

**Royal University of Bhutan
Jigme Namgyel Polytechnic
Dewathang.**

**Draft Concept Paper on the establishment of Centre for Appropriate
Technology (CAT) at Jigme Namgyel Polytechnic**

Note: Preparatory research conducted in 2010-11 by Luke Raftis as background for this proposal investigated the curricula, activities, operation, management, and funding of centres for appropriate technology globally. Luke Raftis' subsequent draft concept paper was discussed in depth and detail over a period of several months in joint consultations between Jigme Namgyel Polytechnic management and faculty and Samdrup Jongkhar Initiative staff and representatives, and the proposal was endorsed and approved in principle by the Royal University of Bhutan Vice-Chancellor, Dasho Pema Thinley.

The CAT paper was then revised and modified extensively based on input received, and particularly based on recommendations and feedback received at an extensive joint SJI-JNP meeting held at JNP on 1st March, 2011. Based on that, this present proposal was then developed by Mr. Denten Zangpo — the appointed JNP faculty and focal person for the proposed new JNP Centre for Appropriate Technology — with further suggested minor edits and revisions from Mr Raftis and SJI working group members.

The next steps are (a) SJI search for and appointment of an interim SJI appropriate technology coordinator as outlined and described below, and (b) formal approval of this proposal by JNP and SJI management (with any further final amendments), after which it will be submitted to RUB for formal approval. As soon as SJI is formally registered as a Civil Society Organization (anticipated by mid-2011), a Memorandum of Understanding between SJI and JNP will then be developed on the basis of the approved proposal.

1. Introduction

1.1 Jigme Namgyel Polytechnic (JNP) is one of the constituent colleges of the Royal University of Bhutan and is located in Dewathang, Samdrup Jongkhar, in southeast Bhutan. JNP is seen as one of Samdrup Jongkhar's key assets and resources, and a potential powerhouse and knowledge base for Samdrup Jongkhar Initiative development actions.

JNP was formerly known as Royal Bhutan Polytechnic, established February 22nd, 1974 in Dewathang. In 2002, while the institution was situated at the Rinchending campus in Phuentsholing, it was upgraded to a degree-granting institution, offering undergraduate degrees in Civil and Electrical Engineering, and was renamed the *Royal Bhutan Institute of Technology*.

1.2 The institute was relocated back to its original campus in Dewathang in June 2006 and renamed as Jigme Namgyel Polytechnic. It is currently offering diploma courses in Civil, Electrical and Mechanical Engineering. The institute aims to expand its offerings in future with a degree level program in Mechanical Engineering, a diploma in Electronic and Communication Engineering, and a diploma in Information Technology. The institute also plans to offer other professional services through engaging in materials testing and certification, and carrying out consultancy and community services including research.

2. Origin of the creation of Centre for Appropriate Technology (CAT).

2.1 The Samdrup Jongkhar Initiative (SJI) is a civil society organization founded on the vision of Dzongsar Jamyang Khyentse Rinpoche, which aims to improve living standards within Samdrup Jongkhar dzongkhag and establish food security and self-sufficiency — fostering GNH-based, ecologically-friendly development in harmony with the government goals, while fully protecting and enhancing the natural environment, strengthening communities, stemming the rural-urban migration trend, and fostering a cooperative, productive, entrepreneurial, and self-reliant spirit.

2.2 Following the initial 2010 request from SJI for consideration of creation of a new Centre for Appropriate Technology at JNP, both the JNP Director at that time, Lopen Kezang Choddar, and Dasho Pema Thinley, Honourable Vice Chancellor, Royal University of Bhutan, have strongly endorsed and supported the creation of the new centre at JNP in collaboration with SJI to achieve this noble objective. JNP had also reflected the intention to start this new Centre for Appropriate Technology in the current version of its strategic plan.

3. Outcome of first full joint meeting on Centre for Appropriate Technology.

3.1 After many prior informal discussions, the JNP faculty and SJI representatives held their first full formal meeting on 1st March 2011, where they jointly expressed that the proposed new Centre for Appropriate Technology will be a remarkable opportunity for JNP to become a regionally renowned educational institute, attracting a new breed of socially and environmentally conscious students from throughout the country and region, nurturing GNH values and principles, and providing tangible benefits to the region and the country at large. It would also provide opportunity for greater institutional autonomy for JNP and could also fulfill the stated goal of the Royal University of Bhutan to diversify the courses.

