BioRegions Newsletter

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Increasing community participation in wellness campaigns for rural Mongolians

By Sean Armstrong, public health, U. of Michigan

Mongolia has undergone rapid changes in the health sector since the transition to a democratic state took place in 1991. Often, these changes have been dramatic and based on practices developed by nations whose economic and social situations do not reflect the society of rural Mongolia. One of the most startling changes

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My Short Trip to Renchinlhumbe

By Retta Bruegger, Fulbright scholar

During my 10th month as a Fulbright scholar in Mongolia, the opportunity arose in July 2006 to visit the headquarters of BioRegions International in Renchinlhumbe. While there, I met Cliff Montagne, the director of BioRegions, as well as the great staff, researchers and students working with BioRegions. I also met with the famous artist of the Darhad Valley, Lamjii, and viewed his paintings. As the BioRegions group and I attempted to drive back to Mörön, our plans were foiled by a massive deluge that flooded everything. Water flowed over the grass in torrents. What had been meadows on my way there were suddenly shallow lakes. A few hours after starting the drive we came to a river. In its muddy, flowing water we saw logs sticking upwards. These, apparently, were the bridge. The river was flowing above, not under it. Crossing would be impossible, we were told as we sat in the soggy van contemplating our options.

Cliff took the lead in formulating a plan. In the end, we took shelter for several days in the home of traditional medicine doctor and friend of BioRegions, D. Basbish. Waiting for the flooded rivers to subside in the stunning environment of Basbish's home, I became more familiar with what it is that BioRegions does, and how it accomplishes its goals.

As a Fulbright Scholar, I endeavored to study the representation of nature in Mongolian folk literature and song. Over the course of my research, I worked with a professor at the National University of Mongolia, and traveled and lived in eastern and western provinces. I had never been to Khövsgöl province, however. In many respects, I saw how BioRegions as an organization deals with the same issues I had as a Fulbright scholar. For example, how do you build trusting relationships over cultural, economic and linguistic differences? How do you build a genuine interaction between groups of people from different backgrounds so that it benefits all parties involved? Finally, what can we teach and learn from each other?

Being stranded in the home of Basbish turned out to be a great learning opportunity. Basbish took us around to visit other doctors of traditional medicine. We visited springs, rivers and forests. Basbish pointed out plants, showed us dried specimens of herbs, and talked about his home. One day, it was decided that we would make a

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video about herbal medicine to be shown as an educational film to other people living in the Darhad Valley. Basbish took us to one of his favorite places, an area rich in water, with tangled willows and thick moss and fallen trees that were soft from decay. There we filmed Basbish playing a musical instrument while Temuge, BioRegions' translator, spoke and the rest of us examined the moss enthusiastically. Eventually most everyone in our crew was featured speaking about their research or experience.

For me the video we made served as an example of positive cultural exchange. It integrated people from the Darhad Valley, Mongolians from other provinces, and foreigners like me. It synthesized ancient wisdom with modern technology. Finally, the video united the different skills that we all brought to the table. Despite missing our flights, and being away from loved ones, for me it was a gift that the rivers flooded. The flood gave us the time to listen, communicate and create. The openness to ideas and projects that BioRegions invites, and it's support of different kinds of knowledge, is a model of collaboration and that will continue to inspire my actions. BioRegions' model of synthesis is a hopeful example of how the forces of globalization can be turned into a positive exchange.

BioRegions International

BioRegions International works to empower the nomadic cultures of Mongolia to survive in a rapidly-changing world. We support holistic, locally-based projects promoting public health, education, environmental preservation, and sustainable economic development.

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CHALLENGES OF TRANSLATION

By Temuge Tsagaan, translator

I worked as a translator for the BioRegions Program in the Darhad Valley of Mongolia last summer. Since the BioRegions Program implements holistic and locally based projects such as education, public health and environmental preservation, the translator's work is a very responsible and important job. Some responsibilities are communicating with foreign people and local residents as well as running our projects successfully. Hence translators have been a voice of the BioRegions.

It was a great challenge for me to translate many different ideas in various fields. It required not only a language technique but a background knowledge and understanding of what BioRegions' offers to the remote Darhad Valley, and what solutions need to be done with that community.

I enjoyed working very much and making friends with both BioRegions crew and local people. I learned many things from BioRegions' President Cliff Montagne and other team members about how to work with dedication, initiative and a generous heart!

I am really enthusiastic that I participated in this humanitarian work; therefore I am willing to contribute my skills in the future.

I will never forget traveling around Darhad – the Blue Valley – experiencing country life, which has given me unforgettable and beautiful memories. When Cliff Montagne shot a video film about our project, I enjoyed interviewing traditional herbal medicine practitioners and others. After staying with them we thanked them for their hospitality, then we had to leave for Ulaanbaatar. But we were all sad to leave such nice people, such beautiful land and tears were coming.…

Everybody in Renchinlhumbe calls Cliff Montagne "Bagsh" which means "Teacher" in English, showing him deep respect. It was a great honor for me to work as a team member of BioRegions. As result of building a successful working environment, BioRegions has become the most welcomed and closest friend of Darhad people. I appreciate that.

