of mutual development. The project must show evidence of close collaboration with a counterpart in India. It should be an expression of the goals and the objectives of INSTEC. A possible cross-fertilization among institutions behind the project is considered an advantage.

Originality: The suggested project should add to the knowledge within its area. A project may be built on ongoing cooperation but there should be an element of originality so as to avoid unnecessary duplication of work and efforts.

Technology transfer: The application should define how technology (in a broad definition, including machines, equipment, skills, abilities, knowledge, systems or processes) would be exchanged through the execution of the project.

Probability of success: The project should be realistic in achieving its primary goals. The time frame and the budget should be commensurate with these goals. The project should result in tangible deliverables and the application should give a clear indication about the sustainability of the project.

Submission

The application should be submitted electronically to XXXX no later than YYYYYY. Please also send 8 paper copies of your application to:

XXXXXXXXXXXXXXX,

An application form (in MS Word) will available on the INSTEC Web page. The application should not exceed 10 pages (excluding appendices).

A decision about the application is expected to be communicated by xxxxx.

Reporting

Each project must submit a preliminary report no later than xxxxxxxx. The final reports - along with a financial report should be submitted by the end of xxxxxxxxx. The reports should not exceed 30 pages (excluding appendices) and must include an executive summary of up to 5 pages.

Appendix 3 – Research areas, examples

Swedish environmental technology

There is a considerable international interest in Swedish services and products within the environmental technology sector. Swedish enterprises have established a lead in many service and product segments and are particularly well respected for systems solutions and holistic approaches to various environmental problems. Sweden's competitive edge lies in its engineering know-how, which enables the provision of custom-tailored solutions and the delivery of turnkey solutions.

Environmental technology is one of the sectors with a great future potential. OECD figures clearly indicate that environmental technology is one of the sectors with the greatest an annual rate of 5–20%. The OECD estimates that the global market will generate sales of SEK 6,000 billion by 2010.

Information Technology

The immense importance of this field for all engineering sciences means it has a given place in all courses and in all research at many Swedish universities and the IT area also represents a link to, and a precondition of, development within other scientific areas

Basic data logical research with applications in areas such as large-scale calculations, database management and bioinformatics are areas that provide good preconditions for both subject specific and cross border research.

Research at, for example, the IT University in Kista covers the entire spectrum of the computer and telecommunications area, from new materials, new components and electronic circuits, via systems' technical infrastructure to the services offered by these systems to future users. Applications are mainly to be found within wireless communication systems and communications networks, in which industrial cooperation and participation in EU's framework programmes form dominant elements.

Other important engineering science research is within signal processing and network research, based on automatic engineering theory. IT use is increasing rapidly within all areas including the engineering and vehicle industries. There is also a radical rise in its use within the infrastructure of society and trade, learning and banking operations.

Biotechnology and pharmaceuticals

Biotechnology is an area, which receives much attention both as concerns its scientific content and the industrial exploitation of its research results. Biotechnology is vital for Sweden's industrial and economic development, not only for new pharmaceuticals and methodological development within medicine, but to a similar degree for the forestry and foodstuffs industry and for areas touching on the environment and energy. Genetics, research into the structure and function of proteins and research on biological processes and material - they are all interwoven into technological and scientific research, which provides the preconditions for scientific and industrial development in a huge spectrum of fields of endeavour.

In a future pharmaceutical industry chemical and biological technical production research will be increasingly important. In its current position as methodological developer, the technical platforms developed at Swedish universities will benefit all Swedish biotechnical research. KTH forms a national hub of biotechnical research, and will continue to create new applications and new products for the pharmaceutical industry. Progress made within biotechnical research will also contribute to innovative materials product development within, for example, the pulp and paper industry and the packaging field. Biotechnical research concerning the storage and production of energy is a new field that will also be of immense future significance.

Technical bioscience

The borderland between technology, biology and medicine is arousing increasing interest. Increasing demand for care – in its widest sense – makes increasing demands on society's resources. This requires a well-developed interplay between medicine and technology in order to develop new forms of treatment and to streamline care operations from a systems perspective. Crossover research becomes a cornerstone when biology, medicine and technology grow together.