3.2 The Samdrup Jongkhar Initiative sees JNP as one of the dzongkhag's major assets, and the new CAT as a potential knowledge base for SJI, particularly in some of its key initial focus areas like rainwater harvesting systems, solar drying for fruits, vegetables and herbs, solar lighting, solar cookers, and other rural-based needs in the region. Since a key objective of SJI is to identify and build on the region's existing strengths, it sees the new JNP Centre for Appropriate Technology as a core component of its project actions and as a key means to achieving the objectives outlined above.

3.3 The JNP will also integrate appropriate technologies into the current curriculum by creating components for inclusion within existing modules — particularly in the 5th semester practicums. It is planned that SJI and JNP will formally sign a MoU after the SJI receives full Civil Society Organization (CSO) status (anticipated by June, 2011).

4. Vision

4.1 The Jigme Namgyel Polytechnic Centre for Appropriate Technology will be a collaborative venture between Samdrup Jongkhar Initiative and Jigme Namgyel Polytechnic. The Centre aims to improve the living standards of rural Bhutan by providing well-informed, ecologically-friendly technological support to address problems faced by the residents.

5. Mission

5.1 The mission of the new centre would be to establish Jigme Namgyel Polytechnic as a regionally-renowned Centre for Appropriate Technology that serves the local community and responds to community needs, strengthens JNP as a regional asset, provides a practical knowledge base for ecologically friendly and culturally appropriate development in the region, and creates good, interesting, and meaningful jobs for local youth. That, in turn, is seen as helping stem the present massive tide of rural-urban migration among youth. Overall, the centre will endeavour to nurture GNH values and foster greater environmental and social awareness in its students.

6. What is Appropriate Technology?

6.1 The term *appropriate technology* refers to a wide range of ecologically- friendly and generally low-cost technical and socio-technical solutions which are compatible with the social, cultural, environmental, economic conditions of the people they serve. In practice, the focus is usually, though not exclusively, on rural and

agricultural populations, primarily because mainstream technological solutions are more likely to be out of reach financially or otherwise impractical for them.

6.2 Appropriate technology is designed with special consideration of the environmental, ethical, cultural, social, political, and economic aspects of the community for which it is intended.

With environmental and ethical goals in mind, appropriate technology methods require fewer resources, are decentralized and easier to operate, maintain, and repair (generally by local residents with modest training), and have less of an impact on the environment, compared to techniques from mainstream technology, which are often wasteful and environmentally polluting, highly centralized, and require advanced technical skills (often from outsiders) for operation and maintenance.

6.3 Appropriate technology is considered particularly suitable for use in [developing nations](#) or less developed [rural](#) areas of industrialized nations. In this form, [labour-intensive](#) solutions are preferred over [capital-intensive](#) ones, although labour-saving devices are also used when capital or maintenance costs are low. In practice, appropriate technology in developing nations is sometimes described as using the simplest level of technology available to achieve effectively the intended purpose in a particular location. In [industrialized nations](#), appropriate technology often refers primarily to engineering solutions that take special consideration of social and environmental ramifications.

6.4 The term *appropriate technology* came into some prominence during the [1973 energy crisis](#) and the early [environmental movement](#) of the 1970s in the west. The term is therefore typically used in two arenas: utilizing the most effective technology to address the needs of developing areas, and using socially and environmentally acceptable technologies in industrialized nations. Often the type of appropriate technology that is used in developed countries is called "Appropriate and Sustainable Technology" (AST); or appropriate technology that, besides being functional and relatively cheap (though often more expensive than true AT), is also very durable and lasts a long time.

6.5 ***Examples of technologies that have been proposed as potentially appropriate for Samdrup Jongkhar***, and which require further exploration and investigation to assess appropriateness, feasibility, and capacity to contribute to local livelihoods and environmental wellbeing include:

1. Solar drying of fruits, vegetables, and herbs.
2. Wildlife deterrent devices.
3. Rainwater harvesting systems.
4. Food storage and processing equipment.
5. Composting and biogas units, compost toilets, and zero waste solutions.