PRESIDENT'S MESSAGE

I was fortunate to be in Mongolia from mid-May through early August this year. In May, Canadian volunteer Cleone Todgham and I attended the Nomadic Pastoralism and Climate Change workshop of the Lake Hovsgol Biodiversity Project held in Ulaanbaatar. We were impressed with the depth and breadth of the scientific findings which highlight the effects of warming temperatures on the watersheds feeding into Lake Hovsgol. Check out their impressive website, www.hovsgolbiodiversity.org, to learn more. Board member Wayne Poulsen and I then attended the conference for the Joint Mongolian-Smithsonian Deer Stone Project, http://www.si.edu/mci/english/research/conservation/deer_stones.html, to present a paper on BioRegions Program work in the Darhad Valley. Our team, led by Joan Montagne and including Loren Barber; Catherine Kirkland; Sean, Tugsu, and Amina Armstrong; and Amina's cousin/nanny, left for Renchinlhumbe on May 23rd. By the time I joined our team at the new BioRegions cabin in Renchinlhumbe, they were well underway with numerous projects. Most of our first team left Renchinlhumbe on June 23, but we were joined by Khaliun and Ariunbolor, social health majors at the Mongolian University of Health Sciences. This 'second crew', including translator Temuge, Mongolia Institute of Botany moss botanist Enkhjargal, Canadian volunteer Cleone Todgham, cooks Maagi and Peljee, along with Mishig's daughter Tuul, accomplished a great deal as we worked on community health, a moss inventory, and sand dune rehabilitation. Gordon and son Nick Wiltsie joined us in early July to photograph rock art and a shaman. They spoke of torrential rains near Muren. When these rains reached Renchinlhumbe in mid July, we rejoiced for the moisture. The grasses and flowers carpeted the valley. As the rains continued right through our planned departure day, we worried. Our worry turned to opportunity as we could not cross the Shishged River just south of Ulaan Uul, and found ourselves the guests of traditional medicine practitioner Basbish and his wife. When the rains ceased and the rivers went down, we left as good friends with plans for upcoming collaborations. After typical Mongolian travel adventures like getting stuck in the middle of one river, impacting our van's radiator fan blades into the radiator while ascending an especially steep river bank, and getting towed across another river, we arrived in Ulaanbaatar just in time for me to attend the last day of the Traditional Medicine Conference most ably organized by recent Bozeman resident Altaa, wife of Battogtokh. Sean Armstrong, Mongolian physician Dr. Kherlen, and I had authored a paper which Sean had already presented. I enjoyed meeting the foreign scientists from Poland, Greece, Japan, and China and getting the sense of how important European scientists think Mongolian herbal medicinal plants are.

Now back in the States, I have just been to Washington DC with board member Dr. Will Swearingen making contacts with potential funding organizations. We visited with National Science Foundation, US Agency for International Development, US State Department, and National Geographic. Everywhere we found interest and enthusiasm for our work.

In reflecting back on all of this activity, I am excited by our broad approach. In Renchinlhumbe we were rewarded for our efforts by the smiles of Mongolian herders soaking up the music at Darhad Blue Valley Days; the initiative of herding families volunteering to experiment with sand dune stabilization; the enthusiastic reports of teachers Lamjii, Dashdaava, Baatar and Batmunkh; the quality items produced by apprentices of teachers in the Art and Artisans program; the enthusiasm of physician Dr. Purevsuren to showcase Loren Barber's water quality information all over the valley; the kilogram of cheese given by a grateful glasses recipient; the performances of student and adult musicians benefiting from instruments and clothing funded by BioRegions; and the results of the community health projects by our Mongolian students. We are bringing collaborations in ecological and environmental sciences, health, the arts, energy and education to fruition. We and our Mongolian partners are learning how to build the components of sustaining communities, one step at a time.

We are gathering steam for proposal writing and fund raising, planning the upcoming 2007 work trip, and working to strengthen and broaden BioRegions. I invite you to participate in whatever way you can. We have many opportunities ahead, and many tasks to make the opportunities happen. We need expertise and help in many areas, we need funding for important projects. I look forward to your participation.

Sincerely,

Cliff Montagne

President and Co-founder

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was a drop in life expectancy that occurred, along with much of the post-soviet world, after the fall of communism. Much of this drop has since been linked to uncontrolled alcohol markets. The purpose of this research is to understand what changes are most closely related to these developments. In particular, this research has the objective of identifying what has changed in rural Mongolia to create such an effective breeding ground for high rates of alcoholism.

