

paradi gm

A CONSCIOUS SHIFT



engineers without borders uk



paradigm /ˈpærəˈdɪm/
noun

1 technical a typical example or pattern of something; a model: there is a new paradigm for public art in this country. See note at model.

*a worldview underlying the theories and methodology of a particular scientific subject: the discovery of universal gravitation became the paradigm of successful science.

2 a set of linguistic items that form mutually exclusive choices in particular syntactic roles: English determiners form a paradigm: we can say "a book" or "his book" but not "a his book." Often contrasted with syntagm.

*(in the traditional grammar of Latin, Greek, and other inflected languages) a table of all the inflected forms of a particular verb, noun, or adjective, serving as a model for other words of the same conjugation or declension.

ORIGIN late 15th cent., via late Latin from Greek *paradeigma*, from *paradeiknumai* 'show side by side', from *para-* 'beside' + *deiknumai* 'to show'.

ACKNOWLEDGEMENTS

From classroom debates to perilous landslides, and from bustling Delhi streets to tranquil Himalayan valleys, the past month has been filled with thrills, drama and excitement. We would like to take this opportunity to thank Mrs. Sharmila Sinha, Mr. Aditya Batra and Mr. D.S. Bains for providing us with this truly unforgettable experience. We have gained much from CSE and the lessons learned will stay with us forever, as will the memories. We would like to thank everyone for their infallible work and lack of sleep which made this all possible.

We'd also like to thank the villagers of Tolma, especially Mr. Rudra Singh, and the hostel staff at Sainik Farms for their wonderful hospitality and making sure that we felt welcome here. We are indebted also to the Ashram near Joshimath for their unconditional grace and kind hearts.

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paradiem

A MODERN DAY PARADIGM SHIFT

Rabindranath Tagore, the eminent writer of the Bengal renaissance once said, "Indeed, in foreign lands, I feel closest to nature." Spending a month in Northern India and the Himalayas has illustrated this point well.

Development is a topic that cannot be avoided in today's society. Despite this, there is a major player in the development game that is frequently overlooked. Amongst the issues of economic growth and urbanisation our greatest natural resource, the environment, is neglected. Environmentalism is commonly believed to hinder development but this is an illusion. The beauty of biodiversity is being sacrificed unnecessarily.

The challenge we face is not only that of balancing the policies and practices of the environment with the country's own development goals but also the need to diminish the divide between the 59 billionaires of this country and the 300 million people living below the starvation line. As each year's figures come in, it is clear that the divide between the very rich and the very poor is only becoming more extreme. An example of this inequality is shown in the nation's energy consumption figures, which are significantly smaller than expected. The explanation for this is not that the rich are consuming less than their quota. The reality is that the poor do not have access to the energy; there is no option for them to consume it. This particular problem is touched on in the main feature of our magazine, the articles on the remarkable Himalayan village of Tolma.

Throughout this course, each lecture has left me asking, 'what can I do? How can I help?' It is not an easy question to answer. There's a growing need for decentralised systems for overseeing effective management of water, waste and natural resources. Consideration of local knowledge and traditions is required. The story on both sides needs to be heard and it is important to look at problems objectively. This becomes evident in the feature on dams, a heavily debated topic.

So how do we move forwards from here? We must start with a new outlook on the subject of 'development'. It is already a difficult concept to define since it is not simply a single action. It is a long, complex chain with twists, turns and barriers to overcome. But it is vitally important that when we think of development we also take the environment into account. The two need to work together, hand in hand. As Anil Agarwal accurately predicted, "Development without consideration for the environment can only be short term." If we carelessly ignore the rate at which our environmental treasures are being destroyed then, before we know it, there won't be an environment to progress forwards into. But this antagonistic relationship can flourish if the system takes both human interests and environmental quality into consideration.

A thought to conclude with: the concept of a paradigm shift was originally created as a way of distinguishing the natural sciences from the social sciences,

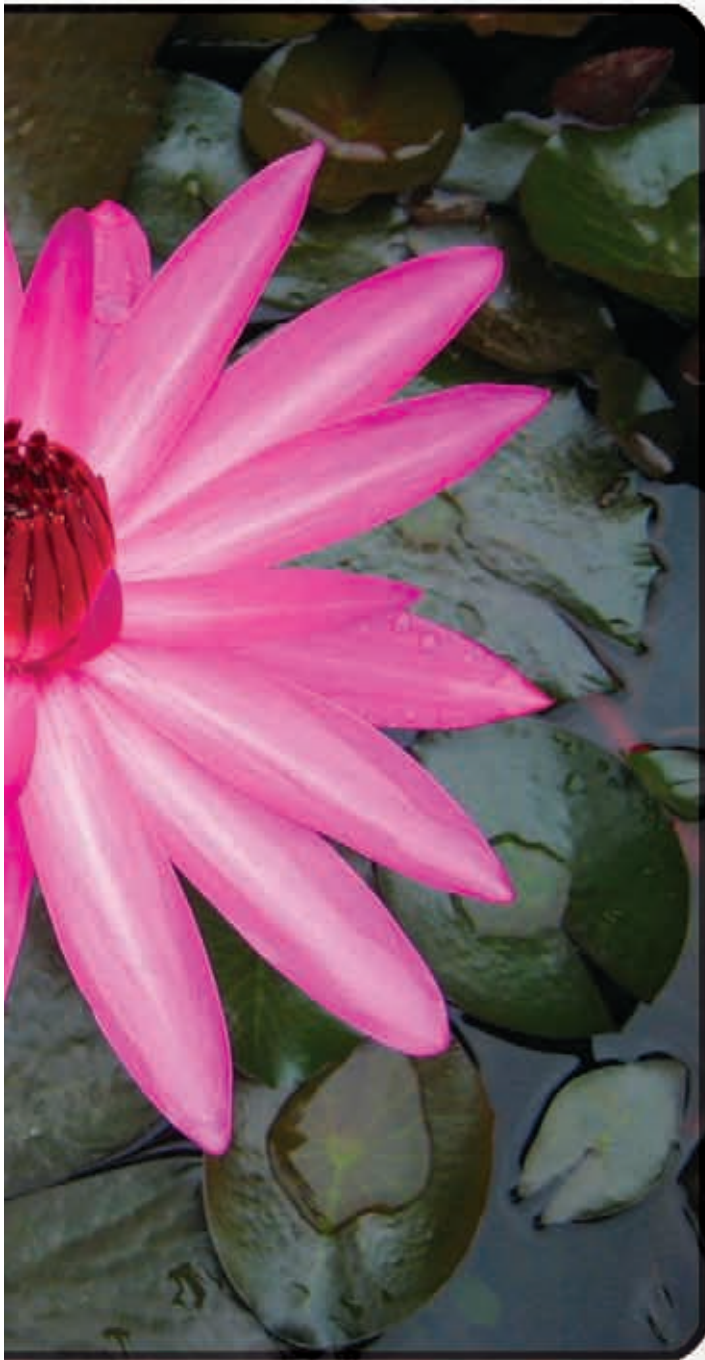
it was never thought appropriate to be used in the context of social sciences. Today we only ever see the term used in this context. A simple analogy of a paradigm is 'the box' in the common phrase 'thinking outside the box'. This is exactly what needs to happen – a broader view, a more flexible way of thinking and an ability to adapt to the ever increasing need to consider development in terms of the environment.

HOLLY GEIPEL



AUGUST 2011

"WE WANTED TO USE
THIS MAGAZINE AS A
PLATFORM TO HELP
RAISE THE VOICE OF
THE VOICELESS."



A NEW BEGINNING

Rushing out of the hostel each day to catch a bus to class; beating both the heat and traffic of Delhi; attending day-long lectures followed by heated debates; case studies and group work; working late into the night to finish assignments; going to remote places for field visits; roaming around on the weekends – well, this is the story of 30 long but eventful days we spent in India during the summer course "Challenge of the Balance" with the Centre for Science and Environment (CSE).

For the 25 of us who came from different countries of diverse cultural and academic backgrounds, these 30 days meant a lot. In spite of these differences, we have one thing in common, that all of us wanted to know why the words 'environment' and 'development' so often stand against each other rather than working together for a better world. We wanted to challenge everything that creates conflict between the two. And here we are, starting this interdisciplinary course to have a bird's eye view on South Asian perspectives concerning the environment-development debate, and after one month, pinpointing what we should do rather than playing the blame game.

Our detailed field visits were real eye-openers. We were out to explore nature - to learn about the people who worship it, who in each phase of their lives try to live without causing any harm to the environment. But at every step we were challenged by nature itself. However, with every new challenge we grew stronger and more determined, and clearer about our responsibilities towards a better world. We further realised that sustainable development is impossible by going against nature.

We wanted to use this magazine as a platform to help raise the voice of the voiceless, and to make sure that the silent stories of those people are being heard. Thus, it gives me immense pleasure to see the creation of 'Paradigm' - the magazine that we started as a part of the course but ended as our responsibility to make a difference in the lives of those whose basic human rights are not rights but more like privileges.

Thus, the end of this course is not an end; rather it is a new beginning. I hope that our quest to work for a better world will always continue, and that we will not have to regret not having acted when we had the opportunity.

We are ready to face the challenges and move ahead with our mission of working for a better world, are you ready to join us?

TABASSUM MOKHDUMA

LIVE TO SLIDE ANOTHER DAY

WRITTEN BY ASHLEY FRAMPTON

If you are to take a trip in the Northern Mountains of India during August or any time throughout the monsoon period, you are very likely to have your journey halted by a landslide. Landslides are naturally occurring phenomena where the materials that form the slope or hillside move in a downward and outward direction towards the bottom of the slope. These can occur naturally due to a number of reasons, be it the erosion of the slope's base or toe or the weakening of the slope due to it being over saturated by snowmelt or heavy rains. However they are also encouraged by the actions of man – deforestation, construction and general altering the shape of the slope.

When they occur naturally, away from people or their constructions, there is no problem. In fact landslides are necessary for the transport of fertile soils from the mountains to the plains further down the river. Unfortunately when they happen on a road for instance, all manner of chaos can happen. Supplies can't get through to towns, people get stuck and miss their scheduled trains, or in the worst cases lives can be lost.

However in a country that is growing as fast as India, construction in these hazardous areas cannot be halted completely. If anything there is likely to be an increase in construction in these mountainous areas.

So if people must pass through areas prone to landslides, what can be done to limit or hopefully completely negate the risks that Landslides pose?