6. Natural cosmetic and soap making equipment using local soap berries.
7. Processing devices for locally available medicinal herbs and other non-wood forest products.
8. Mud brick fabrication systems.
9. Natural bamboo curing and preserving to support bamboo-based craft industries.
10. Organic farming aids, such as compost bins, biological pest control agents, and bio-dynamic preparations.
11. Solar lighting.
12. Solar cookers, etc.
13. Solar hot water systems for off-grid areas and electric boosted solar hot water systems for urban application.

7. Long-term vision and phased implementation

7.1 This concept paper presents the long-term vision for the proposed new Centre for Appropriate Technology (CAT), recognizing that there will be an initial development phase, and that all the proposed activities will not commence immediately or at the same time. Furthermore, this visioning paper describes a broad array of proposed activities which could eventually be undertaken by the Centre. Again, however, these activities would only be undertaken as resources permitted.

7.2 As the Centre develops over time, it will be up to the discretion of the management of the Centre, in close consultation with JNP and SJI, to allocate available human and financial resources in a manner that best serves the Centre's overall mandate and the needs of the region. While there would likely be some core CAT activities, such as curriculum, which would be running continually, other activities might be undertaken at less regular intervals, and new projects would not be initiated without the availability of funds. It is anticipated that each major new project will require separate fund-raising before it is initiated.

7.3 In sum, this concept paper should be seen as a potential long-term vision for the proposed new Centre for Appropriate Technology at JNP, describing how it might function and what roles it might perform in the long term, by 2030 for example. However, the actual development of the Centre will clearly be gradual, with that phased development particularly necessitating different personnel, program, and resource requirements at different stages. Thus, for example, an extensive 1st March meeting between SJI and JNP staff recommended an initial phase of incorporating appropriate technology components into existing JNP courses, particularly into the 5th semester practicum projects work.

This approach and phased development was also seen by both JNP and SJI representatives at the 1st March meeting as having the particular advantage of "mainstreaming" appropriate technology methods and solutions, rather than considering them a separate eco-social 'silo' or approach different from the regular

JNP engineering curriculum. The latter was thought to be more of a danger if the proposed new Centre is established full-blown at the start as a separate unit. Instead, beginning the CAT development by bringing appropriate technology components into existing JNP curricula offerings will create a more natural way for faculty and students to see appropriate technology methods, approaches, and solutions as a normal, and indeed essential, dimension of engineering and student training.

7.4 Thus, it was suggested that the fifth semester practicum course in particular could be easily geared to the design, fabrication, field testing, implementation, and improvement of appropriate technologies of direct use to local communities. This initial developmental phase might also include the design and teaching of an overview Introduction to Appropriate Technology course. SJI will play a lead role in creating, phasing in, and establishing the new Centre in full consultation and collaboration with JNP, including mobilizing resources, designing initial projects, and developing project proposals.

7.5 This proposed phased development, therefore necessitates the appointment of an SJI *appropriate technology coordinator* during the initial developmental phases. In the longer term, it is anticipated that SJI will be the primary conduit between local communities and the new Centre, making community needs known to JNP faculty, assisting in mobilizing resources for the development of the appropriate technologies, and facilitating implementation of CAT projects in local communities. To take the lead in the initial one to two-year developmental phase-in period, SJI will search for and appoint an SJI Appropriate Technology Coordinator by mid-2011.

8. Management

8.1 In the long-term, it is proposed that the Centre for Appropriate Technology will be a joint, collaborative venture between Jigme Namgyel Polytechnic and the Samdrup Jongkhar Initiative, based on a memorandum of understanding (MoU) between the two partners that will outline their respective roles and responsibilities. For example, SJI may function as a conduit to communicate community challenges and needs to JNP Centre faculty, to raise funds for particular projects, and to ensure effective dissemination of JNP projects in local communities, while JNP faculty will likely focus on teaching functions and on the more technical design, training, and testing functions of appropriate technology solutions in which they have expertise.

8.2 To ensure the effective operation of the partnership, therefore, the MoU will clarify responsibility for academic activities, such as courses and practicum projects, as well as the research, project development, networking, fund-raising, and community resource centre roles more typical of a civil society organization.