This project will seek to understand the changing patterns with which rural Mongolians are seeking care for alcoholism and explain the disturbing increases in prevalence in rural Mongolia. A new series of reforms were proposed by the Ministry of Health and the Asian Development Bank in the form of the National Health Sector Strategic Master Plan (NHSSMP) of 2005 that among other things seeks to address the increase in unhealthy behaviors in rural Mongolia. The potential for positive reform through the implementation of this plan is tremendous but it faces in the Mongolian countryside unique challenges. Isolation, lack of infrastructure, a nomadic population, absence of agriculture and a history of collectivization are but of few of the obstacles to implementing this plan. In order to make the program more responsive and relevant to these rural populations an effort must be made to respond to their unique needs. One specific way in which this challenge presents itself is in how individuals in the community seek treatment and access the health system. Understanding who is sought for advice first, what symptoms are associated with different diseases and the timeliness which individuals treat differing symptoms, will go a long way in determining the effectiveness of these reforms.

This project will be carried out with the assistance of multiple partners in Mongolia. Policy issues involving rural health care matters and alcoholism will be addressed with the assistance of the Ministry of Health's "Soum (county) Hospital Development" project. For assistance in understanding previous alcoholism education and behavior change efforts I will partner with the National Center for Health Development. Finally, coordinating my research with the research efforts of the Mongolian Health Sciences University will assist in the completion of the research as well as in providing me with assistance in compiling previous publications in this issue, none of which have been published in international journals. The coordination is essential in both phases of the project design. The first phase will be essentially an efficient review of alcoholism related interventions and research. This is especially important in Mongolia given the sensitive nature of the topic. With the assistance of University students this compilation will be reviewed and summaries developed on the publications in both Mongolian and English. Then, a small mixed-methods survey will be developed that will evaluate both the level of knowledge about alcoholism in Mongolia as well as how health practices around the disease have changed over the last 15 years. These surveys will be carried out at a select few rural locations as well as in the capital city.

The target population for this summary is the foreign health sector development community, made up of NGO's, multi and bi-lateral organizations and foundations. The past efforts have involved Mongolian input but often in a hap-hazard fashion. This research will provide a set starting point for all those interested in developing alcoholism initiatives. Ideally the summary will assist in limiting duplication of efforts, by introducing past efforts in a sector-wide way and presenting an unbiased summary of these projects, agencies will be able to build on past programs. This will also engender a sector-wide approach. For example, if a program has policy recommendations contained within it then it should be addressed to the Ministry of Health.

The second phase of the project will be in designing a small survey to be carried out in a participatory manner. It will be designed to build on previous research and implemented in a community in rural Mongolia using community based participatory research guidelines. This will require the communities participation at all levels, so the survey design will be flexible and evaluative measures developed with the guidance of local officials. In a disease like alcoholism, which has such deep roots in local perceptions, their participation is essential. Community involvement will insure stakeholders' involvement with the research as well as providing real insight into how traditional perceptions of alcohol use and abuse affect the disease today.

One of the primary outcomes from this study is an advocacy campaign directed at donors and Ministry officials. Already in Inner Mongolia, Chinese public health professionals have recognized the uniqueness with which this disease afflicts the Mongolian population there in particular. They have discovered that initiatives developed to combat the disease in the Chinese population do not directly translate into effective programming for Mongolians. With the results of this research then I will present the effects of the disease and how to assess it accurately to the nation as a whole. By using photovoice advocacy techniques and creation of a small handbook on culturally sensitive program design techniques in alcoholism prevention and treatment this advocacy should reach the necessary parties. Through coordination with the Health Sciences University the general discoveries made in the area of cultural sensitivity

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will be made into a seminar course that will provide continual testing of these ideas and assist in their efforts to develop best practices in the area of alcoholism treatment.

Therefore, working in tandem with the institutions responsible for making these changes will present increased opportunities for collaboration with ongoing health sector development projects. Alternatively: the collaboration proposed in this research will play a key role in increasing the effectiveness of advocacy efforts. This work will take place over nine months, the first 4 months will be spent with the Health Sciences University increasing my competency in Mongolian to be able to carry out survey work and also compiling the previous publications on alcoholism in Mongolia and developing the summaries. The next 3 months surveying rural citizens and the last two compiling the results and preparing the curriculum for the University course. My research will make it possible for alcoholism to be identified, managed and treated in rural Mongolia and will provide a clear framework to facilitate future rural initiatives.

A Four-way Partnership to Promote Medical School Exchange: Health Sciences University of Mongolia, Renchinlhumbe Peoples' Hospital, Montana WWAMI Medical Program, and BioRegions International

By Susan Gibson, Instructor of Human Anatomy, WWAMI Medical Program, Montana State University

Ten years ago I took a leave of absence from teaching at Montana State University to be a visiting teacher of histology and gross anatomy at the National Medical University of Mongolia (NMUM). Since teaching in Mongolia, I hoped/desired that one day a student exchange could be arranged with the Mongol medical school.