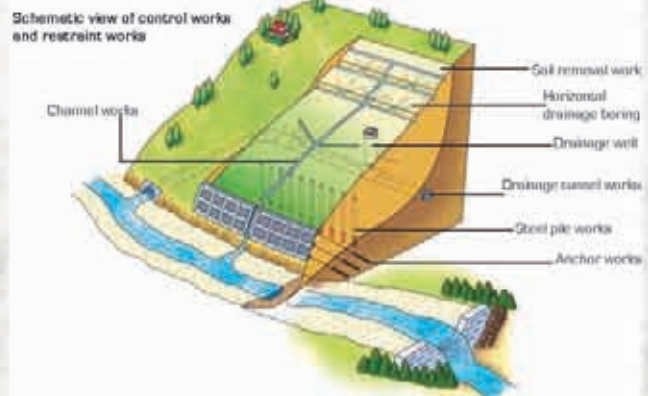
The official strategies that are to be used by The National Disaster Management Authority of the Government of India since 2009 are;

- i) Treating vulnerable slopes and existing hazardous landslides.
- ii) Restricting development in landslide-prone areas.
- iii) Preparing codes for excavation, construction and grading
- iv) Protecting existing developments
- v) Monitoring and warning systems.
- vi) Putting in place arrangements for landslide insurance and compensation for losses

There was very little evidence to suggest that these strategies were being implemented however. At the Sirobagad Landslide Zone it was clear that it was a well-known landslide area; there were signs warning people of the landslide prone area and it was even marked on Google Maps. There were also many signs that warned travellers that many of the roads pass through hazardous areas. Despite this, there seemed to be no serious efforts of "treating vulnerable slopes and existing hazardous landslides."

The government's methods of fixing existing and reducing the risk of possible landslides include; reshaping slopes, introducing retaining structures at the bottom of slopes, management of the water passing over and through the slope, various nailing and anchoring techniques, application of geo-textiles and afforestation. They are especially keen to encourage surface and subsurface drainage management (the water passing over and through the slope) due to the majority of landslides being caused by the monsoon rains.

Below is an illustration of what such systems may look like;



"THERE HAS BEEN VERY LITTLE TECHNOLOGICAL INNOVATION IN INDIA IN THE AREA OF LANDSLIDE CONTROL"

The problem with such a system is that it involves a lot of capital investment, as well as requiring a lot of excavation work to install the multitude of drains, wells and anchors. This would require a lot of the work to be timed so that it can be completed between monsoon periods otherwise all the expensive technologies may be flooded, buried or washed into the river below.

The Himalayan Environmental Studies & Conservation Organisation (HESCO) suggests biological methods instead of these technologically intensive methods. Biological methods refer to the planting of indigenous plant species which add to the ecological values of the area. These must be chosen specifically for each landslide area. Using biological methods has a number of advantages over the ones proposed by the Government.

1. It conserves soil, practically no soil needs to be excavated resulting in less disturbance of the slope, meaning less need for compaction after work has been finished.

2. It conserves water, the drainage management techniques encourage water to be drawn away from the slope as soon as possible. This would result in the slope gradually drying out and all plant life eventually dying out. By using biological methods, plant life is encouraged which further increases the stability of the slope

3. The result of these two is that land is relieved permanently. Trees, shrubs and grasses tend to look after themselves once they've grown, and so would require very little maintenance. However the drainage systems shown above would likely need to be dug up every so often to allow maintenance. This would further disturb the soil and weaken its stability.

However there is an obvious problem with this method – time. Plants take time to grow, HESCO state that it took 8 years to bring 17 landslide areas under control. Obviously this is a very long time so temporary control is necessary to hold the land while the root systems form. To this end, Geogrids or retaining structures are likely the most sensible options.

Geogrids can be made from synthetic or natural materials but due to them being only a temporary measure in this context, a natural, biodegradable material would be better. To this end wicker or brushwood mats made of vegetal material can be used. Very long and flexible willow branches can be used which are then covered with infill soil. Alternating stakes of different wood species are used and they are woven to form a barrier against the downward drag of the material eroded by the monsoon rainfall on the surface.



Geogrids

However for slopes as steep as those found in Uttarakhand, retaining structures such as walls or embankments may be better options. They provide a solid barrier between the public and the landslide material. These are well-established technologies but still they require inspection and maintenance. These types of structures were in fact already in use at the roadsides, though it was clear in many cases that they weren't enough. It seemed to me that they were too

small considering the steepness of the slopes. In addition, all the retaining walls seemed to be the same height suggesting there were no site-specific designs.

Taking all this into account, it is apparent that each landslide zone must be treated individually; there is not one method or design that can possibly work for every single case.

The technologies used to treat landslides should ideally be self-sustaining. Considering the type of terrain where landslides occur, you cannot feasibly bring in large machinery or workforces to maintain the technologies very often. Therefore low maintenance technologies would be preferable.

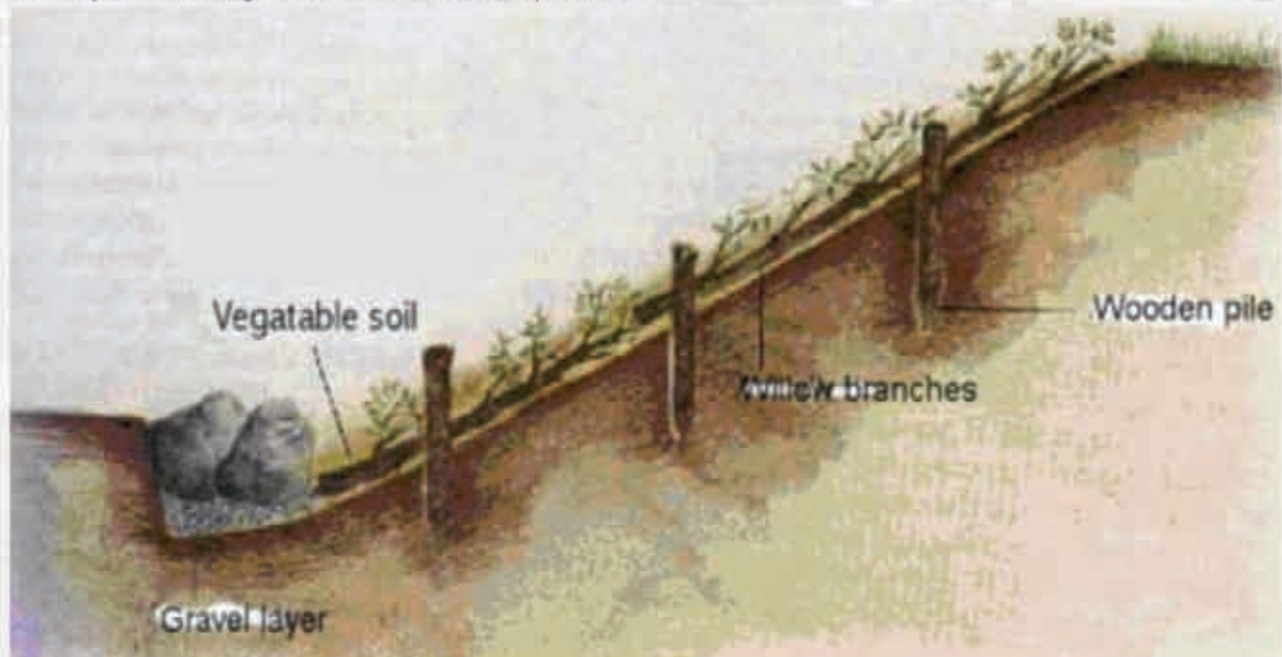
In short, much research and testing is necessary to find exactly which methods work best in which situations. The government itself admits "there has been very little technological innovation in India in the area of landslide control". I hope that it sees the benefit of using natural methods as opposed to synthetic ones. However this is unlikely as this is not the tactic being used in western countries and in the case of waste water management and hydro-power generation, the government has strived to emulate the technologies and methods used in the west. India should start its own trends rather than follow those started thousands of kilometres away.

Images respectively:

<http://www.sabo-int.org/dott/landslide.html>

<http://en.wikipedia.org/wiki/File:Geogrids1.jpg>

<http://en.wikipedia.org/wiki/File:Brushwood.jpg>



LEARN THIS FROM THE WATERS:
IN MOUNTAIN CLEFTS,
LOUD GUSH THE STREAMLETS,
BUT GREAT RIVERS FLOW SILENTLY.
BUDDHA

NAGRASU



DEBATING DAM NATION

BY ASHLEY FRAMPTON

As you proceed up into the mountains of Uttarakhand, you see more and more signs directing you to various hydroelectric projects. On the approach to Srinagar, the first sight of the work being done are the four, 5.6m diameter tubes that will direct water from the Forebay to the generators. These only give a hint to the scale of work being carried out.

The 330MW run-of-the-river Srinagar Hydro Electric project is a private power generation facility being built for the Alaknanda Hydro Power Company Ltd. This company is in fact a subsidiary of GVK Hydel Ltd.

The dam being constructed to divert water towards the powerhouse is to be 248m in length, which is the same as two football pitches. The height of the dam from foundation to crest is 90m, with the riverbed being 66m from the dam crest. The water from the reservoir is to be diverted through a tunnel over half a kilometre long, which is able to carry 700m³ of water a second. Any solid material, dirt, silt, etc. must be removed from the water before it reaches the generators. This is done through the use of a desilting basin, a massive pond-like structure that slows the water down so that all the "large" particles will settle to the bottom and then be discharged into what used to be the riverbed. The water must then travel over 3km through an open-air channel towards the powerhouse, which contains the four 82.5MW generators.

So the maximum power output of the hydro-electric project is 330MW, however we were informed by the site engineer, Mr. R. D. Joshi that this would only be during the peak of the monsoon period. The output would normally be 40-50% of this maximum. To put the scale of this dam into perspective, the average kettle is rated at 3000 Watts. Therefore this project could power 55,000 kettles during its normal operation and at peak demand this figure could rise to 110,000 kettles.



Then Mr. Joshi informed us that between 5000 and 6000 people work the construction site, of which 60% come from the local area. The expected lifetime of the project is 100 years, with completion being expected during 2012.

"THE WATER FROM THE RESERVOIR
IS TO BE DIVERTED
THROUGH A TUNNEL
OVER HALF A KILOMETRE LONG,
WHICH IS ABLE TO CARRY 700
CUBIC METRES"

OH, DAM

BY JOSHUA FLOWER

Dams are big business. They are said to be a clean and renewable method of electricity generation, which has the ability to plug the energy gap in the domestic Indian market. Massive incentives have been provided by the World Bank and private partners to encourage India to take advantage of its hydroelectric potential. On paper it seems to be a wonderful solution to an increasing problem. However, standing on the site of an emerging dam project it is hard to accept that these projects are the clean solution we have been dreaming of.

Driving through the site of the new dam at Srinagar, the sheer scale of the project hit me. The idyllic image of a large curved wall holding back deep blue water was trashed when the site came into view. Stretching several kilometres the network of concrete structures, channels and walls immediately challenged the claim that this is a clean project. Cement production is a massive polluter, emitting one ton of CO₂ per ton of cement produced through fuel combustion and calcination of raw products. Considering the millions of tons of cement required for a project of this scale together with the carbon output of steel production it becomes clear that this cannot be considered a clean project. Although I'm aware that once built the dam produces energy that does not directly release CO₂, taking this out of context does not remove the embedded carbon footprint of the construction process.