Alongside developments in medical technology KTH, in close cooperation with the Karolinska Institute and other partners, carries out multi-disciplinary research and education within the broad field known as Technology and Health. Research concerning technical solutions and systems is initiated and coordinated based on preventative health and medical care perspectives. These research activities promote an environment, which encourages innovation and product development involving companies and care providers. Research on biological and biocompatible materials is a central, and growing, field in which chemistry, polymer technology and materials science play essential roles together with several other branches of physiological and medical research.

Materials and nano-science

Nanotechnology is probably the most important development within traditional technology this Century. Current research within nanotechnology is often based on developments in traditional engineering sciences, which create new concepts and opportunities. Some of the practical areas of application for nano and micro technology are found within medical technology in which smaller scale components can mean totally new forms of surgery treatment. Within production technology, higher levels of precision can mean better efficiency and longer lifetimes for mechanical systems.

Materials science utilises improved defect control to create lighter, but at the same time stronger, materials. The shorter scales bring totally new scientific phenomena, which must be controlled, but they also bring new opportunities. By combining materials science with biotechnical research, new concepts can be developed for the manufacture of a new generation of bio composites.

Nano and micro technology possess the prerequisites to revolutionise technical research within important, classical engineering fields. Compared with the processing research within materials and production technology many years ago, the equivalent methods and tools must be developed within the nano and micro scales in order to enable the development of new processes and products. It is essential for Sweden to establish powerful networks between nano researchers within the various technical areas as well as establishing external networks, primarily with medical researchers.

Urban engineering

The central question to be answered by the built environment's functionality concerns its use, whether it is individual buildings or entire urban districts. It is essential to formulate strengths in terms of the planning process and project management which construction primarily requires, with a highlighted connection to general engineering scientific subjects. Operation and maintenance of infrastructure is of uttermost importance, not only in the urban environment but in society in general.

The built environment, regarded as an infrastructure, bears increasingly great importance for both competitive edge and welfare in an interwoven, mobile society. The network theories and planning methods developed for society's infrastructural systems have also proved to have great relevance for many other applications. Research and education on planning in its widest sense, with a greater or lesser connection to engineering, is and will continue to be one of the areas of excellence in Sweden.

Energy technology

The world is facing a change in its energy infrastructures that, in both the short and the long run, will require major research investments. In order to successfully manage future energy supply and provide the preconditions for climatic development, which does not threaten human life, opportunities for a reduction in the use of energy must be utilised and new ways of generating and distributing primary energy developed.

New technological research is necessary to achieve this, for example for the development of more efficient climate control methods and production and use of electrical energy, but also as concerns production and use of hydrogen gas, for transport and for electricity and heat production. A great deal of energy supply can be improved with more efficient use of energy, however it is also necessary to develop new primary sources of energy in order to be able to replace fossil fuels. Solar and nuclear power in various forms are currently the only possibilities.

Sustainable development

Sustainable development has become a concept meaning positive, future societal development. In spite of the fact that many question marks remain concerning exactly what sustainable development is and how society is to achieve it. Social objectives may come into conflict with practical functions and short-term economic requirements for profitability within industry and business. Sustainable growth implies economic growth without jeopardizing the ecosystems on which we depend and while protecting human resources.

Food technology

This is a large and diversified area of great importance. According to FAO about 440 million people will be chronically undernourished by 2030. The estimated increase of world population from 6 to 9 billion in 2050 reveals a demand of a 60% increase in food production, not only in quantity but also in quality of food.

In South-Asia about 65% of the work-force is dependent on the agro-food sector for income generation while this only represents around 25% of the GNP in the region. India's share of the global market is for example only 5%. The value addition in the sector is as low as 5-7%, but areas like functional foods are increasing on the world market creating possibilities for the future.

Appendix 4 - "Innovative Sweden" – A strategy for growth through renewal

The "Innovative Sweden" strategy is about the long-term promotion of growth and has been developed by the Ministry for Industry and Trade and the Ministry for Education and Science in 2004. It is included in the appendices in order to give an insight into Swedish priorities and to show that the concept of INSTEC lies well within these priorities. Sweden is in a good position to benefit from the ongoing process of internationalization and the emergence of the knowledge-based economy.