Recently, the Montana WWAMI Medical Program at Montana State University partnered with BioRegions International to reestablish the relationship. In May 2006, I returned to Ulaanbaatar to meet with the administration and faculty at the Health Sciences University of Mongolia (previously NMUM) to establish a student exchange between the two institutions. The following occurred.

(1) A Montana WWAMI 2006 medical student will be selected to travel to Mongolia next summer for four weeks to observe and participate in a rural health opportunity. A Mongolian medical student will accompany the WWAMI student and they will be under the supervision of a physician in the Darhad Valley community of Renchinlhumbe.

(2) During the fall semester 2006, the WWAMI Medical Education Program is hosting a Mongolian faculty member, Dr. Baasansuren Damdin. She is observing the teaching of histology and gross anatomy to the WWAMI medical students.

The program is an International Health Opportunity (IHOP) in Mongolia and is sponsored by the Montana WWAMI Program. It will provide the opportunity for a first year medical student to have a rural medical experience in countryside Mongolia. We will be raising funds to support this effort to send a WWAMI medical student to Mongolia for the summer 2007.

BioRegions' Blue Valley Awards

By Wayne Poulsen, Board of Directors, BioRegions International

The first of what we hope will be an annual Blue Valley Awards was held in Renchinlhumbe, in the Darhat valley, on June 15th of this year.

The concept for a Blue Valley Awards "festival" was born at the conclusion of the BioRegions work visit in 2005 and grew out of the success of the BioRegions Art and Artisans program.

The Art and Artisans program seeks to sustain culture and community through preserving, encouraging and expanding the local economy and its fundamental constituents: artisans and skilled craftsmen. The Arts and Artisans program achieves this goal by supporting artisans directly, and indirectly by subsidizing a program making it possible for craftsmen to bring apprentices into their workshops for training in traditional skills.

The aim of the Awards festival idea was to create an event which would communicate the philosophy and goals of the Arts and Artisans program and provide an exhibition honoring the artists, musicians, poets and craftsmen and their work. This was to be an "open" event; open to all ages and to all communities. A short program description was provided by BioRegions staff to Mishig and Amarjargal, our local partners in the Darhat, who did an energetic job of bringing together, at the appointed time, enthusiastic participants from all around the valley. This had been our hope.

The "open" concept of the program, intended to be inclusive, was a novelty to many of the local organizers and participants more used to performance "competitions" rigidly organized and judged based on achievement level and merit. They were skeptical.

Some of the most fascinating and moving moments for BioRegions came during a series of meetings held just before Blue Valley Day. The meetings involved detailed and passionate discussions among BioRegions and leaders of the attending communities of how judging of each type of performance would take place, and, by extension, of whether the traditional philosophy of judging would change due to the peculiar "open" concept of the event.

A Five-year-old in Renchinlhumbe

By Tugsu Armstrong, translator

Although some of her first words were "I'm from Mongolia", Amina had never been to Mongolia before. However, going to Mongolia was one of her biggest dreams. Ever since she was a toddler, every time we went to the airport to pick up or drop off somebody she would always get sad that we are not going to Mongolia. So when we decided to go to Mongolia in the summer of 2006 she could not wait to get there. She was especially excited to go to the countryside and live in a tent for month and a half. Sean and I have not been to Mongolia for 6 years ourselves, and never been to Huvsgul, so we were not sure what to expect. Some people were concerned if it was the right decision to bring Amina to Renchinlhumbe but we were sure Amina would do fine. Nevertheless, we were starting to get worried when we arrived in Huvsgul to discover how cold and harsh the weather seemed. We weren't sure if Amina would be content without electricity and hot water and all the modern day amenities. Over the course of a really long and exceptionally bumpy ride (even by Mongolian standards) from Murun to Renchinlhumbe, Amina proved her toughness and did not even complain once. She was fascinated with the beautiful nature and the people right away. People, especially kids, were interested in Amina right away too. She adapted to life there much quicker than most and enjoyed learning to herd sheep and how you feed the newborn kids (baby goats). Having to walk 5 minutes to the bathroom was an adventure, not a chore. In truth, I could have been quite miserable myself at times if it hadn't been for Amina's always cheerful demeanor. Although she missed a month of school that spring, she learned an immeasurable amount about her heritage and culture that will always stay with her.

An Update from Baljaa

BioRegions translator, 2004 and 2005

I'm currently a senior student in Lindenwood University, Missouri, USA, majoring in International Relations & Political science heading toward to become a diplomat. (hehe, this is my long term plan). At this moment, I'm doing an internship that involved helping and participating in the U.S. election. I'm now in the Honor's Society in my school and maintaining 4.0 GPA. I would like to pursue my education until I get my Ph.D.

THE JOY OF SIGHT

By Joan Montagne, co-founder BioRegions International

Nomadic herders depend on their eyesight as well as their antique spotting scopes to find their herds and travel across the landscape. During the socialist government all people had access to eye exams and glasses. As the isolated Darhad Valley falls behind other places in Mongolia in access to quality inexpensive health care, eyeglasses are an increasing need. In the cities you can get an exam, glasses and frames for the equivalent of $5.00.