Submerging vegetation causes massive methane output and the loss of agricultural land. Changing the flow of a river causes unpredictable variations in aquifer levels and effects downstream. Land acquisition causes social disruption and conflict. Faults can cause wholesale destruction by flooding (seen previously at Srinagar with the bursting of the previous dam causing the loss of the old town). Power being exported out of the producer state causes resentment within

communities facing the effects of the dam itself.

These are all issues associated with large-scale dams and have not been satisfactorily dealt with, in the past or the present.

To deny that hydropower has a place in the sustainable energy model would be wrong. But to choose micro scale projects over large dam based ones seems to me to be common sense. These installations are rated up to 100kW and do not require construction of a dam. They can be setup close to individual communities along the length of a river, thereby minimising the concentration of negative effects. They can also be community managed and locally sourced providing local jobs and revenue. Power can be used at source with excess being sold on for the benefit of the local population and energy needs of the state. And if irrigation or water storage questions are raised, small step dams can provide the storage of water and aquifer replenishment without blocking the flow of a river.

Some will attempt to argue that the local level destruction that building a large dam inevitably causes is offset by the final destination of 'renewable' power. But so often communities are destroyed, the environment sacrificed or pillaged in the name of the 'greater good'. When will governments, companies and individuals see that this is simply a case of the ends justifying the means? Alternative paths are open but unless the government starts putting people and the environment before money I fear these paths will not be meaningfully explored.

"SO OFTEN
COMMUNITIES ARE DESTROYED,
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DAM FINE

BY NICK MADANI

"ANYONE CAN SEE THAT THERE IS NO SUCH THING AS A WHOLLY GOOD OR BAD DAM. IT IS NOT SIMPLY A BLACK OR WHITE PICTURE."

Less than 2.5% of all the water on our planet is fresh, of which less than 33% is fluid, of which less than 1.7% runs in streams. And yet the 45,000 structures damming that tiny proportion of water are contributing to one fifth of the world's electricity supply. The potential of water is astonishing and this is why every country in the world is looking to hydroelectricity as a means to meet the demands of the future.

Dams have already made significant contributions to human development and the benefits derived from them are not limited to electricity. They store, use and divert water for consumption, irrigation, cooling, transportation, construction and recreation. They remove water from the world's biggest rivers in order to sustain our societies that live on their banks.

There are hundreds of websites, books and journals informing the debate about dams from each side. We were fortunate to have Mr. Soupoma Lahiri come to speak to us to give his view that in many cases an unacceptable price has been paid to secure the benefits described above. Lack of equity in the distribution of benefits has called into question the value of building dams at all.

But as engineers and young people knowing the seriousness of our planet's predicament, we have been disappointed by those saying so much, yet resolving little. When you think of a dam, what might come to mind is a smooth, parabolic, concrete structure. Engineers worship them, ecologists curse them, and indigenous tribes lose their culture to them. Local fish stocks go down but so does flooding. The river is diverted, people and animals are relocated but reliable water is provided to local towns, arid soil becomes fertile and the economic benefits are felt. All of this without polluting the air or water. That's a common impression. But like the thousands of people that built them, every dam is different.

There are dams built of dirt, dams that generate hardly any electricity, dams that are praised by ecologists and ridiculed by engineers. Dams that have been used for centuries, dams to boost fish numbers, dams that cause deadly floods, dams that change the entire chemistry of a river and increase greenhouse gas emissions. Some dams forget to feed the villagers they've displaced, and there are dams that displace no one. Some create work and nature reserves, others cost thrice their budget before being abandoned half way through construction.

Anyone can see that there is no such thing as a wholly good or bad dam. It is not simply a black or white picture since criticism and praise can be true of each. Therefore I would like to appeal as much to those that continue to build dams without thinking, as to those that oppose them outright. We must remember the speaker that highlighted the bad habit of compartmentalising issues into simple 'for' and 'against'.

Consider the individuals: A tribal woman preparing to drown instead of moving away from her land, looking into the eye of a senior engineer who has built his career designing these schemes. Or the self-made leader of the world's most powerful turbine manufacturer, who will probably never meet with the voted leader of 100,000 dispossessed people. These people have to talk and a solution must come.

We do not have the time to take sides. And it's not just energy we need. 1 in 5 people lack access to safe drinking water. Half of the world is at risk from waterborne diseases. Water tables are falling one meter per year in parts of India. The concerns swirl around us but rather than join the list of people predicting the next 'World Water War', let's try to work something out. Ecologists, engineers and communities can't build the perfect dam alone but we can build the right one together.



SMALL IS BEAUTIFUL?

THE BENEFITS OF SMALL SCALE HYDRO GENERATION FOR LOCAL COMMUNITIES, COMPARED TO PRIVATE LARGE SCALE DAMS

BY JAMES SHIPTON

Whilst on our field trip we stayed in Tolma, a remote village in the Himalayas and experienced first-hand the difficulty in relying upon energy that is generated over 450 km away in the region of Kalagarh, Uttarakhand. Distribution over large distances requires the utilization of vast infrastructure which leads to efficiency losses. The clearing of forests and land for pylon construction could potentially cause land destabilization and landslides. The most reliable energy source in the village of Tolma was the solar panels that were installed 5 years ago, but these could only provide so much due to the lack of direct sunlight. 16km away in Tapovan, a large-scale 520MW hydro project had been under construction for the last two years but has been currently suspended due to an on-going court case. Given that this was a private investment it was difficult to know when funds would be secured for work to continue. Whilst this had provided employment for two of the locals that we spoke to, the fact that the development was not driven by public interest means that the community will not receive any energy provision from the dam.

The micro solar grid established in Tolma was fully funded by the government based upon a community initiative that originally sourced the funding, and provided a renewable source of energy for the twenty odd families living within the community. During the stay it was evident that this was by far the most reliable source for providing energy, whilst the central grid provided power for a fraction of this time. With British colonisation the drive for efficiency led to the desire for centralisation but resulted in communities losing responsibility for their resources and becoming dependent upon the government instead. This trend has continued to date and the result of this reliance upon the governing body to provide amenities has led not only to the disappearance of traditional approaches such as rainwater harvesting, but also a failure to independently consider how new technologies may be best utilised to benefit fully from local resources. This was

highlighted by the fact that the local community was not interested in pursuing alternative renewable resources such as micro hydro power from the local perennial stream making the village more self-sufficient and not reliant on the central grid. The solar panels were subsidized by 75%, but this was seen by the community as a token effort made by the government. An alternative such as micro hydro would not receive funding from the government since they were allowing construction of large-scale dams nearby.

HESCO, short for Himalayan Environmental Studies and Conservation Organization operates with a decentralised approach, focusing upon independent solutions for rural

"THERE IS VAST POTENTIAL FOR MICRO GENERATION... IN THE REGION OF 2,800 MW. THIS IS EQUAL TO 8% OF THE 36,877MW TOTAL INSTALLED HYDRO CAPACITY AS OF 2009"

communities in order to further their development through a sustainable approach to their local resources. The organisation has been running for the last 28 years and is led by Dr.

Anil Joshi who has won the Magsaysay award, which is perceived to be the Asian equivalent of a Nobel peace prize. The solutions implemented by the organisation to improve energy access include solar and micro hydro projects to allow for development of rural communities. There is vast



potential for micro generation as a source of energy, with HESCO estimating that there are 200,000 traditional watermill sites spread throughout the Himalayas which have the potential to generate in the region of 2,800 MW. This is equal to 8% of the 36,877MW total installed hydro capacity as of 2009. So far only 5,000 watermills have been revived. This would be through the upgrading of existing sites without the need for the construction associated with large scale dams or the need for significant infrastructure to

"UPGRADING TRADITIONAL MILLS HAS THE POTENTIAL TO INCREASE THEIR EFFICIENCY BY 3-4 TIMES"

distribute the electricity that is generated vast distances. Upgrading traditional mills with approaches including replacing wooden and stone components with metal to reduce friction has the potential to increase their efficiency by 3-4 times making them considerably more viable. The local people are trained in their maintenance thereby increasing the skill base of the community and providing employment prospects as well as clean energy. Such an approach that allows community involvement in the project insures its success due to the vested public interest in its continued operation.

Hydropower clearly has great potential in India, but the issues surrounding the contentious large-scale private projects that are discussed within this magazine are significant enough in my opinion for alternatives to be considered. Whilst the creation of many small scale hydro projects does not provide an answer to the whole of India's electricity supply it would surely be more

appropriate to fully utilise the potential for micro generation before approving construction of vast dams with potentially disastrous environmental effects. It is no doubt naive to rely upon a single source of renewable energy given that hydro power already provides 25% of the total demand with a further 64% attributed to thermal combustion. It is certainly no more precarious to attempt to generate vast quantities of energy from large dams in the Himalayas and then distribute it to the rest of India, than it is to generate it far from the Himalayas and attempt to transfer it there. It was E. F. Schumacher in his 1973 book 'Small is Beautiful' who stated that any approach to development in a region "has no chance of success unless it is based on the employment of a suitable technology". Therefore whilst large scale dams with a nationwide distribution network may be seen as an adequate solution, if this technology imposes too much strain on the surrounding environment it is not appropriate and more suitable technologies are required. It may well be that other more suitable solutions such as solar or wind may be suitable for providing sources of green energy away from the areas with potential for hydro, rather than the current ambition to over-exploit hydro power without necessarily considering the implications. In the Himalayas for hydro prospects, small is beautiful.

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DEVELOPMENT IN A REGION
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OF A SUITABLE TECHNOLOGY".



A TREKKING STORY

BY TIM HASID AND IAN MACH

tSssh...Fuush...KlingKling were the only sounds echoing through the valley. Acting like 5 year old adventurers we were courageously following a faded path leading to the unknown. According to the local legend, ancestors marched for days to reach the white untouched peaks of Nanda Devi where they could communicate with Lord of the Gods Rah. Is it true? We will never know.

Walking in fear, I was leading the march, cutting our way through the dense vegetation using an old uneven stick snapped from an abandoned bridge. The wood was moving through the air as if I was holding a finely honed saber to trace our next steps. Ian was following my hesitant steps whilst rattling a shiny metal cup & spoon together to avoid falling 'nez a nez' with an angry black bear. The challenge of reaching the peak kept our legs going. Subtle smells and animal calls mixing with our heavy breathing made us feel part of the forest.

Suddenly, a rattle reached the back of our ears. A defined silhouette swerved with purpose among the blades of grass. Keeled brown scales, with a short tail and a triangular-shaped head, there was no doubt it was a viper. Before we could shout "it's a snake!", we were already running as if there was no tomorrow to avoid a deadly bite. After reading this you will say that Frenchmen are used to running away but this is not true. France had one of the biggest empires during the 19th century as a result winning numerous battles against Spain, England, Italy, etc. I will not get started on that topic.

It is safe to say we'd been scared by the viper. During the afternoon, I couldn't stop thinking of rattle snakes and their ability to fright human beings, despite their size. Then my brain switched to an episode of 'Man vs. Wild'.