The rapid global developments highlighted the need address a number of broad challenges, which a Swedish innovation strategy must meet:

- Investment is becoming increasingly mobile internationally
- International competition is getting tougher
- The public sector is facing new demands
- Initiative and skills are growing in importance

In order to do this it is important to build a firm foundation for a sound innovation capacity in the business and public sectors, developing a strong, specialized knowledge base. Innovations enable enterprises to compete successfully on international markets The Innovative Sweden strategy therefore focuses on four priority areas for action and initiatives:

- Knowledge base for innovation
- Innovative trade and industry
- Innovative public investment
- Innovative people

For the strategy the following vision has been formulated to guide future efforts.

"Our vision is for Sweden to be Europe's most competitive, dynamic and knowledge based economy, and thus one of the world's most attractive countries for investment by large and small knowledge-based enterprises. World-leading knowledge will flourish in a number of priority research areas. Well-developed interaction between the research community, the public sector, industry and trade unions will guarantee the large-scale transformation of knowledge into goods and services. Both traditional and new industries will be permeated by the capacity for renewal. Business product development will be extensive and rapid and innovative people will see to it that both existing companies and the new emerging companies grow. Public investment will be an engine for innovation and growth. Sweden will have the world's highest educational level, it will be best in the world at making use of the skills of its population and it will have a working environment that encourages women's and men's initiative and skills development. The points of contact with the surrounding world and between the various sectors of society will be well developed. Swedish society will combine economic development, social welfare and cohesion with a good environment."

To give an overview of the Innovative Sweden strategy the main components are presented below:

ENSURING THAT SWEDISH EDUCATION AND RESEARCH ARE OF WORLD CLASS

- Create a school that gives everyone basic skills
- Promote good mathematical skills and an interest in studies in science and technology
- Promote lifelong learning
- Ensure internationally competitive higher education institutions
- Encourage international student and researcher mobility
- Continue to invest in research and research education
- Strengthen industrial research institutes

CONCENTRATING EFFORTS IN SWEDISH PROFILE AREAS

- Prioritise strategic areas in research and the business sector
- Increase interaction between research, industry and the public sector
- Promote regional specialisation in combination with national priorities

SEIZING THE OPPORTUNITIES PRESENTED BY GLOBALISATION

- Promote good language skills
- · Promote Swedish business establishment in strategically important markets
- Promote Sweden's attractiveness as a cooperation partner for research and development
- Attract foreign direct investment and top skills
- Ensure an internationally competitive corporate tax rate
- Develop the image of Sweden as a country of innovation

KNOWLEDGE BASE FOR INNOVATION STRENGTHENING THE INNOVATIVE CAPACITY OF EXISTING SMALL AND MEDIUM-SIZED ENTERPRISES

- Strengthen strategic collaboration between enterprises
- Strengthen cooperation between company networks, higher education institutions and research institutes
- Develop support for product development and design
- Develop production technologies and production systems
- Encourage small and medium-sized enterprises to invest in R&D
- Promote the capacity of small and medium sized enterprises to operate internationally

INNOVATIVE TRADE AND INDUSTRY INCREASING THE COMMERCIALISATION OF RESEARCH RESULTS AND IDEAS

- Transform research results and ideas more effectively into businesses and enterprises
- Increase financing at early stages of business and company development
- Design workable ground rules and promote the use of intellectual property protection
- Create sound conditions for competition that favour the growth of new enterprises

USING THE PUBLIC SECTOR AS AN ENGINE FOR SUSTAINABLE GROWTH

- Ensure that publicly financed activities contribute to creating products and services for export
- Make use of the industrial and technological potential of the defence and security sector for civil applications
- Develop more forceful, demanding public procurement
- Develop regulations that force the pace of renewal

PROMOTING RENEWAL AND EFFICIENCY IN THE PUBLIC SECTOR

- Operate public services more effectively and innovatively
- Develop new solutions to meet the needs of society

DEVELOPING INFRASTRUCTURE THAT PROMOTES RENEWAL AND SUSTAINABLE GROWTH

- Develop effective systems for transport and logistics
- Increase mobility in and between local labour market regions
- Develop an IT infrastructure for the future

INNOVATIVE PUBLIC INVESTMENT STIMULATING ENTREPRENEURSHIP AND ENTERPRISE

Promote positive attitudes towards entrepreneurship

• Secure a simple and expedient regulatory framework that facilitates enterprise

MAKING THE MOST OF PEOPLE'S SKILLS

- Develop working organisations that encourage renewal
- Make better use of everyone's skills
- Increase mobility between the business and academic communities, the public and private sectors

The present endeavour to create INSTEC as an Indo-Swedish centre for innovative development lies well in line with this strategy.

