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**TOWARDS A GLOBAL K-NET:
SETTING-UP THE SUB-REGIONAL INFRASTRUCTURE
FOR A WORLD BRAIN¹**

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I. OVERALL DESCRIPTION

Rationale. Three trends are aggressively manifesting themselves within the developing world amidst this age of information and communication technology (ICT). Firstly, globalization has become a primary agenda among development agencies. Secondly, networks are becoming the most dominant organizational structure among development institutions. Finally, knowledge is becoming the most critical resource in developing economies. Establishing a *Global Knowledge Network or Global K-Net* is now providing the logical closure for these trends, the long-term goal being the evolution of a so-called “world brain.” Such a global network links up the knowledge bases of research and development agencies all over the world.

Employing Bill Gates’ “digital nervous system” metaphor, a world brain requires an infrastructure in the same manner as an ordinary brain requires a network of neurons to function. The World Wide Web has become the *de facto* backbone of this infrastructure. However, the immense differences in bandwidth and interconnectivity among regions and countries within regions have so far prevented the formation of such a Global K-Net. Interventions should be made to effectively bridge this Digital Divide through the appropriate technology. Furthermore, the interconnectivity of this network should be assured.

National knowledge networks are slowly but surely becoming a reality, with individual nations investing heavily into IT infrastructure development and the identification of common platforms and standards among national research institutions. This is a welcome development on one hand. On the other, some futurists are alarmed by its implications. Based on generally observed network behavior, these systems will link up with one another sooner or later to form systems of a higher level of complexity. Thus, national knowledge networks will link-up with one another to form sub-regional (e.g., South Asian, East Asian, Central Asian, etc.) knowledge networks. Sub-regional knowledge networks will join together to form regional (e.g., Asian, North American, European, African, etc.) knowledge networks that in turn combine to form the Global K-Net. Due to the lack of *de facto* standards, however, the development of national information systems and knowledge networks independent from other national systems and networks may soon pose problems of compatibility and interconnectivity.

This paper describes a super-project that establishes the infrastructure for Southeast Asian sub-regional knowledge networks. While still employing the World Wide Web backbone, it will make use of broadband and wireless technologies for connecting research and development institutions from the ten Southeast Asian countries, i.e., Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. Furthermore, it shall identify the most appropriate standards and platforms for knowledge exchange and sharing.

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Objectives. The objectives of the super project are:

1. to design and develop the infrastructure for a Southeast Asian Knowledge Network that may serve as a template infrastructure for other sub-regions in Asia and the Pacific;
2. to establish and operationalize this knowledge network by linking research and development institutions in Southeast Asia through a complete intranet system within specified knowledge domains;
3. to identify appropriate platforms, standards and protocols for the K-Net and to ensure their compliance among the participating nodes.

Mechanics. A template infrastructure for a sub-regional Knowledge Network will be designed and developed. This infrastructure will cover hardware, software and middleware requirements. Although it may be applicable to any specific knowledge domain, this project will concentrate on the highest priority domain in the region, which at the moment is food security. Hence, it will be a knowledge network designed and developed for the Southeast Asian Forum for Agricultural Research (SEAFAR), the sub-regional node for the Global Forum for Agricultural Research (GFAR) based in Rome. It will establish domain specific agricultural knowledge bases in the national agricultural research centers (NARC) and link these up electronically as complete intranet systems using broadband and wireless technology. The network is tentatively being called the SEAFAR KNet. The Secretariat of SEAFAR, the SEAMEO Regional Center for Graduate Study and Research in Agriculture or SEARCA, will manage it.

Pre-feasibility studies for the SEAFAR KNet have already begun in earnest since March 2001. Although institutional arrangements are yet to be firmed up between GFAR and SEARCA, it is anticipated that the project will commence in 2002 with a number of feasibility studies and project preparatory designs. This will be followed by the development of the KNet infrastructure, inclusive of its hardware, software, middleware and connectivity specifications. The use of broadband and wireless is expected to enable countries such as Laos, Cambodia, Vietnam and Myanmar to leapfrog ICT development bypassing cable requirements. The construction of appropriate facilities and the installation of the equipment will follow the design process, which would entail a series of consultative meetings with the NARCs based in the ten countries. Standards, platforms and protocols will have to be identified by consensus.

Additionally, the super project will have a content development component that will likewise be designed through a consultative process. This will be supplemented by a capacity building component for the NARCs, SEAFAR and SEARCA staff.