Before the unlucky encounter we could only glance the fold of the mountain, but as soon as we stopped our frantic rush we only had a few steps left along the windy path until the green horizon unfolded in front of our eyes. A lane made of rocks had carefully been laid along the mountain ridge by the natives who used to climb the mountain (as a guide to Rah). Satisfied by our adventure, we sat down peacefully on the hard rock surface to gaze at the spiritual valley of Nanda Devi.



TOLMA: DEVELOPED, UNDERDEVELOPED OR

UNDEVELOPED? INTRODUCTION

FOREWORD

BY NARENDER PAUL

India is popularly known as a land of villages. A village is not a simple entity but a composite whole, which stands as an evidence as to how India has been able to safeguard its traditional knowledge. The fabric of Indian society is decorated with many beautiful designs embroidered with strong threads of culture and ecology. India, being a region of ecological prudence, has always exhibited a symbiotic relationship between environment and culture, and this shows that the two are complementary in various stages of evolution. Traditional village societies have co-evolved with their environment. Using their old wisdom, they prosper from its resources without desecrating its sanctity. However, these communities can no longer remain resistant to the changes linked with over-exploitation of natural resources and modernisation occurring in the world. Villages that have managed to keep alive their pristine knowledge of conservation for many generations are now being seduced by the allure of modernisation, and aspiring to attain it. This is slowly and steadily replacing the conventional concept of development. The visit to Tolma in the state of Uttarakhand helped me to understand the meaning of economic growth to a remote Himalayan village.

In Uttarakhand, near the border with Tibet, the majestic mountains of the Himalayas seem to stretch on endlessly. Nestled in the hills, the rains pound the cobbled courtyards of Tolma, a little village that's part of the Tolma Gram Panchayat. The air is cool, the breeze is refreshing, and at an altitude of 2575m above sea level, the air is so fresh that it leaves a taste on the tongue with each breath. Tolma and the other villages of the Panchayat, (Suraithota, Phagti and Long) fall within the Nanda Devi Biosphere Reserve, which is a UNESCO World Heritage site. Below are some details about the village:

- The Tolma Panchayat population is approximately 750
- The Tolma village, comprising of Bhutia people, has 22 households with a population of approximately 150
- Five families each own a house in Tolma but live outside due to government jobs in other parts of the state. They visit their village during certain festivals or events only
- The other 17 families stay in the village from April to early December. From December to March, this village is covered with heavy snow, so the families migrate to a nearby village named Guhad with their livestock and belongings
- The main income of Tolma comes from agriculture, cattle rearing, forest produce, and apple (1250-1300 trees), apricot and walnut orchids. They also grow pulses like Rajmah, Potato, Chulai and wheat. Each family can earn up to Rs 2 lakhs by just collecting and selling the herb 'Kidajadi', and 'Gucchi' (a very costly variety of mushroom) locally available in the mountain

- Oils can be made from the seeds of apricots and sold at high prices
- A type of millet, called Phapher, also sells at a high price
- An estimated average income per family per year is almost 2.53 lakhs per year

WOMEN OF TOLMA

by RATNA BHUSAL

Although there are confirmed statements made by organisations such as the World Bank and WHO about women being one of the key catalysts in eradicating poverty, gender inequality still exists especially in developing countries. Whether it is in education, land ownership or in division of labour, women are still considered to be inferior to their male counterparts. On my recent trip to a village called Tolma in Uttarakhand, I spoke to a few women there about their lives.

A typical day for a woman in Tolma includes getting up before dawn and spending most of the day doing housework and farming, with a 3-hour break after lunch. In the evening, time is devoted to their cattle. This involves carrying cattle-feed 3km from the village, down a steep slope of mountainous terrain, sometimes weighing up to 20 kg. To my astonishment, I saw a 70-year old woman carrying a heavy basket of apricots through the town barefoot. This made me realise how hard working the women are, regardless of age.

In terms of education however, a huge improvement has been seen across the village. Parents are more aware about the importance of education and, for the first time in the history of the village, girls are being schooled until they complete their university degrees.

I SAW A 70-YEAR OLD WOMAN CARRYING A HEAVY BASKET OF APRICOTS THROUGH THE TOWN, BAREFOOT."

Sushila, mother of three, recalls her teenage years when she spent most of her time devoted to housework and caring for her younger siblings. Now, Sushila has sent all of her kids to live in a nearby town which is 30 km away, to gain a better education.

"We (villagers) have realised that we can't go much further by selling farm produce to make a living," says Sushila.

For a 10 year old girl named Gudiya, being in school has given her a new born hope, "I want to work as a doctor in a big city like Mumbai or Delhi one day." She told me with a smile.

As most of the girls in Tolma are going to school to finish university, it has opened up new career paths for them. Another great improvement of the village is that women are now seeking jobs in nearby towns. Meena, 24, who is also in



in the Uttarakhand state rafting team, is looking for a job as a teacher after recently graduating in Sociology.

Traditionally, the average age of marriage for women in Tolma is 18. However, with education now becoming more of a priority, this trend is more likely to change in the near future.

Coming from Burma, a developing country itself, it was very astonishing for me to witness the extent of change from one generation to the next. When I spoke to some of the villagers, they told me how television was responsible for widening their views. Moreover, villagers are now trading in the markets themselves rather than relying on others coming to them.

The lives of the women in Tolma have drastically changed for the better over the past decade. With the increased awareness of the role women play within the community, it is an inspiration against the fight against gender inequality and a promising step for a more equal India.



HYBRID HOUSING

BY MUTHU KRISHNA

Following on from the laws on environmental protection, the time-old, traditional way of constructing houses in Tolma has officially died out. The Vice President of the Tolma Panchayat, for example, owns two very different houses. The older is built from materials such as rock-slate, wood, mud and clay, which is found in the surrounding lush forests. For decades they have been using these materials from the forests but never have they used them to the extent that it affects the natural ecosystem, particularly wood. These houses are also quite sturdy and can last for a long time.

"TOLMA:

A HYBRID OF MODERN
AND TRADITIONAL
HOUSING."

However, when the VP wished to expand his property for his own reasons, the region had just been declared a Biosphere Reserve. This meant that the forests were now protected and any cutting down of trees became a punishable offense. Therefore the VP had to use other materials like concrete and cement. This was bought from Joshimath, the nearest town about 25km away, along with labour and transportation. It would have been easier, cheaper and more practical for him to have used the natural materials in the forests, especially considering that the only way to reach Tolma from the main road is a 3km hike uphill from Surathota.

Concrete does have its benefits though. Though the cost of construction is inherently much higher, its durability and strength means it requires less maintenance and its lifespan is longer than its traditional counterpart. This is particularly useful in the mountainous region around Tolma, where bitter winds and snowfall are not uncommon.

The population of Tolma has remained constant for many years now and looks to continue that way. In essence, it is an interesting hybrid of modern and traditional housing.



RENEWABLE ENERGY

BY RISHI SINGH

Tolma has a truly inspirational story. With a low population of 150, energy consumption of the village households is relatively low, and they obtain all the required power from renewable sources. The electricity used to power the homes is obtained from the Kalagarh hydroelectric project (also known as the Ram Ganga dam), located in the Pauri Garhwal district of Uttarakhand, roughly 450 km away from Tolma. Some solar panels have also been purchased as back-up to power the houses as energy from the dam is not provided on a consistent basis. The communal areas such as courtyards and walkways are illuminated by lampposts, which are powered by Tata-BP solar panels.

The rate at which electricity is provided from the Kalagarh dam is Rs. 2.20/kWh and the average energy consumption per home/family is 205kWh, leading to an average monthly bill of Rs. 400-500. The solar panels were obtained at a price of Rs. 2500 per panel, subsidised by 75%. 9 such solar panels were purchased for the village and have been functioning for 6 years now. These two sources are the sole providers of electricity in Tolma. Although some believe biomass and biofuels are cheap, easily available and perhaps better sources of energy, local field guide Rudra Singh explains that the climate of the region is not suitable for producing Gobar gas and hence the process is not feasible.

Rudra Singh also believes that the investment on solar panels has been very beneficial. "They have been working very well for the last 6 years and the one time investment has yielded great results. There are times when the electricity provided to our homes runs out but these vital common areas are still lit up. We are not considering it as a permanent replacement of the hydroelectricity though, because in this region of the Himalayas sunlight is not guaranteed throughout the year."

Although the use of renewable energy sources in the village is extensive and well planned, there are drawbacks. The locals experience widespread power cuts and sometimes have to do without electricity for days because of the inefficient and disorganised supply provided by the government. Due to the costs of transporting the electricity over 450km from the dam in Kalagarh, the villagers of Tolma are required to pay large amounts for their electricity. This is done even though there are numerous dams in the region itself that are capable of providing electricity to Tolma at a significantly cheaper price.

The Rishi Ganga Hydel Power Project (18 MW) near the village of Reni is situated inside a UNESCO World Heritage Site, where any form of development is frowned upon. The Tapovan Dam built on the Dhauliganga River is a 520 MW project and construction has been suspended temporarily as the company funding the project faces a court case. Another 48MW project is coming up in close proximity to Tolma.

So there seem to be plenty of dams in the region, but why not provide Tolma any power from these neighbouring dams at a cheaper rate? This is because the intentions of the government are purely business oriented.

The government constructs the dam and sells it to a private company upon completion. Following this, all the generated power is sold to other private distributors and transmitted to all regions across India, except to the neighbouring rural communities whose land is usually either taken away and exploited in order to build the dam or submerged as a consequence of rising water levels. The only benefit the locals in the area receive is few days' employment. Narender Paul, a member of the Chinmaya Organisation for Rural Development, believes the government should first aim to supply the electricity produced by the dam to the local communities and other settlements within the state, and then the excess should be transported out of the state. "Dam construction should not be looked at as a means of making money but instead should be brought about to provide electricity to the immediate areas and communities in need first."

Even though government practices give the Indian people little to smile about, the community spirit of a village like Tolma provides a beacon of hope and reassurance that there are people and communities out there who still strive to make as much of a difference as they can.

"THE COMMUNITY SPIRIT OF A VILLAGE LIKE TOLMA PROVIDES A BEACON OF HOPE AND REASSURANCE."



STREAM WATER RECHARGE

BY IAN MACH

Could you ever imagine yourself drinking untreated water from your tap? The precipitation process part of the natural water cycle is the primary source for fresh water. However, through the centuries human's activities have interfered with

"EVEN DURING THE DRY SUMMER MONTHS, THERE IS ENOUGH WATER TO SUPPLY ALL HOUSEHOLDS."

this cycle leading to the contamination of the water. Engineers are working hard to find better water treatment technologies which are able to cope up with our ever-growing thirst

for the vital resource. But how long will it take before our rate of contamination overtakes the

rate at which our technology can treat the water? Few places can still boast the fact that they have managed to preserve their precious resource. This is a short review of the fresh water supply in Tolma.