8.3 The new Centre should eventually be headed by a full-time director, who will oversee all of the Centre's activities, both academic and applied. The director will be responsible for ensuring that the Centre will operate as outlined in the MoU. As the Centre develops in stature, reputation, and number of students — and as it

potentially becomes self-supporting through its new designs, inventions, and applications — full-time staff members with expertise in particular areas (e.g. energy, agriculture, waste minimization) may eventually be recruited. The Centre director, who will be responsible for both the the academic and applied appropriate technology activities of the Centre, will report to both the JNP and SJI management from time to time on progress.

8.4 A joint JNP-SJI task force will oversee and give direction to the Centre's ongoing and overall operations, ensuring that it is making efficient progress towards its objectives, that it is working in a way that benefits both JNP and the SJI's broader societal goals, and that both organizations have sufficient knowledge of the Centre's operations and opportunity to provide informed input.

9. Funding

9.1 As committed by SJI in the joint SJI-JNP 1st March 2011 meeting, it is proposed that some core funding will be raised for the Centre's basic operations, including academic activities beyond current JNP offerings (such as the proposed Introduction to Appropriate Technology course), and some of the Centre's core research and networking activities geared to undertaking the first initial design, fabrication, and testing projects. For example, it has been proposed that an initial project might be development of solar drying units, funding for which might include travel by a JNP faculty member to the Barli Development Institute in Madhya Pradesh that has effectively developed such units, and purchase of essential materials for fabrication. Identifying suitable sources for such initial core funding will be one of the main tasks of the interim SJI appropriate technology coordinator to be appointed by mid-2011.

9.2 The MoU will also outline the proposed longer-term funding structure for the Centre. Based on effective functioning of similar appropriate technology centres in other parts of the world, and beyond such initial core funding, it is proposed that other larger or smaller scale implementation projects would be funded separately from the project-specific funds raised by SJI and the Centre. For example, zero waste projects may be funded by organizations and donor agencies with a particular interest in waste issues while agriculture-related appropriate technologies may be attractive to other funding sources. The interim SJI appropriate technology coordinator and (in the longer term) the Centre director will explore such potential area and issue-specific funding sources for different proposed dimensions of the Centre's activities.

9.3 Based on the experience of other such appropriate technology centres globally, which were investigated in the preparatory research conducted for this concept paper, it is also anticipated that many of the projects on which the proposed new Centre collaborates will involve other partners, such as government agencies, international NGOs, or farmer and enterprise groups, some of which may be able to fund certain components of projects according to their own interests and activities. It is anticipated that such partnerships will allow the Centre to work on more projects without drawing on its core funding.

9.4 One of the responsibilities of the interim SJI appropriate technology coordinator and the longer-term Centre director will be to write proposals, raise funds, and build the capacity of the Centre by seeking out such partnership opportunities in addition to other grants that would be able to provide project-specific funding.

9.5 It is likely that some of the new Centre's innovations will eventually provide opportunities for patents, and for securing royalties from use of its inventions. Universities throughout the world frequently use such research contributions as a source of funding for their institutions and for further research and innovation. Rather than become 'factories' themselves for the innovations they design and test, such research institutions may sign agreements with external organizations, businesses, and government agencies that would take responsibility for actual fabrication and large-scale production of effective and tested innovations that result from the research. Such an approach would be entirely in line both with RUB's intention to give its constituent colleges greater autonomy and financial independence, and to enable the new Centre for Appropriate Technology to become gradually more self-supporting over time.

10. Time-line

10.1 In order to develop the proposed new Centre's capacity to undertake all of the actions outlined above, there will need to be an initial period of capacity-building, where background research is further developed, networks are developed, pilot projects are initiated, sample curricular and practicum units are developed, new funding sources are identified and sought, and formal agreements are arranged. As described below, and as agreed in the 1st March joint SJI-JNP meeting, it is proposed that SJI begin work immediately on the research, networking, and fund-raising tasks, and that both organizations continue to work together towards developing a formal agreement, initiating pilot projects, and developing initial curricular and practicum units.