Appendix 5 - Indian Science and Technology Policy 2003

In the policy of 2003 the following areas of priority are high-lighted. In order to recognize the changing context of the scientific enterprise, and to meet present national needs in the new era of globalisation:

• To ensure that the message of science reaches every citizen of India, man and woman, young and old, so that we advance scientific temper, emerge as a progressive and enlightened society, and make it possible for all our people to participate fully in the development of science and technology and its application for human welfare. Indeed, science and technology will be fully integrated with all spheres of national activity.

• To ensure food, agricultural, nutritional, environmental, water, health and energy security of the people on a sustainable basis.

• To mount a direct and sustained effort on the alleviation of poverty, enhancing livelihood security, removal of hunger and malnutrition, reduction of drudgery and regional imbalances, both rural and urban, and generation of employment, by using scientific and technological capabilities along with our traditional knowledge pool. This will call for the generation and screening of all relevant technologies, their widespread dissemination through networking and support for the vast unorganized sector of our economy.

• To vigorously foster scientific research in universities and other academic, scientific and engineering institutions; and attract the brightest young persons to careers in science and technology, by conveying a sense of excitement concerning the advancing frontiers, and by creating suitable employment opportunities for them. Also to build and maintain centres of excellence, which will raise the level of work in selected areas to the highest international standards.

• To promote the empowerment of women in all science and technology activities and ensure their full and equal participation.

• To provide necessary autonomy and freedom of functioning for all academic and R&D institutions so that an ambience for truly creative work is encouraged, while ensuring at the same time that the science and technology enterprise in the country is fully committed to its social responsibilities and commitments.

• To use the full potential of modern science and technology to protect, preserve, evaluate, update, add value to, and utilize the extensive knowledge acquired over the long civilisational experience of India.

• To accomplish national strategic and security-related objectives, by using the latest advances in science and technology.

• To encourage research and innovation in areas of relevance for the economy and society, particularly by promoting close and productive interaction between private and public institutions in science and technology. Sectors such as agriculture (particularly soil and water management, human and animal nutrition, fisheries), water, health, education, industry, energy including renewable energy, communication and transportation would be accorded highest priority. Key leverage technologies such as information technology, biotechnology and materials science and technology would be given special importance.

• To substantially strengthen enabling mechanisms that relate to technology development, evaluation, absorption and upgradation from concept to utilization.

• To establish an Intellectual Property Rights (IPR) regime, which maximises the incentives for the generation and protection of intellectual property by all types of inventors. The regime would also provide a strong, supportive and comprehensive policy environment for speedy and effective domestic commercialisation of such inventions so as to be maximal in the public interest.

• To ensure, in an era in which information is key to the development of science and technology, that all efforts are made to have high-speed access to information, both in quality and quantity, at affordable costs; and also create digitized, valid and usable content of Indian origin.

• To encourage research and application for forecasting, prevention and mitigation of natural hazards, particularly, floods, cyclones, earthquakes, drought and landslides.

• To promote international science and technology cooperation towards achieving the goals of national development and security, and make it a key element of our international relations.

• To integrate scientific knowledge with insights from other disciplines, and ensure fullest involvement of scientists and technologists in national governance so that the spirit and methods of scientific enquiry permeate deeply into all areas of public policy making.

It is recognized that a dynamic and flexible Science and Technology Policy, which can readily adapt to the rapidly changing world order, will best realize these objectives. This Policy, reiterates India's commitment to participate as an equal and vigorous global player in generating and harnessing advances in science and technology for the benefit of all humankind.

Appendix 6 - Swedish funding agencies

MISTRA

The Foundation for Strategic Environmental Research, Mistra, supports strategic environmental research with a long-term perspective, aiming to solve major environmental problems. The main part of Mistra's funding is focused on broad-based interdisciplinary programmes. Mistra will in the future be prepared to fund foreign research groups as a contribution to strengthening Swedish research environments.