The little village sitting in the Himalayas harvests its water from various sources across the mountain using very simple techniques. A network of iron pipes have been laid down with inlets located at key locations such as water streams, waterfalls and the nearby glacier. Some pipes go right up to the glacier, located at 2900m, which provide most of the village's water supply as a result of ice thaw. The difference in height is sufficient to supply pressurised water at the main village outlet.

In the past few years, the villagers have noticed a decrease in the amount of water. This has been due to a decrease in snowfalls which didn't restore the glacier's supply as well as before. There are also inefficiencies in the pipe network mostly caused by leaks in the pipes themselves. Pipes are not always properly fitted and repair is made difficult by inaccessibility to the network. They are also prone to bursting during winter months. To limit this, they are buried several cm under the ground and water is left constantly flowing – the outlet is never closed.

Despite those issues, the population has been satisfied so far with the service which has been put in place by the government. Each of the 22 households pays the very reasonable amount of Rs. 64 per year as no energy is required to treat or pump the water. Investments are only needed for the expansion of the pipe network and its maintenance. As the water comes up from the mountain, contamination is non-existent and water can be drunk without being filtered.

A family of 4 members – that includes two parents and two children – typically consumes 12-18 litres per day. This is enough for all daily requirements which includes washing clothes and plates, cooking and drinking. To think we use the same amount each time we flush our "Western toilets..."

This careful use of water has preserved the village from any water shortages so far. Even during the dry summer months, there is enough water to supply all households. From a Westerner's perspective, the fact that they haven't got water connection or toilet facilities in their houses might appear primitive. But actually, this is the very reason for our environmental problems today. Our technologies have made the consumption of water so convenient and cheap that we blindly consume vast amounts of it every day. The future of a sustainable planet doesn't rely on technology; it relies on technology working with our environment and our scarce resources.



SOCIAL VENTURES

BY ANOKA PRIMROSE ABEYRATHNE

Tolma is a refuge, a misty range of stone-shelved roofs and exceptionally strong-willed people. The journey up from Surathota should not be attempted by the faint-hearted though – the 3km long path is steep, slippery and muddy. But for the local villagers, it's just another walk in the park.

Out in the fields near the village, the women of Tolma are busy toiling away with the care of their apricot, chive and other crop plantations. What looks like a normal business here is in reality a Social Business (SB). The concept model of SB, brought to the limelight by Hon. Mohomad Yunus of Grameen, is being widely replicated around the world.

The simple yet powerful idea is of a business run around a community. It is run by the community and for the community, which ensures its economic and social growth.

The women of Tolma usually sell their produce through the VP of the Panchayat, a businessman himself. "This allows the produce to be sold with minimal transportation costs," states Rudra Singh, our friendly host for the stay.

The success of social business has brought riches to the village. However, it is also causing far bigger riches, giving more people the chance to leave, which may cause the village problems in the future. But for the present, the sight of the women of Tolma going about their daily rigorous activities, which require more strength than oxen, was a heartening sight. It shows that they will continue their venture of bringing money to their families and community. In turn, they will keep the money circulating there, nestled among the leafy, apple-tree covered hills of Tolma.

UNDER A DIFFERENT SKY... WHERE BASIC RIGHTS TO HEALTH AND EDUCATION ARE STILL A FAR CRY

BY TABASSUM MOKHDUMA

Living in a traditional house atop the mountain, it seems she keeps watch over the whole of Tolma. As the oldest person of this small village, blessed with diverse species of herbs and medicinal plants, she has literally lived her entire life here. I am talking about Nomi, the old woman in her eighties who is known locally as Dadi [grandmother] and who has played a very crucial role in the lives of every villager.

Nomi (pictured pg 21) has been the lone midwife (Dhai) in Tolma and many other neighbouring villages like Sukhi and Vala-gaon for a long time. When the Indian government was introducing health centres in remote places like Tolma, especially to ensure better reproductive health facilities, people like Nomi were the only hope for pregnant women.

When I first heard that we were going to live in Tolma for three nights, the first thing that came to mind was how the villagers could be getting their access to medical facilities. Whilst I was climbing up the mountain to reach the village and having seen no health complex nearby, I was convinced that I should find out about the medical facilities available here.

While in Tolma, I met a diverse range of people and I did not meet a single woman who hadn't ever sought medical assistance from Nomi! This might sound surprising but that's the reality.

"It's really tough for us to travel to Joshimath to see a doctor. Firstly, it's quite a long way and it's not smooth either. Secondly, going all that way is really expensive," said Arvind Singh Rawat. Perhaps this is why a large number of the village youth want to become doctors, so that they can help out their own village.

Speaking of the youngsters, the education facilities available in the village are not great either. It was Independence Day when I visited Tolma's government primary school - the lone educational institute of the village. Like every other school of India, they had organised a nice programme to celebrate the day.

It was undoubtedly memorable to be with those kids on that day. Starting with the flag-hoisting at 8:00am and the Indian national anthem, some 18 kids brought out a colourful procession to commemorate the day. The primary school started in 2005 with only 9 students. This figure reached its peak in 2006, with just 11. Despite the number of kids present on Independence Day, there are just 3 students enrolled this year!

Two sisters - Babita (6) and Kavita (7) and their cousin Sangeeta (9) are the 3 present students (pictured bottom right). While the brothers are studying in Class I, Sangeeta is the lone student in Class III. A toddler, Asa, also goes, but she is too young to be 'officially' enrolled. Most of the other kids in Tolma study in Joshimath.

It is common enough that post-primary students would study outside Tolma, but I find it surprising that even primary age students would also study elsewhere, given that there is a government school in the village.

"It has become fashionable to send kids outside Tolma for their education," said the lone teacher of the school, Yashpal Yadav.

"I come to school regularly from Monday - Saturday, 7am - 1pm. But parents still prefer to send their kids to other places, spending more money," he continued. He is the only teacher for all five classes. Yadav explained that the reason behind this was that no one wanted to be in "remote places like Tolma where there isn't even any phone network." He also said that he had just returned from a 10-day training course. The teacher who had come in as a replacement came to school only for three days as he was scared of the forest. When asked how he manages to teach students of different classes at the same time he explained that only English is taught as a whole because "the levels of the syllabus are quite similar". This response confused me the most!

Yadav has been in the education sector for the last six years, spending his entire tenure in this school. "Teachers should be regularly transferred so that they

gain experience and the children too would benefit from this. If anyone stays for long periods, then chances are high that they will get caught up in village politics. Besides, villagers also take her/him for granted," he said. He also feels that the infrastructure is underutilised, as more students are going to schools in nearby villages rather than in Tolma.

But students and parents have a totally different story to tell about the school, and especially Yadav. Satyasori Devi Pawar, mother of five, said that her daughter Sangeeta is not getting proper education in the primary school in Tolma, as the teacher does not come to class regularly. Another one of her daughters, Sarojini, who is in Class VI, walks all the way to Surathota for her schooling, whilst the other three study in Joshimath.

Pushpa, Mamta and Suraj live in a rented house in Joshimath for Rs. 600 per month. Every month, beside the school fees, they need extra money for their private tuition. To support all of this, both parents work extremely hard. Satyasori

works in Tolma whilst her husband works on their village farm and occasionally in factories during Pooja or festivals.

Satyasori expressed, "I wish all the schools were here in Tolma," adding that sooner or later, she also needs to send Sangeeta out of the village for better education.

"SURAJ MISSES HIS PARENTS SO MUCH THAT HE HARDLY MANAGES TO CONCENTRATE ON HIS STUDIES."



Both Satyasori and her husband try to visit their children in Joshimath once or twice a month, but the transportation cost between there and Tolma is quite high. Their kids come home to Tolma only during holidays. Their son Suraj, who is studying in Class IV, shared that he misses his parents so much that he hardly manages to concentrate on his studies. "He cries a lot for mum and dad," said Pushpa, his eldest sister.

Pushpa explained that in the school in Tolma there's hardly any order. "Every year, students moves to a new class but they hardly learn anything as the teacher comes only once or twice a month." Like them, many others live in different villages for the purpose of their education – some with their cousins, and some with their siblings, far away from their parents. But is it worth sacrificing time growing up with family for a better education? Surely there must be a way of bringing good education to all parts of India.

While leaving Tolma I deeply felt that these people are living under a different sky, where basic rights to health and education are more like privileges.



"IT'S REALLY TOUGH FOR US TO TRAVEL TO JOSHIMATH TO SEE A DOCTOR."



VP of the Tolma Panchayat, an Interview by Narender Paul

The Tolma Panchayat's Vice President, Sh. Prem Singh Panwar also owns a local transport business. He owns one truck and one jeep, with which he works in coordination with other similar firms in the area. We had a broad discussion about what he sees for the future of this village, and what he thought of government schemes such as the MGNREGA [Mahatma Ghandi National Rural Employment Guarantee Act] came up. When I asked him about it, he told me that almost no work was being undertaken, and I found that his knowledge of the MGNREGA was very poor. He didn't even seem interested in learning about the Act or other government schemes to help develop the villages he was elected to represent.

CONCLUSION

BY NARENDER PAUL

It was fascinating to see a remote, mountainous village with a good economic situation where people live happily. After some general observations and interactions with the men, women and children of the village, I found that Tolma is developed both economically and, to an extent, socially as well. Though if healthcare and education are also considered, then overall, this village would be classed as underdeveloped. They need to synergise both their own and their village development by broadening their knowledge and information base. The village's unity is very good in certain events and programmes in the village, but they need to understand how their traditional way of life can work with government schemes, such as MGNREGA, for the welfare of their community. It is not impossible to adapt traditional wisdom and transfer it to future generations in harmony with modern technology, but this can only be achieved from raising awareness from the lowest level, through the Gramsabhas and Up-Gramsabhas. Then only can this vision come to life.

WHEN ASKING A VILLAGER WHAT HE THOUGHT ABOUT THE NEARBY DAM PROJECT, HE REPLIED:

"IN THESE MOUNTAINS, WHEN THE PEOPLE SLEEP AT NIGHT, THEY'RE AFRAID WHETHER THEY WILL BE ALIVE THE NEXT MORNING OR NOT DUE TO THE BLASTING AND TUNNELLING SHAKING THE MOUNTAINS."

A PLANET WITHOUT AUTOSAVE

BY NICK MADANI

We're all pretty bad at remembering to save our documents as we work. You never know when your colleague is going to kick the socket out of the wall, or if your dad will mow the cable instead of the lawn, and you'd better hope your deity is looking down on you favourably in the 30 minutes each year that mum feels like 'researching the family tree' whilst unknowingly playing into the hands of a talented Chinese hacker sitting alone in his underwear, destroying all of your files. CTRL-S, back-up. We should know better. Everyone knows how it feels when the screen clunks and everything fades: the feeling of adrenaline and anger that instructs your hands to smash the PC through the window. Despair. You'll never be able to remember let alone re-create the wit or wisdom of your most recent paragraph. All those words into oblivion and no evidence they ever existed.