11. Short Term (mid-2011 – mid-2012)

11.1 It is proposed that SJI hire a staff person by mid-2011 as its appropriate technology coordinator, whose work would be devoted entirely to the preliminary development of the Centre. Please see attached terms of reference for this position. This person would be tasked with further research, networking, fund-raising, and curriculum, pilot project, and practicum development, as well as working with JNP to develop a formal memorandum of understanding, and serving as a conduit between the two organizations and with the local community. During this period, and following approval of this proposal by SJI, JNP, and RUB, all the necessary details of the partnership and of the new Centre's function and structure will be discussed at length through proper and extensive consultation, and a more detailed strategic plan for the Centre will be developed to include specific pilot projects and implementation mechanisms. This agreed plan will then be submitted to the Royal University of Bhutan for formal approval and also used as the basis for core

fundraising proposals, which the SJI appropriate technology coordinator will develop and submit after full consultation with JNP.

11.2 As agreed at the 1st March SJI-JNP meeting, one of the most important tasks during this initial period is to lay the foundations for the proposed new Centre by bringing appropriate technology components into the existing JNP structure. This approach has the dual advantage both of rousing interest and enthusiasm among faculty and students by gradually demonstrating the utility, relevance, and potential benefit of an appropriate technology approach, and also of mainstreaming appropriate technology by seamlessly integrating it into existing conventional structures (such as mechanical and electrical engineering and information technology) rather than regarding it as something 'different', 'alternative', or 'fringe'.

11.3 At the initial phase, appropriate technology components will be integrated into existing JNP modules and courses, both as theory or workshop projects. JNP faculty have noted with particular interest and enthusiasm that the design, fabrication, testing, and implementation of appropriate technologies would make excellent projects for the fifth semester practicum course, which often searches for relevant, practical subjects and applications. As well, this initial period would see the development of a basic *Introduction to Appropriate Technology* course that would provide both a theoretical and practical overview of the subject and approach.

Following the February, 2011, SJI-organized visit of the co-directors of the Barli Development Institute for Rural Women in Madhya Pradesh, where effective low-cost solar drying units have been designed, developed, and widely applied, it has been recommended that this solar drying technology can be a very useful, manageable, and low-cost initial SJI-JNP appropriate technology project for the 2011-12 year. Following a presentation to JNP faculty and students and further discussions with JNP faculty and management, the Barli directors kindly and generously offered to make their solar drying design plans and training available to the SJI and JNP. JNP faculty expressed confidence that they could adapt those plans effectively to Samdrup Jongkhar conditions based on study of type and quantity of local products to be dried, local market demand for dried products, and cheap and locally available materials for fabrication. Such an initial year one project, perhaps incorporated into one of the fifth semester practicum modules, will demonstrate the utility of the appropriate technology in a very practical way.

A second initial project that would fit well into existing SJI activities is use of other solar powered devices like solar hot water systems, particularly in remote Samdrup Jongkhar villages. In off-grid solar electrified villages, there will also be need for local operation and maintenance of solar lighting systems to increase village self-reliance and reduce dependence on external agencies like Bhutan Power Corporation and Department of Energy. To that end, six village women from remote Lauri Gewog are currently undergoing six months of 'solar engineering' training at the Barefoot College in Rajasthan. Before their return home in September-October, 2011, the women will visit the Barli Development Institute for 15 days of training in solar drying technologies and methods. It has been proposed that SJI could fund the costs for a JNP faculty member to meet the women at Barefoot College towards

the end of their training to see what they have learned, and then accompany them on the 15-day Barli Development Institute training.

Following the return to Samdrup Jongkhar of these newly trained 'solar engineers', such projects — solar drying and solar lighting in off-grid solar electrified villages, and electric-boosted solar hot water systems for on-grid Samdrup Jongkhar locations — might become initial JNP appropriate technology practicum projects in collaboration with the villagers and with SJI.

11.4 The SJI appropriate technology coordinator will be responsible for working closely with JNP faculty to accomplish such immediate tasks, which are not dependent on formal establishment of the new Centre or even on prior existence of an extensive, formal MoU between SJI and JNP, since this initial approach of bringing appropriate technology elements into existing courses and practicum modules entirely respects and works within the existing JNP structure, framework, and offerings. In sum, this is a way of beginning the appropriate technology process at JNP and in Samdrup Jongkhar without delay and with minimal cost and risk. This approach will also work to develop a good working relation between JNP and SJI which will form the basis for the more formal development of the proposed new Centre.