IVA

The Royal Swedish Academy of Engineering Sciences, IVA, is an independent arena for the exchange of knowledge. By initiating and stimulating contacts between experts from different disciplines and countries the Academy promotes cross fertilisation between industry, academia, public administration and various interest groups. Bringing people together to take part in lectures, conferences, research exchanges and other projects serve to generate new ideas and knowledge

VR/Sida

The main objective of the Asian - Swedish Research Links Programme is to encourage research co-operation between researchers in Asia and Sweden. The aim is to contribute to mutual scientific and socio-economic development of the countries involved in the collaboration by supporting joint projects of scientific excellence. The basic condition for the programme is that researchers from Asia and Sweden should submit joint applications.

Sida

In March 2005 the Swedish government decided on a new strategy for development cooperation with India 2005-2009. The cooperation will have a pro-poor focus including areas such as environmental protection and scientific cooperation.

Formas

Formas encourages and supports scientifically significant research related to sustainable development. Especially this means support in the areas of the environment, agricultural sciences including forestry, horticulture, veterinary medicine, food, fish and reindeer husbandry, and spatial planning including building sciences and community systems. The projects supported cover a wide range of approaches from basic research to more applied efforts and within the built environment also demonstration and experimental projects. The aim of Formas' activity is to promote international contacts, import new knowledge, new ideas and experiences, and to bring about greater Swedish participation in the international research collaboration.

The Swedish Foundation for Strategic Research

International cooperation is of great significance in maintaining and raising the scientific quality of the work the Foundation supports. Thus the Foundation finds important to promote cooperation between prominent Swedish research teams and leading foreign ones. Collaborative programmes have been set up with organizations in many countries including the USA, Great Britain, Japan, Finland and Canada.

VINNOVA

Swedish Agency for Innovation Systems, integrates research and development in technology, transport and working life. The mission is to promote sustainable growth by financing RTD and developing effective innovation systems.

IFS

IFS is a research council with international operations and the mission to build the scientific capacity of developing countries in sciences related to the sustainable management of biological and water resources.

Appendix 7 – The Competence Centres Programme

The Competence Centres Programme is a long-term effort to strengthen the very important link in the Swedish innovation system between academic research groups and industrial R&D. The programme at present comprises 28 Competence Centres at 8 universities. It is managed by VINNOVA in collaboration with the Swedish Energy Agency, STEM, which is co-financing five of the Centres. The parties of a Competence Centre - a number of industrial companies, a university or institute of technology, and VINNOVA or STEM - contribute jointly to the centre's research programme, in the form of cash or contributions in-kind.

List of competence centres

Chalmers University of Technology, Gothenburg

Catalysis, KCK* Combustion Engines Research, CERC* Environmental Assessment of Product and Material Systems, CPM High Speed Technology, CHACH High Temperature Corrosion, HTC* Railway Mechanics, CHARMEC

Karolinska Institutet, Stockholm Research Centre for Radiation Therapy

Linköping University

Bio- and Chemical Sensor Science and Technology, S-SENCE Information Systems for Industrial Control and Supervision, ISIS Noninvasive Medical Measurements, NIMED

<u>Luleå University of Technology</u> Integrated Product Development, Polhem Laboratory Minerals and Metals Recycling, MiMeR

Lund University Amphiphilic Polymers from Renewable Resources, CAP BioSeparation, CBioSep Circuit Design, CCCD Combustion Processes*

Royal Institute of Technology, Stockholm Bioprocess Technology, CBioPT Customer Driven High Performance Production Systems, Woxéncentrum Electric Power, EKC* Fluid Mechanics for Process Industry, Faxén Laboratory Inorganic Interfacial Engineering, Brinell Centre, BRIIE Parallel and Scientific Computing Institute, PSCI Speech Technology, CTT Surfactants Based on Natural Products, SNAP User-Oriented IT-Design, CID

Swedish University of Agricultural Sciences, SLU, Uppsala Wood Ultrastructure Research Centre, WURC

<u>Uppsala University</u> Advanced Software Technology, ASTEC Surface and Micro Structure Technology, SUMMIT

Appendix 8 - Ongoing Indo-Swedish research financed by Sida/Sarec (examples).