But wait... there are fingertips clutched on the cliff edge - AutoSave! We run to the edge, snatch the recovered file and CTRL-S and Close and phew-thank-god-for-that. It's an injustice that thousands of students graduating every year don't include it in their acknowledgments. Why not? Yes their patient professors might have steered them in the right direction, old school teachers probably did inspire an interest at a young age, and okay the corner chop bloke does deserve credit for fuelling revision (forget how he provides the means to forget it all afterwards). But not even the kebab shop on City Road, heck not even the great financiers of your student life, the parents, can be put above AutoSave on the list of thanks to your shiny new 2:1. The same goes for any occasion when we celebrate word-processed achievements from any modern day scholar, minister, peace keeper, poet or songwriter. So let's take a moment. AutoSave: we know you were there for us, we know you do your job without thanks and we salute you for saving our sorry asses every minute around the world.

Erm... perhaps this intro got a little bit out of proportion. What happened was that I had begun writing about hydro-electric dam projects when we had a power cut and the PC went dead. Someone had set the AutoSave to every 60min and I lost everything. Why anyone would do that I don't know, but after consoling myself (it took a while) I was forced to think about the basic question: why are we getting power cuts every single day in this city?

A lost word document, cricket highlights, the health of our family in hospital... it's getting more serious and unless we address the problem it will become more frequent. Dramatic? The truth is that there's a shortfall of electricity and we have to act swiftly. As a journalist you could call it a crisis. An economist might see it as a sure indicator of growth. The environmentalists told you so. But how do you go about solving it?

It is time to question our consumption, I mean really question it. Change the paradigm of achieving global economic growth at any cost. Analyse ourselves and our societies and see that our excesses don't make us happy. Time to decentralise, to take responsibility for our actions at all levels. Stop using jet planes, live without AC, only take what we need from nature and cease our addiction to energy. If we change our mindset and live in harmony with nature, our problems will be solved.

Since we're solving problems... why isn't there always water in our hostel at night? How come the internet connection gives up for no apparent reason every day? And why did we get so many landslides on the trip back from Tolma?

Same answers. We are stretching our planet too far and too fast. At this rate oil will run out first, then rivers will run dry, food will go short, sea levels and weather systems will change. Not to mention the destruction of millions of living animals and organisms. We need to live with less and make real, uncomfortable sacrifices.

Erm... sounds kinda bad... when did you say I should start doing this?

As an engineering student I know there are technological solutions to almost everything. And if we work with ecologists there's no reason why we can't make these solutions green and sustainable, give or take a few necessary compromises. But through this course we have seen that bringing change is excruciatingly more complex. Strong government, honest businessmen and informed citizens are needed as well. And this is where my head starts to hurt.

But probably not as much as Anna Hazare's stomach at this moment. Let's throw our support behind people like him. Try to understand the challenges and ask questions about how and why things happen the way they do. We should take small steps every day, bigger steps when we can, and spread the message to others back home.

You don't have to. For the time being we have that luxury to choose. Most of us live miles above the poverty line and out of sight of all the mess. But next time there's a power cut, or no water to shower at night, when the internet cuts out again, or you hit a new delay because of a landslide, you might be reminded of the growing need to do your bit.

Power cut in Delhi -

both AC units in our classroom go silent, the room goes dark, four overhead fans start slowing down and laptops stop charging. Silence. I lose my document. It doesn't come back for half an hour because its peak time and city blocks are taking it in turns to cut the grid some slack.

Power cut in Tolma -

some of the villagers move from their DishTV and start a fire for dinner like almost every other night these days. Someone switches to whatever they have accumulated from the solar panels to light up the communal areas. Our roaming blackberrys run out of battery and we don't get to catch up on cricket highlights until the next day.

Power cut in the UK -

backup generators start up in a hospital on a freezing evening in Manchester. Pagers and lifts all still work, life support machines keep beeping, wards are prioritized for how long they will stay warm without power, and surgeons in operating theatres don't even notice the difference. In Snowdonia a team of engineers open a 65m vertical shaft to connect two reservoirs through the Dinorwig Electric Mountain. 16 seconds later and water rushes through six massive turbines to pump energy into the grid. Everything goes back to normal.

GOVERNMENT FILLING THE GROUNDWATER GAP

BY ANNA BAMBRICK

For households in a settlement in Saket, New Delhi, the government has been attempting to fulfil the deficit in water supply.

Every other day, a government-sponsored tanker arrives at the settlement to provide free water for local households. This system began in 2001 when the water pump wasn't able to provide a reliable supply. This scarcity led to suffering among the affected households, impacting the health of the people living there.

A local businessman, Rakesh, described how the system worked: "The tap water supply varies between properties depending on which side of the road your property is on". He also commented that the water quality was "good – suitable for drinking or bathing" but that some households still took extra precautions by choosing to boil it.

For the days when the tanker doesn't come, the government has constructed a new well at the entrance to the colony which is free for households to use.

Two men were collecting water whilst I was there. The first commented that "there is hardly any water in the tap because the water level is so low". While the second, explained that "the pump they set up for the colony doesn't work".

For some businesses in the settlement, this government supply is still inadequate and they choose to pay for a private water service. 'Water Rates', a water supply company present during our visit charge a flat rate of Rs. 1000 for 5000 litres – Rs. 0.2/litre. This water is Grade B quality – drinkable upon boiling. Despite this lower quality and higher cost, many choose to use this service as it is more reliable than the government supply.

The initial reason these government solutions were introduced was to resolve the problem of groundwater depletion, which is persistent in Delhi. In some instances, the groundwater level in some areas is falling by an average of 10 feet per year. This has caused a widespread water crisis, where established methods of accessing water such as pipes, taps and pumps have become inadequate and this directly impacts the ordinary man.

At least for Saket, the government has provided temporary solutions. However, it is a shame to see that even households with plumbing have become so reliant on regular outside sources – adding further weight behind the call to replenish groundwater levels.

TÊTE-À-TÊTE WITH YESHU

BY TIM HASID

Yeshu, a 54-year-old priest, has dedicated his entire life to people. Originally a school teacher in St. Columbus, he erected a spiritual temple amongst the busy traffic of Saket, New Delhi. He kindly welcomed me with open arms asking my name and where I came from as all Indian's do: 'what's your country?'. A banyan tree marked the location of the 'Dakshani Shawari' temple. It was covered with a bright purple and gold silk cloth that stood out against Delhi's suffocating pollution.

As a good host, he offered me 'dal' and spicy potatoes as a snack followed by biscuits and as a good priest he initiated me to the Hindu religion and the figure of each God present in his place of worship. Shiva (God of destruction), Saraswati (Goddess of education), Maa Kali (Goddess of power), Hanuman (God of courage) and many more which, believe it or not, he made me learn by heart. On top of that, I joined a few prayers as people stopped on the side of the road abandoning their car for a moment of worship. This shows how despite the rapid economic developments in India, people are still very dedicated to religion.

After asking Yeshu a few questions about Delhi, India and the world we live in, I tried to understand how he saw things. 'Obama is Great Britain's president'. I sniggered before he corrected himself, 'Obama is America's president, he is a very strong man, however he has a very fat wife'. This statement made me burst out laughing. However, he was certain of one thing: 'every man is good'. The hospitality he showed me was representative of how people in India receive their guests in the most spiritual manner.



CITY OF RUINS

BY NICK MADANI

'Coffeeboy' is one of hundreds of auto-rickshaw drivers we've seen in India. He is memorable for playing cheesy pop music on his phone, the long nail on the little finger of his left hand, and, most of all, his warm smile. He has memorised every train that passes through Hospet and can spot tourists in sleeper class before they've even realised it's time to alight. We heard his quiet and polite greeting as the train was still moving, "Guys, guys, hello, welcome to Hospet, how are you?" The three of us had travelled 20 hours from Cochin after realising we'd lost track of time in the green and hospitable state of Kerala. The sight of Coffeeboy in his bright blue Nike shirt was a fine welcome. He was determined but not pushy, "See, come and have a look, I have lots of space here for bags, it's very wide, and it really is a fair price, a very honest price." He also told me I resembled Andrew Strauss so there was no reason to believe anything he said, but, buoyed by the Karnataka sunshine and the need to lie down in a decent hotel, we accepted and boarded yet another mode of transport (which was indeed wider than usual). To the inappropriate tune of 'Hero' by Enrique Iglesias, we swerved rapidly between the cows that rule the windy roads in that area. His driving was testament to what we'd heard about India having the worst road stats in the world, but where he lacked road awareness he possessed the ability to speak more European languages than all of us put together. There were 13 km of 'Indian driver questions' before our stunning destination came into view. "Guys, welcome to Hampi."

Ancient Vijayanagara: City of victory of the Hindu Empire – a vast, open air museum of history, architecture and religion, 41sq km of giant temples, palaces, monuments and aquatic structures surrounded by the most bizarre landscape we have seen anywhere in India. It had been the one place that multiple friends had insisted we visit, and we were immediately impressed. The huge boulders

that lie on every hill and horizon are said to have been thrown by godly apes, and it was hard even as a scientist to imagine how else they could have got there. So striking was the ancient metropolis that it was no surprise to see the UNESCO World Heritage Site



sign as we approached the main bazaar. Coffeeboy, sensing the moment, suggested that we check out a hotel, "It's my friend's place, very nice AC, clean towels, I can take you there." Low and behold he found us in an agreeable mood, and we sped towards our host for the week.

Looking up and down the bazaar it seemed like a backpacker's paradise. Hundreds of market-stalls and shops selling everything from jasmine to precious stones and decorative items. Often called the 'Reception Room' of the region, restaurants, hotels and cyber cafés stand in the same place as pearl and diamond merchants did during the rule of Kings.

Kishore appeared in less than a minute on his 250cc Hero Honda. He introduced himself before tipping his loyal driver, and we were invited into his office. At 22 years old, he struck us immediately as a good guy to know around town. His English was impeccable, his attitude laid back, and his business very good. We negotiated a room and some motorbikes, and he gave us some tips on where to eat and drink. Over the course of the next four days we saw many other drivers like Coffeeboy delivering tourists in the same way, so much so that his rooms were always full. We spent quite a bit of time hanging out, watching cricket, climbing Matanga hill, having henna tattoos and chatting about our lives, especially interesting because we were the same age.



He had studied Commerce at a local university and used his qualification to apply for a loan to open his hotel just off the bazaar. Whilst waiting for finance he worked on the vehicle gates and founded the Auto Driver's Union enabling him to get to know 39 local drivers and giving Coffeeboy his nickname. He had also formed political contacts in order to find out the best ways to gain his licenses from the Panchayat. He was smart and charismatic, but business always came second to having a good time.

During our stay we followed the typical tourist routine; to explore the ruins in the daytime and chill at the bazaar during the evening. Between the year 2000 and 2005 the numbers of people coming to Hampi rose from 400,000 to 800,000 per year, making it the biggest tourist attraction of the entire state. However, the negative impacts of this growth were also visible.