12. Medium Term (Mid-2012 – 2014)

12.1 Once a formal agreement between SJI and JNP is established, and sufficient funding sources are in place, the new Centre can be formally inaugurated, if only on a modest initial basis, and can begin to work in all the functional roles outlined above. During this period, appropriate technology courses will gradually be developed and put in place, and will be refined and broadened as necessary. Research will be conducted on key issues in the dzongkhag, and some key demonstration projects will begin to be implemented.

12.2 A strategic plan will be developed and new sources of funding, student interns, and volunteers will be investigated and secured. The Centre will begin to engage with the community, to arrange its first training sessions, and to begin networking on a continuous basis. As the Centre will still be in its infancy, there will undoubtedly be some early missteps, which will constitute key learning experiences, and plans will likely have to be adjusted and modified accordingly as the new Centre gradually identifies and defines its functions.

Indeed, the outcomes of the short-term (2011-12) activities noted above will undoubtedly define and generate the needs and activities that characterize this medium-term period. For that reason, it is not possible to specify precisely at this stage the activities of this medium-term phase. As noted above, it is proposed that there be a task force or advisory board, which would be comprised of members from JNP, SJI, the community, and the dzongkhag administration, to guide all developmental activities.

13. Long Term (2014 onwards)

13.1 As the new Centre grows and matures, its activities will continue to expand, guided by its strategic plan, its faculty, and its board members. As the Centre gains an ever stronger regional reputation for excellence and innovation, it will be better able to secure funding from a wider range of sources, and will gradually develop the capacity to undertake larger projects, conduct more training sessions, expand its academic offerings, and attract more and better qualified students from throughout the country and region.

13.2 The Centre will be able to offer a continually expanding realm of expertise on appropriate technology issues, eventually becoming a centre for excellence in the field, and collaborating with organizations from across Bhutan and abroad. By 2014-15, Samdrup Jongkhar and its residents will be experiencing tangible benefits from the appropriate technologies developed to date, and some of these technologies will begin to be applied nationwide based on successful testing and appropriate modification within the dzongkhag.

14. Capacity Building/Human Resources Development.

14.1 In order to fulfill the above expectations, the Centre needs to recruit skilled personnel with expertise in the specific subject areas, and will be able to train other staff as necessary.

14.2 During the winter of 2010-11, SJI and JNP hosted the founders and directors of the Barefoot College in Rajasthan, and Barli Development Institute for Rural Women in Indore, Madhya Pradesh, who came to showcase some of their appropriate technology activities. Both institutes invited staff from JNP and SJI to visit their respective campuses to get a better understanding of the work they do. Therefore, it would be of great benefit to the development of the new Centre for Appropriate Technology for both the JNP focal person and the SJI appropriate technology coordinator to have hands-on experience with the specific technologies involved in both institutes, since those technologies will likely be taken up as initial projects. SJI will undertake to raise funds to make that possible.

It is also recommended that key members of the Samdrup Jongkhar Appropriate Technology working team may undertake a study tour to already existing appropriate technology institutes in India (e.g. Mysore) and possibly also to successful appropriate technology projects in Nepal or Bangladesh, in order to bring back and apply in Samdrup Jongkhar what they see and learn in these neighbouring countries.

15. Infrastructure.

15.1. In the initial phases of CAT development, the workshops, classrooms, and other facilities already existing at JNP may serve the initial requirements. At later stages, however, as courses, practicum modules, and activities are further

developed and expanded, and as appropriate technology faculty and students increase in number, an expanded Centre will demand more space and facilities, which will require further investment as these requirements are assessed.

16. Equipment and machinery.

16.1 The present equipment and machinery available at JNP may be able to carry out some initial manufacturing and fabrication work — for example in initial experimentation with solar drying units. Again, however, as projects expand in both scope and number, there will certainly be some special equipment requirements, which JNP does not presently have, to carry out key components of new projects. Only after the initial short-term developmental phase described above, and the proposed study visit to some of the existing appropriate technology institutes also described above, will it be possible to specify precisely what such new equipment and machinery requirements might be. However, as appropriate technologies are generally quite “low-tech” and low-cost, and since they attempt as far as possible to use local materials, it is not anticipated that equipment requirements will be overly onerous.