The BioRegions Program collected donations of classes from Bozeman eye doctors and opticians until we made contact 3 years ago with the Northwest Lions Club Eyeglass Recycling Center (www.lionsnwlerc.org) in Seattle. This group of volunteers collects, screens, and packages donated eyeglasses according to prescription. They also sponsor the work of optometrists and cataract clinics.

As most Darhad people only know their 1990 vintage prescription, BioRegions simply brings recycled reading glasses and hopes they will fill some of the need. Women can again see to sew, men can see to make furniture and equipment, and most importantly, all can see to read a newspaper, book, or letter. We have personally distributed over 1500 glasses in every imaginable situation. Clients test eyeglasses by determining if they improve their view of a printed page. They then get to choose frames from the larger supply, sign their name, age and glasses strength, and receive a handshake from a BioRegions Program member. Most leave with tears of gratitude in their eyes.

THE SIXTH SENSE

By B.Khaliun, Y.Ariunbolor, students majoring in Social Health at Health Sciences University of Mongolia

The first thing I felt here in Renchinlhumbe was beautiful nature and cordiality. My work started by making a list of disabled people, doing a survey about their needs, and meeting their family. One of them is Erdenebayr. He is 14 and deaf, which is why he can't talk too much. He has never been to school because here in Renchinlhumbe, there is no special teacher for children like him. When I first saw Erdenebayr, he was observing newspaper and listening to a tape recorder. His eyes told me that he wants to read and listen. He was born disabled, it is not his fault. His disability shouldn't disturb the main rights, like rights of studying, playing with other children and developing. There must be a chance to make a bright future and possibility to study like other children. Disabled people are handicapped and some are missing part of their organs. But their physical body can continue to live, develop, and grow. For example, Erdenebayr can't hear but his eyes can hear. Yes, eyes are for seeing, but if we try, eyes can hear and say too. His eyes see every simple movement and sight, so he understands some more emotions which usual people can't hear. This is called empathy. We couldn't see words, but I felt some of his wishes. This implies that everyone has an ability to hear what eyes are saying.

Let's hear by eye, see by ear. It will be the sixth sense of human that was searched for long and from far.

WATER QUALITY MONITORING AND EDUCATION IN RURAL MONGOLIA

By Loren Barber, Master's Student in Land Rehabilitation, M.S.U. and American Center for Mongolian Studies US-Mongolia Field Research Fellow, sponsored by BioRegions

Why Water?

With 300 lakes, about 80 rivers and streams and a massive amount of wetland area, the "Blue Valley" or the Darhad Valley's water plays a big part in the local people's livelihood. The people rely directly on surface water and have no way to purify it except for woodstoves. Therefore, water quality in the Darhad Valley is a concern of the community members, health professionals and the local government. I collected samples, performed thirteen water quality tests and gathered information through surveys on water from community members. In an interview with Dr. Purevsuren, director of the Renchinlhumbe hospital, the head doctor and chief surgeon, he informed us that the top three health concerns in the valley, related to poor water quality were: ***tooth decay, kidney disease and diarrhea in children.***

What and Where?

At the request of the Darhad residents, fifteen different sources were tested for nine and sometimes eleven different water-quality parameters. The main measurements were: *E.coli* and fecal coliform bacteria, arsenic, fluoride, nitrate/nitrite, phosphate, pH, temperature, total dissolved solids (electrical conductivity), alkalinity, dissolved oxygen and, biologically dissolved oxygen. Water sources in the area ranged from lakes, streams and rivers to medicinal springs through out the valley. The major river that flows through the valley is the Shishgid River. Everything drains into this river as it flows north, then turns west and joins up with the Tengis River and heads out of the Darhad Valley into Russia. It eventually turns into the Yenisei River and flows into the Arctic Ocean.

Medicinal Springs are an important part of the Darhad culture's traditional medicine. Three different springs were tested. At each site there are several different individual springs that represent different health conditions and are meant to alleviate that ailment if water from this spring is drunk. Mongolians come to the valley specifically for the multitude of medicinal springs.

Water Quality Issues:

According to the results, the water in the Darhad contains high amounts of fecal coliform bacteria, especially *E.coli*. The Mongolian people are nomadic herders that raise goats, sheep, horses, cows and yaks. These animals roam freely throughout the valley and in and out of the same water bodies in which the residents of the Darhad obtain their drinking water. These bacteria results along with the rest of the data collected were reported in table form on a large poster for the residents of the valley to view in bold font. One of the most important educational experiments performed was with different boiling times of the same sample of water taken from the main drinking water source for the people of Renchinlhumbe. This experiment indicated the importance of boiling water for a full eight minutes before consuming. The quantities determined are the number of bacteria in 4mL of the sample water. Here is an example of two petri dishes; the first is the amount of bacteria in the original sample, before boiling. The second is a bacteria growth from a sample collected as local people would normally prepare it, (barely boiled then placed into a thermos).