"YOU CANNOT
FIRST ALLOW LIFE TO FLOURISH IN A PLACE
AND THEN DECIMATE IT IN ONE BLOW."



UNESCO sign explained the huge importance of the site, but it didn't seem like there was much being done to inform tourists at all. The ticket office offered a scam to enter without a coupon, kids working for rickshaw drivers emptied our motorbike tyres in the middle of nowhere, litter from ice-cream stalls was thrown into excavations by staff hoarding groups into electric buggies... the list goes on. Hawkers and scammers were part of daily life and it often left a very bad taste in our mouths. No wonder the 'Master Plan 2021' for Hampi took issue. The 2006 report stated:

"Illegal tourism and related developments are leading to immoral and anti-social activities and adversely affecting the World Heritage site. All encroachments will have to be removed and Virupaksha Bazaar shall be restored to its original condition. If proper infrastructure is not provided for in a planned manner, the basic tourist needs will be catered to in an undesirable way. The bazaar is a glaring example of this."

No one expected their next move. On the 29th July 2011, a week after we left Hampi, district officials came on a rainy afternoon to give a verbal warning of the demolition of those buildings 'encroaching' on the bazaar. Flyers were handed out during the night and JCBs arrived at 5am the next morning. Using the premise of a High Court order [later found to be false] they destroyed a total of 237 structures, including 93 residential dwellings, 50 commercial units, and 94 partly residential and partly commercial places.

Included in this was Kishore's home and office. After seeing his anger posted on Facebook we got in touch with him and he shared, "We tried to stop them by making strikes but we couldn't. They took to the jail and they destroyed everything including some monuments as well. Everything is gone in ash. This is the situation in Hampi right now. Lots of people don't have the shelter, no food, no money."

Bellary Deputy Commissioner Amlan Biswas said the encroachers would be rehabilitated within six months on an 11-acre revenue land at Kad-dinapur, 2.5 km from Hampi. "The modern structures were not only an eyesore, but they were also damaging the original structures. Prior notice was given several times to the people illegally occupying the bazaar," Biswas said.

Noted historian Suryanath Kamath said the area in front of the temple had been completely commercialised. "The entire atmosphere had been ruined by unauthorised structures. The encroachments had spoiled the sanctity of the heritage site. Good, it is finally cleared."

However, Nalini Thakur, Principal Consultant to the ASI (Archeological Survey of India) Management Plan for Hampi and Professor of Architectural Conservation at the School of Planning and Architecture, New Delhi said the demolition drive was unscientific. "The authorities have not assessed whether the residents were really unauthorised dwellers. If they had, they should have put the issue in the public domain for debate. The drive has been conducted in an inhuman and unscientific manner."

Noted playwright and one of Karnataka's best known cultural icons Girish Karnad took strong exception to the recent demolition. "People have to make a living. If at all, illegal encroachment should have been stopped right in the beginning. You cannot first allow life to flourish in a place and then decimate it in one blow. This is not the way to protect Hampi."

Art historian Annapurna Garimella, who based her Ph. D. on the ruined city and the politics of tourism, says that the Hampi bazaar needs a new, sustainable plan that keeps in mind the livelihoods and changing aspirations of local people. "The demolition's aim to create 'culturally pure' spaces is exclusionary. All we do is attempt to reclaim a past that never existed."



Kishore agreed. "Technically they want to create heritage shopping malls, like old style, because they know Hampi is a big tourist place in the world and they can get lots of money from the tourists. But in this deal they forget that there are lots of people losing their life."

Further to the issue of the demolition of 29th July is the broader issue of inclusiveness in the 'Master Plan 2021' for the heritage site.

1. Were the local people consulted before Hampi was declared as a UNESCO World Heritage Site in 1986?
2. What is the constitutional mandate for the creation of the Hampi World Heritage Management Act 2002, when there is already a progressive Panchayat Act, 1993?
3. What has been the inclusive process in the formation of the 'Master Plan 2021'?

UNESCO upholds the Universal Declaration of Human Rights. They must actively and publicly condemn such acts to impress upon local, state and national authorities that World Heritage tags cannot be earned or retained sacrificing human and democratic processes and respect for the rule of law.

As tourists to Hampi we were mute with wonder. Silence now pervades the Bazaar.

"TECHNICALLY
THEY WANT TO CREATE
HERITAGE SHOPPING
MALLS"

FOREST GARDENS

AN EDIBLE LANDSCAPE

Imagine that you are in a forest where almost everything around you is food. Fruit and nut trees form an open canopy bearing raspberries, blueberries, currants and nuts. Wildflowers, herbs and vegetables thickly cover the ground. Some plants attract beneficial insects, birds and butterflies; others provide nutrients for the soil. But this is not a fictional Garden of Eden, this is a forest garden and it could be in your back yard.

Forest gardens are designed to work with nature. If it wasn't for the constant mowing and weeding, your back garden would eventually return itself to woodland. But instead of fighting the tide of nature, forest gardens move with it – harnessing it to work with you. Thus, forest gardening is not gardening in the forest, but gardening like the forest.

It requires very careful planning to replicate the structure of natural woodland. Food is grown on many different levels (shown in the diagram).

Plants requiring less light can be planted under taller trees, while gaps in the canopy allow light to reach other plants at ground level. Every plant in the ecosystem has a function. Some provide fruits and vegetables, others provide

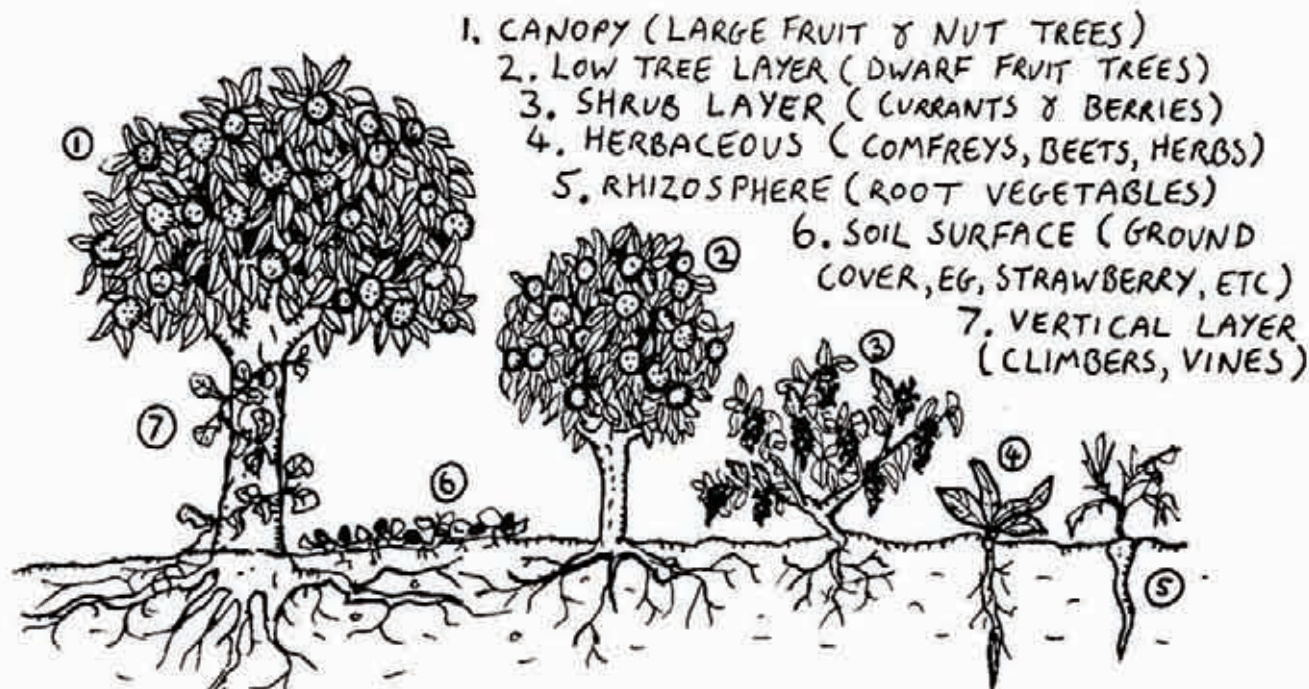
firewood or leaf litter to give the soil nutrition. However, once the plants are mature, very little work is needed to maintain them.

Forest gardens are not a new way of thinking. Plants have been cultivated in this way since agriculture first began, right up until the present day. In Tolma, a small village in the Indian Himalayas, a single hedgerow contains a variety of useful plants... from fruit to medicines; firelighters to animal fodder.

The practice of monoculture dominating Western farming was designed to minimise the need for manual labour. However this practice allows diseases and pests to easily multiply on a sea of their favourite foodstuffs, requiring wide use of pesticides. The diversity of a forest garden avoids these risks. Furthermore, they can be planted on plot sizes ranging anywhere from 10 x 15m to 2 acres.

So the next time you look out of the window at your back garden, why not picture a green forest teeming with wildlife that is producing large amounts of fruit and vegetables for you. It's not outside the realms of possibility.

BY JAMES WILSON



THE FOREST GARDEN: A SEVEN LEVEL BENEFICIAL GUILD

[illegible]

PRASAD

A BLESSING FOR THE LOCAL COMMUNITY

BY RAKESH KALVAMTA VAISHNO DEVI TEMPLE:

India is famous for its cultural and religious values and it is very much evident from the number of temples in the country. Religion, despite being the most powerful institution, is hardly being able to contribute for the welfare of the masses.

The scale of operations in temple is as big as any other corporate company. They can be a major source of employment in any given region. One common thing among all these temples is offering to God/Goddess in the form of flowers, Prasad etc. Most of these offerings are unhealthy and the ironic thing is that all these are prepared at outstations, mainly in big towns and cities. These generate very little employment to the local communities around the temple – a reality identified by an NGO called HESCO (Himalayan Environmental Studies & Conservation Organization).

HESCO, especially under the WISE (Women Initiative for Self Employment) programme, mobilised and trained the communities on Prasad preparation by utilising local crops. They are also trained in incense and basket making using locally available resources. Two such temples where this programme was successfully implemented are Badrinath and Vaishno Devi.

BADRINATH:

Badrinath is a very holy shrine for Hindus located in the state of Uttarakand. For years the temple bought Prasad called Batasha from towns situated in the North. In 2006 HESCO kindled the idea of using locally grown crops and plants in making Prasad. The villagers of Saldhar and Mukhba were involved in Prasad preparation while the villagers of Dangwar and Bonn were making Ringal baskets.

The Prasad were prepared by using wheat, Amaranthus, barnyard millets, soya beans and gram, all of which are easily accessible. The communities used locally available aromatic plants for incense preparation. A rough estimate reveals that about more than Rs. 1 Lakh worth of incense sticks were sold in Badrinath alone last year.

Ringal, the smaller variety of bamboo found in high altitudes, is used in making Prasad carriers. The Rudiya community make these baskets and the Ringal has come to replace plastic bags. Last year, the local communities generated an annual turnover of about Rs. 7 lakhs.