17. Additional Societal Justifications

17.1 Bhutan has embraced a development path which seeks to balance and integrate sustainable and equitable economic development with environmental conservation, cultural promotion, and good governance. This approach, as summarized by His Majesty the Fourth King in the proclamation that “Gross National Happiness [GNH] is more important than Gross National Product”, constitutes a direct challenge to the dominant global development paradigm that sees economic growth and conventional industrialization as the key to progress.

17.2 Bhutan has a long history of wise and benevolent monarchy and this reliance on good government has carried through into the democratic era. At the same time, Bhutan’s civil society, grass roots organizations, and entrepreneurial sector remain relatively undeveloped.

17.3 In the course of its work, JNP’s proposed new Centre for Appropriate Technology can potentially play an important role in nurturing and strengthening these civil society and entrepreneurial sectors, which are so crucial to an active, effective, and functioning democracy. Because appropriate technologies are almost always decentralized and low-cost, and can be mastered, maintained, and repaired by communities, they can simultaneously build the self-reliance and local confidence that are prerequisites for a strong and active civil society and entrepreneurial approach. As well, the direct, substantial benefits that rural communities can potentially reap from application and use of appropriate technologies that improve agricultural productivity and rural economic viability in ecologically friendly ways, may provide good and interesting local job opportunities for educated youth, stem the rural-urban migration tide, and strengthen GNH values in harmony with both SJI and government objectives. In these ways the

proposed new Centre for Appropriate Technology can potentially contribute directly to broader social and national goals.

17.4 Samdrup Jongkhar dzongkhag is presently one of the poorer regions in the country, and like much of Bhutan, it is still predominantly rural. It faces high levels of rural-urban migration, particularly among youth. In Bhutan, as in many countries, technical education has traditionally been focused entirely on the industrial sector, with little attention paid to the agricultural sector, thus encouraging tertiary graduates to seek employment in urban areas. There are government agencies and organizations in Bhutan which do work on agricultural technologies, but these presently have a somewhat limited scope, and do not have the resources to expand their focus to a sufficiently wide array of rural issues and challenges. JNP's proposed new Centre for Appropriate Technology could potentially draw together the resources necessary to research and address more fully and comprehensively a wide range of related pressing challenges facing rural communities. That, in turn, can certainly create new opportunities in rural areas that could help stem the tide of rural-urban migration that is presently depleting rural areas of much of their youthful talent, energy, education, and experience.

17.5 In summary, building on the existing technical knowledge of the Jigme Namgyel Polytechnic, the proposed new Centre for Appropriate Technology will therefore be able to support the development of the entrepreneurial and civil society sectors in Samdrup Jongkhar and beyond. By developing strong community connections and serving local communities in highly constructive ways, and in conjunction with other innovative activities of the Samdrup Jongkhar Initiative, the new Centre can potentially interest JNP students in improving livelihoods and quality of life both in the Samdrup Jongkhar region and throughout rural Bhutan. In these ways, the new Centre can potentially serve wider social and national goals in harmony with GNH principles and values.

Vacancy Announcement: Title: Appropriate Technology Coordinator

The Director, SJI Appropriate Technology, will represent the Samdrup Jongkhar Initiative in working closely with the Jigme Namgyel Polytechnic (JNP) in Dewathang, to establish a regionally renowned Centre for Appropriate Technology that serves the local community and responds to community needs, strengthens JNP as a regional asset, provides a practical knowledge base for ecologically friendly and culturally appropriate development in the region, and creates good jobs for local youth.