Educational Application:

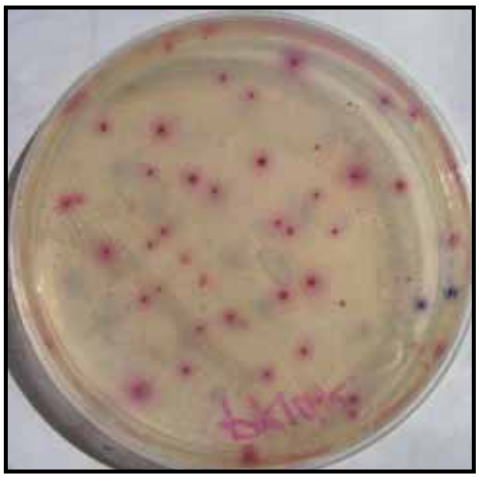
With all this information collected, a presentation was created for the Darhad Valley people with the help of translator, Tugsu Armstrong and a BioRegion's volunteer, Cleone Todgham. Educational posters were created, including the following:

- Bacteria pathway in drinking water
- An explanation of the test determining the amounts of bacteria in the water
- Effects of boiling times and thermos storage on bacteria
- Prevention education on use of fluoride toothpaste
- Table showing water quality data on all sources tested.

This educational material, was initially displayed outside of Renchinlhumbe's Cultural Center for the "People of the Blue Valley Awards," hosted by BioRegions International and attended by about 300 residents. Then we gave these portable, cloth posters to Dr. Purevsuren to display in the hospital and take with the mobile field hospital for his community educational presentations.

In addition to the educational posters, a slideshow presentation was also created. This presentation included all of the experimental methods that were completed, why they were performed, who had asked BioRegions for assistance, information on fecal bacteria and fluoride, information on garbage in water as well as how to treat the water to be drinkable, and many other things. Tugsu and I gave this presentation at the "People of the Blue Valley Awards" as well as the next night to about 30 people. A copy was also given to Dr. Purevsuren for his educational presentations. After I left the valley, Cleone gave the presentation to the local governor.

I hope that the monitoring and educational information presented to the people of the Darhad Valley will aid them in obtaining clean drinking water. Eventually, I would like to help BioRegions install a solar powered water treatment system for the Renchinlhumbe boarding school and hospital. A system like this is becoming more and more necessary as the population increases in the valley, however, for now this project supplies the necessary information in the first steps of obtaining healthy drinking water.



Sample tested before boiling

Sample brought to a boil then placed in a thermos

Loren Barber tests water samples while fascinated local children watch.

SOLAR POWER IN RENCHINLHUMBE

By Catherine Kirkland, engineering student, M.S.U.

In my capacity as BioRegion's solar power project coordinator, I made my first trip to the Darhad Valley in Summer 2006 with Cliff, Joan, and the BioRegions team. My primary goal was to investigate the proposal for new systems submitted to BioRegions by an Ulaan Baatar solar power company on behalf of the Renchinlhumbe community. I also hoped to identify people who could be candidates for further solar power training and the job of maintaining any new solar power, or *photovoltaic* (PV) system.

In Ulaan Baatar, I spoke with Zorig, the solar technician who conducted the November 2005 solar power training in Renchinlhumbe, which he described as very basic, and who was the author of the proposal submitted to BioRegions for new PV systems at the school and hospital. He told me he followed Renchinlhumbe's lead in designing the systems (i.e. determining the wattage required for each system) and was adamant that the citizens there need extensive training before any new system is installed. Following the training, Zorig evaluated and repaired the library and kitchen systems at the boarding school. Funding for the training in Renchinlhumbe came from a grant from the Bozeman Sunrise Rotary Club.

During the month I was in the Darhad, I spoke with as many people as I could about Renchinlhumbe's energy needs and how best to meet them. The school teachers and hospital staff were very encouraged to hear that BioRegions is applying its resources to the energy dilemma they face. Tuul, the assistant school director, told me that government curriculum requires computer education classes for secondary students. The school has 10-15 computers (some were in Moron being repaired) but no electricity to operate them. Teachers give their lectures about computers and how to operate them, as required, but the students get no chance to apply any of the lessons.

Several of the boarding school's computers.

Sharkhuu, who has collected weather data in Renchinlhumbe twice daily for 30 years, was pleased to hear that the town is moving toward solar power like the nomadic herders in the area who have relied on it as their electricity source for years. Bold, who operates the town's diesel generator during its winter operational months, expressed concern over the generator's expected demise. It is on its last legs and the town has no funds to replace it when it stops working.

The hospital's head doctor, Dr. Purevsuren, reported that last year the townspeople took up a collection to purchase a solar panel for the hospital. The panel charges a battery that can be connected to a clip lamp, loaded onto a cart, and wheeled around the hospital to where the light is most needed. Tsedendorj is a hospital employee who attended Zorig's training last November. He has since taken over the care of the hospital solar panel; after the training, he grounded the system and devised a new mounting structure so that the panel can be rotated to track the sun's path.