A/ Sida grants to India related projects in finalised or started 2004 or later:

Göteborg University:

<u>Department of Marine Ecology</u> Researchers: Anna Godhe (project coordinator) Project: Use of molecular techniques to study the influence of benthic resting stages on the dynamics of harmful algae along the south west coast of India.

Karolinska Institutet Medical University, Stockholm

<u>Dept of Public Health Sciences, Division of International Health (IHCAR)</u> Researchers: Vinod K Diwan (project coordinator) Project: The private health sector in Madhya Pradesh, India - Expansion by design or default: role of government. India

Lund University

Dept.of Pure and applied biochemistry Researchers: Bengt Danielsson (project coordinator) Project: Development of chemiluminescent immunoassays suitable for field-analysis of pesticides.

Center for chemistry and chemical engineering Researchers: Bo Mattiasson(project coordinator) Project: Adapted biology for degradation of recalicitrant chemical substances.

Dept. of geology Researchers: Birger Schmitz (project coordinator) Project: Marine gastropod intrashell stable isotope records as a tool to deduce Holocene monsoon variability along the south-west coast of India.

Kristiandstad university college

<u>Mathematical and natural sciences</u> Researchers: Ann-Sofi Rehnstam-Holm (project coordinator) Project: Use of molecular techniques to study the influence of benthic resting stages on the dynamics of harmful algae along the south west coast of India.

Royal Institute of Technology (KTH)

Dept. of Land & Water resources Engineering Researchers: Gunnar Jacks (project coordinator) Project: Groundwater resource management in India with special reference to quality.

Dept. of Land & Water resources Engineering Researchers: Gunnar Jacks (project coordinator) Project: Woman and water: Encountering the challenges of water resource management in rural India from gender perspective..

Stockholm University

<u>Biogeochemistry</u>, Dept. of Geology and Geochemistry, Earth Sciences Centre Researchers: Joyanto Routh (project coordinator) Project: In situ remediation of arsenic rich groundwater in Ambikanagar, West Bengal (India).

B/ Swedish Research Links

The third round of the so-called Swedish Research Links (Asian–Swedish research partnership programme) – grants by Sida and the Swedish Research Council – were distributed in October 2004. The following South Asia related project applications for Swedish Research Links (Asian–Swedish research partnership programme) were granted for the three-years period 2005–07.

Göteborg University:

• Magnus Holm, <u>Dept. of Cell and Molecular Biology</u> Project name: *Improved crop plants by expression of central regulators of light signalling pathways* (research related to India)

Karolinska Institutet Medical University, Stockholm:

• Bjarne Jansson, <u>Dept. of Public Health Sciences</u>, Division of International health (IHCAR) Project name: *Violence in low and high income countries: health economic analysis with public health approach* (research related to India)

• Lena Hammar, <u>Department of Biosciences</u> at Novum, Huddinge Project name: *Structure-function relationship in hepatitis virus E infection* (research related to India)

• Liam Good, <u>Center for Genomics and Bioinformatics</u> Project name: *Drug target validation and antiinfective development for HIV/AIDS and associated infections* (research related to India)

• Rolf Hultcrantz, <u>Dept. of Medicine</u> Project name: *Nonalcoholic fatty liver as a risk factor for the development of chronic liver disease and hepatocellular* (research related to India)

Royal Institute of technology, KTH, Stockholm:

• K V Rao, <u>Division of Engineering Material Physics</u>, Department of Materials Science and Engineering Project name: *Novel Multifunctional Oxide Sensor materials for Monitoring Environment* (research related to India)

• Rolando Zanzi, Department of chemical engineering and technology Project name: *Integrated BIO-FC technology* (research related to India)

Lund University:

• Björn Lindman, <u>Division of Physical Chemistry 1</u>, Center for Chemistry and Chemical Engineering

Project name: Effects of the headgroup architecture on DNA-cationic amphiplile interaction: Relevance to DNA condensation and cationic amphiphile based genedelivery systems (research related to India)

• Marichamy Sankar, <u>Dept. of Biotechnology</u>, Center for Chemistry and Chemical Engineering Project name: *Psychrophilic anaerobes and application of their genes to recalcitrant biomass utilization* (research related to India)

Other funding agencies

Royal Institute of technology, KTH, Stockholm:

• Ann-Christine Albertsson, Department of Fibre and polymer technology Project name: *Polymers for the future* (research related to India)