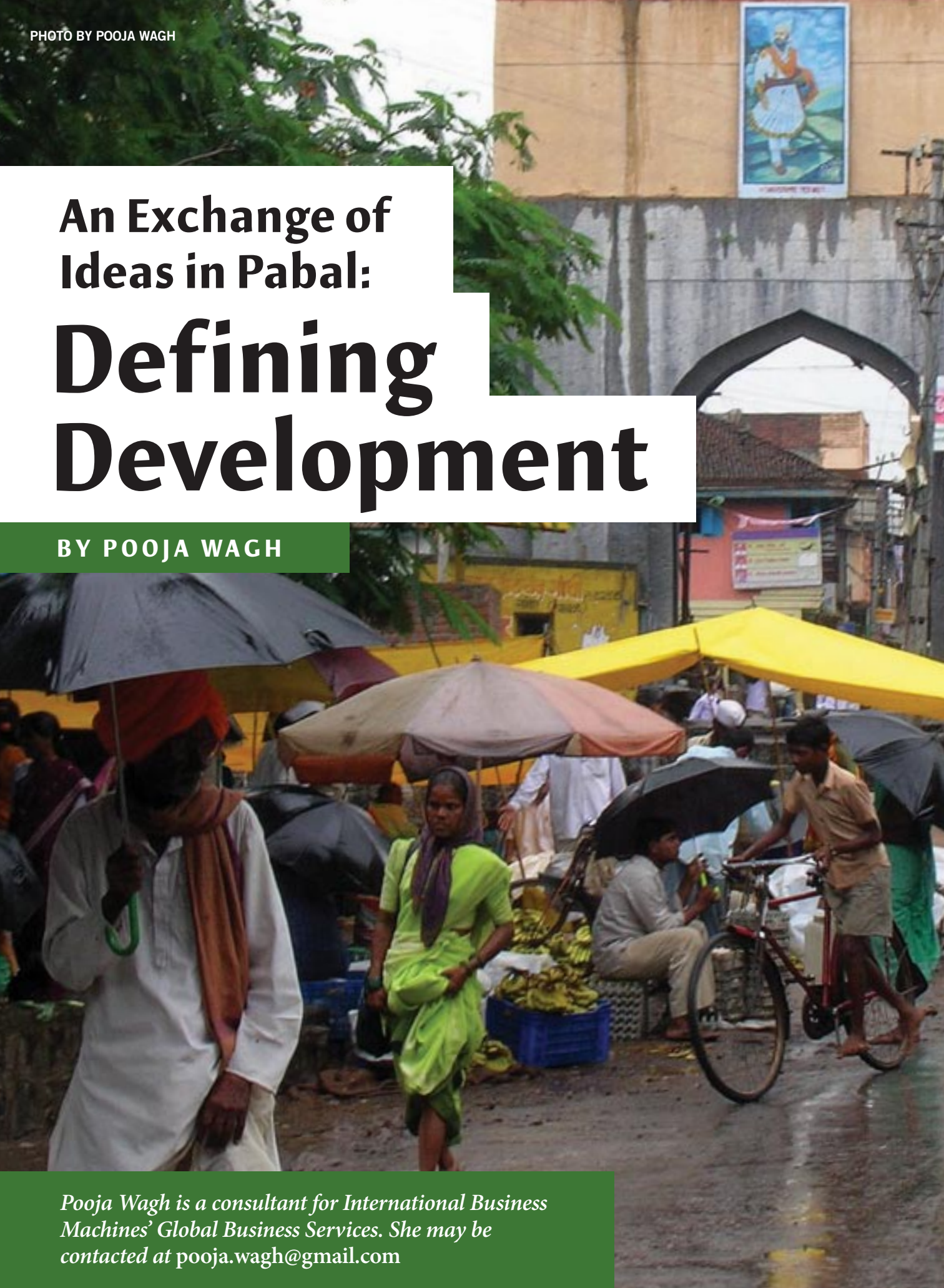

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An Exchange of Ideas in Pabal: Defining Development