Vaishno Devi temple, located in the state of Jammu & Kashmir, is dedicated to the Goddess Shakti and it is one of the holiest shrines of India.

The local communities of the village Parthal were involved in Prasad preparation for the temple. Their ingredients include maize, paddy and wheat, but dry fruits like apple, walnut, amla and almonds are also used. This type of Prasad is called a laddu. The community is also trained in incense and basket preparation using local plants. The village of Parthal, which has around 400 families, was able to generate a turnover of Rs. 45 Lakhs last year.

"GOD SEES
THE TRUTH
BUT WAITS"

This innovative development

programme has triggered a chain reaction and a lot of temples around the country have started implementing similar programmes with the help of organisations like HESCO. Famous temples like the Gangotri, Haleswar,

Maha Maya Bala Sundri, Alagarkoil and many others have started using locally made Prasads as offerings to God.



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ANNA HAZARE

BY WILLIAM BROTHERHOOD

As soon as the idea to script an article on Anna Hazare was proposed, there was a simmering of motion towards justification of its relevance to an environmentally themed magazine. And you may be thinking the same. But Anna Hazare and his fight against corruption within the government is the fight of a nation against an infection that permeates throughout every level of governance in this country. Of which the legality and honesty dictates the future of everything from healthcare to environment. Essentially the future of India has been wagered on this battle of the awoken mass against the corrupt few and this undoubtedly will shape the policies for the future of India and its environment.

Anna Hazare's fame was born out of the rehabilitation of his impoverished home village, by leading campaigns against several regressive cultural activities. This involved addressing issues of alcoholism, water management, grain distribution and poor education policies. His thoughts then turned from localised campaigning to the state level where he led a movement in Maharashtra that forced the state

government to pass a stronger Right To Information Act which led the way for a similar act passed at national level in 2005. This political passion then progressed to the national level where he currently resides, and his avocation is to promote the Lokpal bill.

What Anna Hazare's life has illustrated is the evolution that all environmentalists must consider. Every example of positive environmental action can easily be combated from a higher level of ill-informed bureaucracy. The only way for a country to progress towards a more sustainable and fairer model is for environmentalists and humanists to integrate themselves into every level of governance whether it be at the grassroots or national level. The corrupt cannot continue to dominate India's policies as this can only lead to more inequality and will ultimately damage the global environment that we all live in.

"EVERYWHERE
YOU TURN IN INDIA,
FROM GOVERNMENT
TO SCHOOLS
AND HOSPITALS
TO POLICE,
WE HAVE TO TOLERATE
CORRUPTION,"
RUPAM K. BHATIA



JAN LOKPAL BILL

BY LIZZIE RICHARDSON

Corruption is rife in India and has been steadily growing worse.

Transparency International's corruption index in 2010 ranked India 87th, level with Albania and below China in 78th place. India was in 84th place in 2009 and 69th a decade ago. Indian citizens are now taking a defiant stand against corruption, which infiltrates all parts of their lives.

For the hundreds of thousands who support Anna Hazare on his ongoing hunger strike the Jan Lokpal Bill is a decisive step towards eradicating corruption in India. It has been drawn up by prominent civil society activists who want a Lokpal to be introduced i.e. an independent body that would investigate corruption cases in public life, completing the investigation within a year.

Important features of the Bill include:

1. To establish an independent anti-corruption institution called Lokpal, supervised by the Cabinet Secretary and the Election Commission. As a result, it will be completely independent of the government and free from ministerial influence in its investigations.
2. Judges will appoint members, Indian Administrative Service officers with a clean record, private citizens and constitutional authorities through a transparent process.
3. Every month a list of cases dealt with will be published online, including brief details of each, their outcome and any action taken or proposed.
4. Investigations of each case must be completed in one year. Any resulting trials should be concluded in the following year, giving a total maximum process time of two years.
5. Losses caused to the government by a corrupt individual will be recovered at the time of conviction.
6. Complaints against any officer of Lokpal will be investigated and completed within a month and, if found to be substantive, will result in the officer being dismissed within two months.

I AM THE OUTSOURCED SUPPORT

BY ABIGAIL WOOLF

Having got off the metro a stop too late my initial thoughts were of disappointment at the poor turnout to support a 74 year old man, fasting for the nation. Oh boy! So far from the truth, as we made it to Ramlila Grounds, we began to see the huge support that Anna Hazare has gained.

There was a simple routine to joining the queue:

1. Put on hat
2. Find a flag
3. Join back of queue
4. Start cheering, never stop

This protest was so surprising for us because it was such a contrast to the demonstrations, or riots that have taken place in the UK recently. These have often turned out into anarchy – fires started and lots of looting, a large majority of people participating without reason.

We were offered numerous shortcuts to the front of the queue, but there was no chance we would allow selves such preferential treatment. We sorted ourselves "I AM ANNA" hats, and joined the back of the queue. Unfortunately the queue was too hot, and we had to leave for the metro – the right station this time, which was packed like a carnival. The walls were lined with people chanting and general flag waving. Of course we joined in, enthusiastic and very smiley. This wasn't enough and Will got taken aside, not only testing our knowledge, now also our cheering ability, and had to chant face to face with a fellow protestor for several minutes – while they tightly grasped his arms.

We found our way to India Gate, where 'Anna fever' had also spread. Walking down from the Presidential buildings, hundreds of people were walking with us. The protesters now were sporting subtle face paint, headbands, and there were even more flag wavers. People's interest in us had escalated and the interrogations began again, now well rehearsed, we passed easily enough to land ourselves multiple TV interviews. People were pleased that news of Anna had reached so far: "Even William and Abigail are supporting! From England!". It was inspiring to see so many people of all generations joining in this peaceful protest against corruption, to give India the chance it needs to have honest development.



CHAI

India is a nation of many scents and tastes. For visitors this aromatic mayhem can be as delightful as it could be a nightmare. One of the most remarkable tastes of India is chai. It seems to set a certain order in peoples' lives and this much we can take back with us. Therefore here I compile two different recipes, a masala chai (spiced tea) and noon chai (salty tea). This way we will be able to make our own chai wherever we are, to bring back some of the memories of India.



Masala Chai (4 cups)

Put 5 cups of milk (semi-skimmed), 3 cups of water, 4 teaspoons of black tea into a pan and start heating. Crush the spices and add the mixture to the pan. Add sugar to your own taste and keep on heater for 15 minutes while stirring constantly. Then strain and serve.

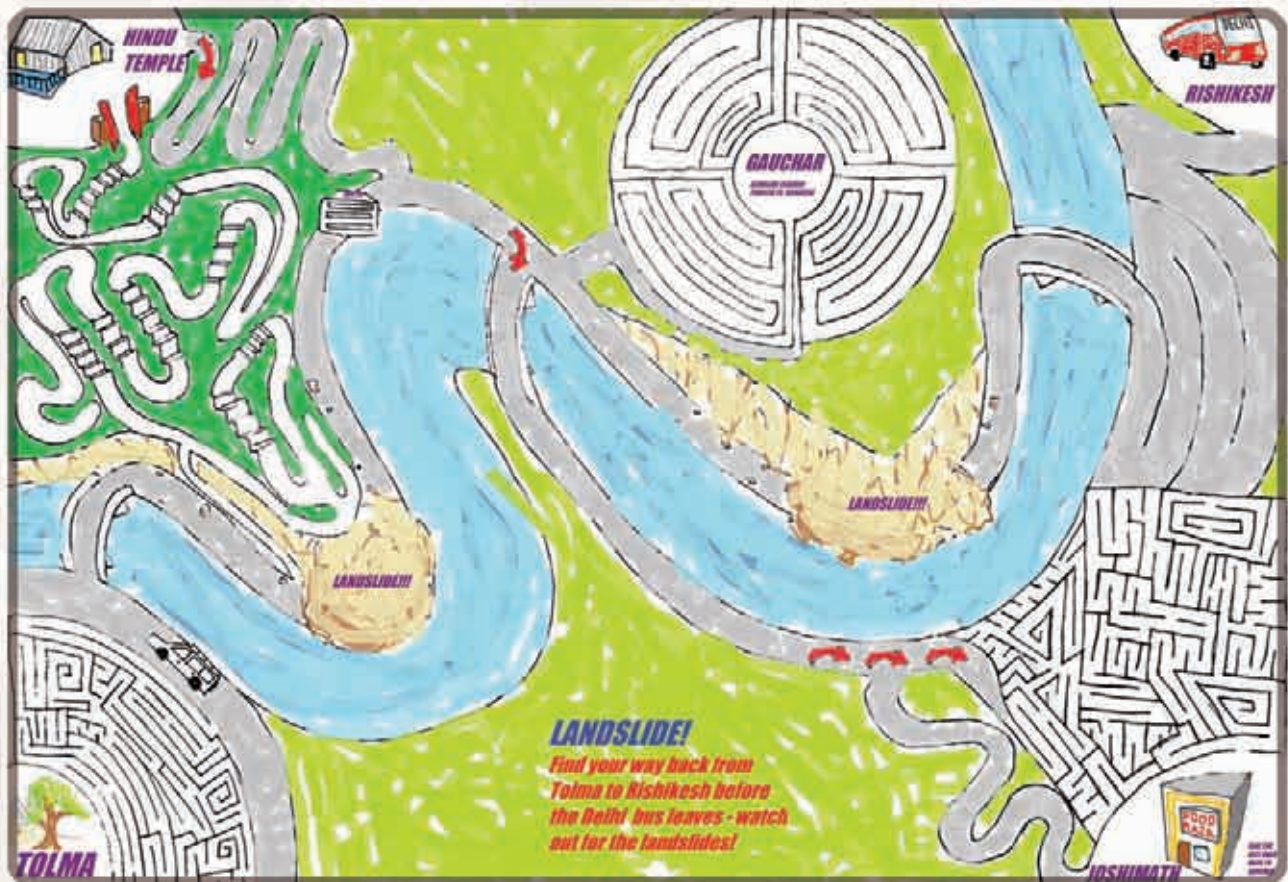
Recommended spices: 2 cardamom pods, pinch of ground ginger, 3 full black peppercorns and half a vanilla pod.

Noon Chai (4 cups)

Put 2 teaspoons of noon chai leaves to boil with about a cup and half of water until most of the water evaporates at medium heat. Repeat the process again. Then add 4 cups of water and a quarter of a teaspoon of baking soda and boil again in slow heat for about 45 minutes. Stir constantly while cooking. Then add 2 cups of milk (semi-skimmed) and get to boiling point. Add 1 or 2 teaspoons of salt. Strain and serve.

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FUN PAGE



U	G	N	I	M	R	B	A	I	N	S	R	R	B	V
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Landslide
Mountain
Colonialism
Jeep
Dam
Corrupt
Rupees
Paradigm
Henna
Ganga
Mr Bains
Sharmila
Tolma
Chai
Monsoon
Environment

Ecology
Grassroots
Gandhi
Sustainability
Energy