Appropriate templates for the content will be designed. A mechanism for the electronic capture, storage, sharing and re-use of lessons learned, best practice, models and methodologies generated by the NARCs will be instituted as an aid to policy formulation for the governments concerned. Employing the knowledge management approach, traditional databases with knowledge bases on specific agricultural research and development domains. These shall contain documented knowledge as well as electronically captured tacit knowledge. Additionally, Southeast Asian experts (known in KM parlance as *communities of practice*) in these knowledge domains may also be tapped through the KNet.

Given the rapid advancements and obsolescence of information and communication technology, the super project should develop a Knowledge Management System that would not be obsolete in a couple of years. It should be a system that is an integral part of the Southeast Asian agricultural R&D supra system that grows and adapts with it. Hence, this project should adopt a *modular evolutionary prototyping* approach.

II. ANTICIPATED COST AND FUNDING NEEDS

The project cost may range from several millions to an estimated US\$ 1.1 billion in its totality covering all components: project feasibility studies, project design and preparation, hardware-software-middleware procurement and installation, construction,

satellite services, capacity building, and monitoring and evaluation. The total budget will be financed by regional technical assistance packages from international and bilateral funding institutions (possibly World Bank and JBIC), as well as counterpart funding from regional agencies (possibly ASEAN) and governments of ten Southeast Asian nations.

III. DESIGN AND CONSTRUCTION HIGHLIGHTS

The SEAMEO Regional Center for Graduate Study and Research in Agriculture is entering into a Memorandum of Agreement with Sun Microsystems Philippines for the infrastructure design of the SEAFAR KNet. This generic design template may be employed in any knowledge domain covered by national research institutions in the countries within the sub-region.

The infrastructure will cover the entire Southeast Asian sub-region using a broadband and wireless platform. This would entail the construction of appropriate facilities in the ten Southeast Asian countries as well as the installation of the requisite hardware, software, and middleware. Much of the cost of this super project will go into the infrastructure, which may require the use of transponders in commercial satellites.

IV. IMPLEMENTATION TIMELINE

PHASES	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
Feasibility Studies							
Infrastructure Design							
Construction							
Content Development							
Capacity Building							
M&E							

Considering that this is a sub-regional undertaking, the super-project will take seven-years to complete beginning 2002.

MANAGEMENT OR SPONSORING GROUPS

SEAFAR. The Southeast Asian Forum for Agricultural Research (SEAFAR) is the planned sub-regional node for Southeast Asia of the Global Forum (GFAR) for Agricultural Research, an association of international and regional organizations involved in agricultural research and development. GFAR is based in Rome and is closely associated with the United Nations Food and Agriculture Organization (FAO) and the Consultative Group for International Agricultural Research (CGIAR).

SEARCA. The SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) is first of seven regional centers established by the Southeast Asian Ministers of Education Organization (SEAMEO), an intergovernmental treaty organization formed in 1965 to facilitate informational, educational and cultural exchange programs within Southeast Asia. Ten countries are represented in SEAMEO.

Sun Microsystems. One of the world's leading business information systems developer, Sun Microsystems is credited for products such as I-Planet and other high-end business applications and solutions. Sun Microsystems Philippines is the subsidiary involved in this super project.

V. ECONOMIC DEVELOPMENT IMPACT

The sharing and re-use of agricultural knowledge among the ten Southeast Asian nations is expected to:

1. improve food production and post-production efficiency by US\$ 60 million annually;
2. generate new knowledge assets worth US\$ 70 Million annually;
3. lead to new national and sub-regional economic transactions at the volume of US\$ 80 million annually;
4. result in R&D savings at the tune of US\$12 million annually;
5. produce spill over effects in other sectors (education, information and communication technology) worth US\$ 40 million annually;
6. improve national and local governance through sounder policy formulation;
7. improve relations within the Southeast Asian sub-region; and
8. reduce poverty in the Southeast Asian sub-region (as well as other concomitant conditions such as crime, child labor, and corruption) by twenty percent through the improvement of social protection mechanisms.

The higher order impacts of this project are not limited to the above. The development of a sub-regional knowledge network infrastructure may eventually serve as the basis for knowledge networks in other sub-regions. These may link up to form regional KNetS and, at a higher level of complexity, a Global KNet. This super project may just serve as the catalyst for the evolution of the world brain.