BY POOJA WAGH

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- **Since January 2005, six students have been working on engINdia, a project that aims to establish communication between university students and a rural area of India.**
- **They returned from their travels with twenty-one Design Challenges and a renewed perspective on development work.**

UNDERSTANDING THE CHALLENGES OF DEVELOPMENT

The summer of 2005 began, for me, in a village populated by several thousand Indians, located about five hours east of Bombay. I was living in a three-room house in the core of the village of Pabal with one other American, three Britons and an Indian. We were all students with international experiences, but none of our experiences could compare to our journey that summer. We went to Pabal as members of engINdia, an international project whose aim is to promote communication between students worldwide and the local people of Pabal, Maharashtra in India. Though my team and I spent half a year planning our six-week stint in the village, we didn't realize until we arrived in Pabal that our trip would be as educational, inspirational, and perspective-altering as it turned out to be.

The purpose of engINdia is to form a channel through which local Pabal residents and foreign university students can discuss potential solutions to the technological challenges facing the Pabal community. The students and the locals have experienced life in different parts of the world. They have seen technology advance uniquely within their respective settings and have developed different views on the possibilities that technology can offer. engINdia's expedition model is based on the belief that these differences between the students and local people will allow for the cultivation of a diverse array of unique solutions to the same problem. By encouraging communication between the students and locals, the array of solutions created for each technological problem can be hybridized into a single, optimal solution to target the problem in the most effective way possible.

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Our approach to forming this communication channel was comprised of several stages. First, we gathered information about technological challenges faced by Pabal's people through direct interviews with community members. From the information we gathered, we then identified the major technological challenges in the community. We documented the challenges methodically, making sure to include all the information that a student outside Pabal would need to design an appropriate solution. Finally, we distributed the documented challenges to students at our home universities and over the Internet. Students who decide to work on any of our projects are put in touch with the organization with whom we worked in Pabal, and the students communicate regularly with those in Pabal who were working on the same project.

EngIndia began in January 2005 when six students from three universities came together to create a multinational team. We spent six months planning a six-week expedition to a village in India that took place from June-August of that year: raising funds, planning our field methodology, seeking approval from Cambridge University and

the Royal Geographical Society. We created a wide network of contacts in India until we finally identified the village of Pabal as the ideal location for the expedition.

Pabal is a village of approximately 9,000 people, but because it is a primarily agricultural community, most of the population is scattered outside the core of the village. It is located five hours east of Mumbai by bus; the closest major city is Pune, which is two hours away. The villagers always seemed eager to implement new technologies into their lives thanks to the presence of Vigyan Ashram, an educational institution in Pabal whose focus is to give students hands-on experience with rural technology. Vigyan Ashram's offer to act as engINdia's community partner made Pabal the best possible choice for the expedition destination.

our main corridor was already filled with a group of children who had wandered in to investigate our sudden appearance. Since it isn't often that a mysterious group of people moves into Pabal, the novelty of our presence didn't diminish during the course of the summer. An average day included multiple invitations to tea or dinner, and no venture into the village to collect information could take place without a dozen children following and asking for our autographs. We were amazed that we were being welcomed with such open arms. We had expected our presence to be met with some suspicion, or at least skepticism about our mission, but pleasantly found none.

Despite our numerous social engagements on any given day, we managed to collect what we had come for: documentation on what Pabal's residents felt were their most pressing technological problems. Each day, we split into two groups and conducted interviews with Pabal's residents. We started our series of interviews with Pabal's professionals – the baker, the tailor, the oil producer, and more. Gradually we moved on to family-style