Tsedendorj with the hospital's rolling cart, solar charged battery, and clip lamp.

After several failed attempts at a face-to-face interview, I sent Baira, the Post-Telecom employee responsible for the post office solar array, a list of questions pertaining to the functioning of the largest solar array in Renchinlhumbe. The 1kW system has required no more maintenance than clearing snow and dust from the panels, but it cannot sustain peak use during the winter months. The system can run at full capacity for only 4 hours.

Aside from my interviews, I also examined electrical equipment already available and asked the hospital and school staffs what they would like to use the electricity for. Lights, computers and musical equipment took priority at the school, while lights and medical diagnostic equipment took precedence at the hospital. Dr. Purevsuren told me that the hospital has many pieces of equipment, like EKG and ultrasound machines, dating back to the socialist era in the 1980's when the Mongolian government operated a diesel power station in Renchinlhumbe. He maintains that he could acquire better and more modern equipment if the hospital had the power to operate it.

From the data I had collected up to that point, I began to make calculations of energy output requirements that any new PV system would have to attain in order to meet the expressed needs of the school and hospital. All indications were that the systems included in Zorig's proposal were insufficient to satisfy winter use. Up until

the last week of my time in the Darhad, I was unable to determine how Zorig had arrived at the wattages for each system. Zorig said he followed Renchinlhumbe's lead, while everyone I spoke to in Renchinlhumbe said he hadn't asked them what they wanted the power for, nor had he looked at any equipment to their knowledge. Mishig said he had provided Zorig with a map of the school grounds, but nothing beyond that. I was baffled.

I held out hope that Odkhuu would know the answer but I had a very difficult time tracking him down for an interview. Odkhuu was the school director at the time of the November training. I only had a few minutes to speak with him as he had to run to catch a ride back to his ger in the countryside where he has been living since his retirement from the school last winter. He said that almost 20 teachers and staff participated in the training and that Zorig conducted 2 separate trainings—one for the school and one for the townspeople. He told me that Zorig did not ask specifically what the power needs of the school were. Odkhuu said that he (Odkhuu) estimated the wattages of each system based on his knowledge of the size of a normal domestic unit. He simply made the wattage a lot bigger.

I returned home at the end of June with a lot of work to do. With the help of Conor Darby at Independent Power Systems in Bozeman, I synthesized my interview and technical data and developed a new design for solar power systems at the school and hospital with winter peak use in mind. The ideal systems included high capacity batteries and high efficiency inverters and charge controllers to maximize the power gleaned from the weak winter sun. The boarding school would have 3 discrete new systems—1kW for the kitchen and dormitory, 3kW for the classrooms, and 4kW for the computer lab. The hospital system would also be 4kW. The price tag was astronomical.

With the prospect of funding this ideal solar project very dim at best, we re-evaluated the project. Cliff and I discussed designing the system for 10 months instead of 12 to reduce the overall cost by eliminating some of the battery capacity. Other ideas included designing a smaller system with a compatible generator to charge the batteries during periods of little sunlight or simply using less expensive, less efficient components that are available in Ulaan Baatar or Moron. We also examined the possibility of expanding, rather than reducing, the system by thinking town-wide. More people would benefit and the town's reliance on diesel generators would reduce more significantly. Both of these factors might make the project more attractive to potential funders, especially if some of the other cost-cutting ideas were implemented as well.

A change of course this significant requires the input and assistance of the people of Renchinlhumbe. During the Summer 2007 work trip to Renchinlhumbe, BioRegions will present the community with the various alternative solutions we have devised and solicit their input and suggestions regarding which to pursue. BioRegions will continue to work with the community and other Mongolian partners to develop a comprehensive needs-assessment, design an appropriate and fiscally reasonable PV array, and establish a local community organization to oversee and administer the project.

A stall at UB's "Black Market" selling PV system components, alongside a booth selling traditional horsehair rope and Mongolian saddles.

Renchinlhumbe Weather at a Glance

- 285 days of sun per year
- Wind blows hard from the end of April until early June.
- From mid-June to September the only wind is before a storm.
- During the summer rainy season, it can stay cloudy and stormy for several days at a time. It used to be common to have 2-3 days of gentle rain; now the storms are more extreme—shorter and more violent.
- Between October 20 and March 10 there is very weak light from about 10 am to 5 pm at about 30 degrees above the horizon. There is virtually no wind during this time.
- From mid-December to mid-January there is 'ice fog' in the morning which generally dissipates by afternoon.
- Before 2000, the average hottest temperatures were 28-29 C (82-84 F), but recently the temperature has reached 30 C (86 F) almost every year.

JOIN OUR 2007 WORK TRIP TO NORTHERN MONGOLIA!