Until such a Centre is formally established, the Director will work closely with JNP to:

- a) integrate appropriate technology components into existing JNP courses and 5th semester practicums (including practical design, testing, fabrication, modelling, training, and modification),

- b) design a full year Introduction to Appropriate Technology course that includes classroom teaching, reading, practical workshop exercises, and field work,
- c) collaborate closely with JNP to establish the new Centre – including proposal writing, consultations, budgets, fundraising, creating MoUs, marketing, and whatever else is required to create the Centre,
- d) serve as a conduit between SJI and the SJ community on one hand and JNP on the other to identify key community needs and how particular JNP appropriate technology projects might meet those needs. This will include ongoing outreach to local Samdrup Jongkhar communities to understand their needs and keep them informed of SJI activities,
- e) mentor subordinates, peers, and volunteers, with a view to building community capacity, sharing knowledge about appropriate technologies, cultivating future community leaders, creating regional opportunities for Samdrup Jongkhar youth, and building self-reliance,
- f) initiate the waste minimization dimension of the SJI in ways that are relevant to the appropriate technology mandate of this position and objective; and
- g) work with JNP faculty to design such particular projects, including preparation of budgets for equipment, staff time, student internship costs, field trips, and visits to existing model projects, to fundraise for such projects, and to oversee and ensure their effective implementation and dissemination to the community.

In addition, the SJI Appropriate Technology (AT) Coordinator will follow up on and ensure effective implementation of existing SJI AT projects, including design, fabrication, testing, and dissemination to S/J farmers of solar fruit and vegetable drying units, and facilitating meaningful and gainful employment that benefits S/J communities for the six Lauri Barefoot College ‘solar engineers’ upon their return to S/J in Sept/Oct 2011. The latter will require careful interim investigation of solar lighting needs in non-electrified villages of S/J and beyond, and preparation of communities for adoption of appropriate solar technologies.

Remuneration and application information:

Salary negotiable, depending on qualifications and experience.

The position will be on a contract basis, initially for one year and renewable by mutual consent. Applicants should include CV, covering letter, university transcripts, and names, titles, and contact information for at least three referees. Please submit application package in confidence to info@sjj.org before 4 April, 2011. We thank all applicants. However only applicants selected for an interview will be contacted.

Qualifications:

- Demonstrated experience in project management and implementation
- Strong research skills: a methodological and rigorous approach to information gathering and quantitative and qualitative data analysis, ability to understand detail and synthesize
- Strong understanding of and/or willingness to learn quickly in most of the following areas: agricultural principles and practices of sustainable development, appropriate technology, and practices in southern and eastern Bhutan
- A graduate degree in engineering, agriculture, or other studies relevant to appropriate technology plus at least three years related work experience.
- Capable of a high level of accuracy and consistency in numerical and written work
- Strong interpersonal skills: able to relate confidently to a diverse range of people, and display diplomatic personal conduct
- Proficient in academic research, internet research, and office software
- Flexible, reliable, enthusiastic and self-motivated
- Willing to travel to rural and/or remote areas to monitor and supervise projects
- English and expressed willingness quickly to learn and master Tshangla-lo (or Sharchopka) — the local dialect in Samdrup Jongkhar.

Location: Jigme Namgyel Polytechnic, in Dewathang, Samdrup Jongkhar.

Vision: Samdrup Jongkhar Centre for Appropriate Technology

The *Samdrup Jongkhar Centre for Appropriate Technology* will be a collaborative venture between Jigme Namgyel Polytechnic and the Samdrup Jongkhar Initiative. The Centre aims to improve the standard of living in rural Bhutan by providing well-informed ecologically-friendly technological support to address problems faced by residents. The centre will conduct research on an ongoing basis to maintain a detailed knowledge base of the current practices, problems and trends in the area as well as ecologically-friendly solutions that have been tried successfully elsewhere. It will promote technology transfer and best-practices dissemination where appropriate, and act as a resource for the rural community, providing training sessions, advice, and support for new technologies, agricultural practices and agro-enterprises. The Centre will provide job opportunities for educated youth and support all the objectives of the Samdrup Jongkhar Initiative listed below.

About Jigme Namgyel Polytechnic:

Based in Dewathang, Jigme Namgyel Polytechnic is one of the constituent colleges of the Royal University of Bhutan, and offers diploma programmes and certificate courses in information technology, mechanical, civil, and electrical engineering.

About the Samdrup Jongkhar Initiative:

The Samdrup Jongkhar Initiative is a civil society organization which aims to improve the living standards in Samdrup Jongkhar and establish food security and self-sufficiency, while protecting and enhancing the natural environment, strengthening communities, stemming the rural-urban tide, and fostering a cooperative, productive, entrepreneurial, and self-reliant spirit.