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CRAFTING SOLUTIONS

We drove into Pabal on a hot, dry day, with the eight of us (the team, a driver, and our guide for the first day) and our luggage packed into a six-seater Jeep. A couple of hours after we had moved our hiking packs into our new home in the village core,

interviews, during which we discussed with entire families how they envisioned technology positively impacting their lives. After interviewing residents for close to two weeks, our team devoted time to consolidating the abundance of information we had recovered into concise and unique problem statements. By the end of our brainstorming process, we had created a list of 21 Design Challenges that cover a variety of topics, ranging from human waste disposal to lighting during power cuts (Please see Focus Box: 21 Challenges in Pabal). Solutions to many of the Challenges are being designed by students in the United States, the United Kingdom, and India. The solutions will continue to be refined through constant communication between their student designers and Vigyan Ashram, and will eventually be implemented in Pabal.

a village without electricity for much of the day, where the water is drawn from wells and farmers plow their fields with wooden steel-tipped plows pulled by pairs of bulls. Though the way of life in Pabal seemed primitive at first, we soon realized that many of the technologies employed by Pabal's people were used not for lack of a more modern replacement but because they were appropriate for the particular environment. The local community never ceased to amaze us with their numerous ideas on ways in which to make their work more efficient, using only a sense of innovation and readily available materials.

It was very important to the engINdia team to document technological problems present in Pabal without assuming that existing solutions to similar problems would be applicable there. We continue

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REFLECTIONS

The experience of the expedition was life-changing, as I was exposed to international development work for the first time in my life, and I was in an environment that was completely alien to me. I had never had the experience of living in

to believe that it is crucial to take into account the environment and culture of Pabal when implementing solutions to any of our Design Challenges. After all, even in the summer of 2005, Pabal's residents were careful to implement appropriate and sustainable technologies; others who have the opportu-

nity to implement new technologies within Pabal should be just as careful as Pabal's own residents. Our experiences in Pabal illustrated that existing solutions to technological problems cannot simply be transplanted to a new place; new solutions must be tailored to fit the problem, taking into account the constraints that are unique to the area.

We were impressed by many examples of appropriate technology during our stay in Pabal. We came across Eknat's farm during our first week. All of the farm's plowing and sowing is done by bulls and mostly-wooden tools, and the irrigation system consists of allowing pumped well-water to flow down a hill into the field. Eknat could purchase a tractor and a more advanced irrigation system; both are easily available. However, after years of running his farm with his existing technology, he is sure that his system is more economical and efficient than a system involving more advanced technology. Aside from his moderate purchases of chemical fertilizers (without which his farm would still be successful), he is not dependant on any external resources. Each year, he is confident that the farming system he has built will have a high enough crop yield to feed his family, and to reap enough profits at market to meet his family's other needs.

During our stay in Pabal, we learned that the people of Pabal are natural innovators, excellent engineers, and, often, born entrepreneurs. Sanjay is one of the first students of Vigyan Ashram and now owns a thriving business in the village: a workshop where he and his staff manufacture custom-made Jeep "hoods" – metal frames which fit on the backs of Jeeps to form storage spaces. When he first began his workshop, he was the only employee. He brainstormed ways in which he could outdo his larger competitors. Realizing he could deliver high-quality products without modern machinery, he instead used the simplest possible tools and materials and hired several employees in whom he placed his complete trust. Sanjay implemented numerous innovative ideas to increase efficiency without compromising quality, and now, while it

takes three days for his competitors to fit a custom hood, he manages to complete the task in under three hours. His loyal customer base has expanded all the way to the city of Pune two hours away. Though Sanjay has had little technical training, even less business education, and limited access to tools and materials, he has managed to build a business that is impressive by most standards.

Perhaps the most important lesson that I took away from Pabal was that the people there are not ignorant villagers waiting for engineers from MIT to come and help them solve their problems. They are people who think logically about the inefficiencies in their lives, brainstorm innovative, practical solutions, and apply very effective technologies to increase their productivity. The engINdia team's expedition to Pabal was not about "helping" people; it was about pooling ideas to learn more about how people in different environments can think about problems. It is the hope of the engINdia team that by documenting the ideas of the people in Pabal, we can facilitate the exchange of ideas across borders and environments to the ultimate benefit of all participants. For now, we are thankful to have been given the opportunity to learn these lessons on a firsthand basis. IR

If you are interested in learning more about engINdia, initiating your own expedition, or applying your skills to the Pabal Design Challenges, go to http://home.btconnect.com/engindia/ or contact the author. You can also contact the entire team at engINdia@googlegroups.com

engINdia Design Challenges

The solution to every Design Challenge should be low-cost, locally producible, and sustainable by the people of Pabal. Students who take on the Challenges are encouraged to collaborate with Pabal locals to produce as appropriate and sustainable a solution as possible. For more information on engINdia Design Challenges, go to http://home.btconnect.com/engindia/

WATER

- *Assessing Suitability of Well Sites:* Design a system to quickly and accurately assess the potential of a site for well construction.
- *Rainwater Harvesting:* Design a system for rainwater collection and storage.
- *Water Testing:* Design a low-cost, easy-to-use water testing kit using locally available materials.
- *Water Treatment:* Design a cost-effective method for water treatment to reduce the number of water-borne pathogens that are ingested by Pabal's population.

WASTE

- *Human Waste Disposal:* Investigate the possible implementation of a composting toilet in Pabal.
- *Waste Management:* Devise a solution to reduce, reuse, and recycle the non-organic waste in the village.

ENERGY

- *Alternative to Batteries:* Devise a lower-cost method for supplying electricity during power cuts. This could involve introducing a charge-storing device that is cheaper than the car and truck batteries currently used, increasing the life of lead acid batteries currently used, or both.
- *Biodiesel:* Design a biodiesel plant that runs on locally-produced organic materials.
- *Biogas Generator:* Develop a small-scale, low-cost, easily maintainable biogas generator. The generator should use solid organic matter to produce biofuel gas for cooking.
- *Lighting during Power Cuts:* Design a more efficient lighting source that can be used during power outages. Current sources such as kerosene lamps and battery-operated flashlights use energy too inefficiently to be cost-effective.
- *Natural Water Heating on Roofs:* Design a system to heat and store water without using a costly energy source.

STRUCTURES

- *Bamboo as a Structural Component:* Conduct a study of bamboo as a building material, including identifying the ideal species of bamboo that should be used, how to cultivate it in the local area, and how to assess its strength, and how to expand its lifespan as a structural component can be increased.
- *Cooler Housing in Hot Climates:* Design housing which can stay cool without the use of electrical appliances such as air conditioners or ceiling fans.
- *Structural Analysis of a Geodesic Dome:* Model the structural response of the Pabal Dome, a geodesic dome designed as a low-cost housing skeleton by Vigyan Ashram; suggest improvements to the structure that will allow for a greater load.

EDUCATION

- *Educational Software:* Design software that can help Pabal's students reinforce what they learn in school. The software should follow the standardized school curriculum and illustrate concepts that are difficult to grasp using pencil and paper.
- *Simplified Computer:* Design a reduced-cost, low-power computer that can be used in Pabal.

ECOLOGY

- *Limiting the Use of Detergents:* Develop a biodegradable or natural detergent for washing laundry to reduce the level of detergents released into the Pabal water table; or, devise a detergent-free washing method.
- *Printer Ink:* Create an organic, low-cost, color printer ink from locally available materials to reduce Vigyan Ashram's printing costs. Currently, printing costs are high because ink must be shipped into the village for use in the inkjet printer.
- *Soil Testing:* Devise a low-cost, easy-to-use method of soil testing that will allow local farmers to determine the nutrient content of area soil, so that fertilizer levels can be adjusted accordingly.

EFFICIENCY

- *Oil Mill Optimization:* Process re-engineer the local peanut oil mill to increase efficiency and reduce the price of peanut oil in the community.
- *Short-Term Food Preservation:* Design a portable, energy-efficient food preservation system that can preserve produce for up to one week to give farmers time to transport crops to markets outside of Pabal.