The valley in which the BioRegions Program works in Mongolia is geographically and culturally isolated from the rest of the country. This reality has both its plusses and minuses and is one of the reasons we continue to find work in the Darhad Valley so fascinating. The homogenization of the unique Mongolian culture has been slow to come to this place of poor access and political influence. During much of the time of the 70 years of Soviet socialist influence, the northern Mongolian border patrol station was actually 75 kilometers south in Ulaan Uul.

The spectacular setting of the Darhad Valley and its semi nomadic culture have attracted what is called "geotourism" (new word for ecotourism) and exposure to European, American and Asian tourists. Imagine what it is like to be highly literate thanks to 70 years of mandatory schooling, have ready access to TV news via a satellite dish and solar panel, see wealthy tourists pass through your valley and yet not have enough resources to do anything but herd your animals year after year in a brutal climate.

These are proud people with their own Mongolian dialect, customs and dress. When the kids and young adults flee to the big city it is often a real culture shock. Some are returning with families as opportunities arise like teaching school or making furniture, running a ger camp or herding with their families.

The BioRegions Program is working to help these people help themselves through our scientific and research projects as well as our community partnerships. We encourage people who are interested in what we are doing and who are willing to physically and mentally contribute to any of our projects to contact us.

Our 2007 Work Trip will leave Bozeman in mid May and return in July. Because of the time involved in accessing the Darhat Valley, a minimum of a two week commitment is requested. It can be any time during these two months and we can help arrange your transportation.

Costs will include a translator, cook, room and board and BioRegions Program Coordinator services. You are responsible for your transportation costs. In 2006, Korean Air from Bozeman to Ulaan Baatar averaged from $1800 - $2000. We will arrange a package price that will include Miat Airlines to Moron and the 12 hour van/taxi ride into the Darhad Valley.

You can either use your own backpacking tent or sleep in a ger (yurt) in our BioRegions Program "hasha" or fenced yard compound. We have a woodstove heated cabin for cooking and dining and computer use.

During the 2007 Work Trip we will be working in the following areas/ projects:

- Medicine and Health (Montana State University WWAMI Program)
- Traditional Medicine
- Solar Energy
- Salty Plant/ Mineral Research
- Soil and Sand Erosion/Grazing
- Art and Artisans Cultural Celebration
- Renchinlhumbe School Education

Consider joining us to experience Mongolian culture "up close and personal" while contributing to the BioRegions Program!

Contact:
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Post-telecom office in Renchinlhumbe and the largest PV array in town.

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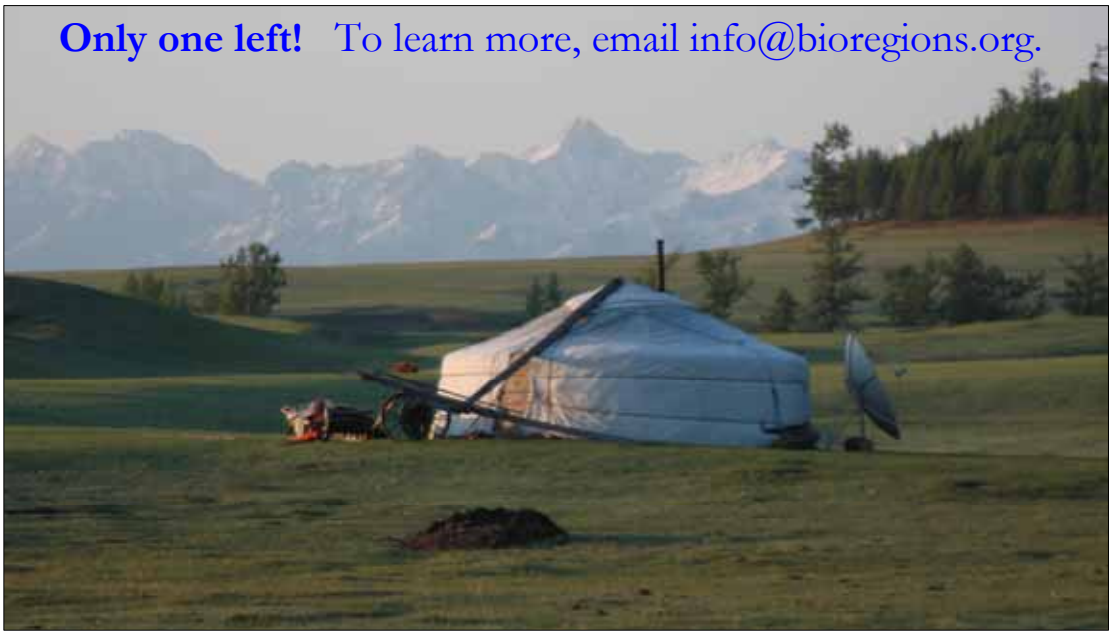

BioRegions International has imported 12 authentic Mongolian gers. These beautifully painted, five-walled felt tents measure ~21 feet across. Mongolian artisans hand-paint the poles, door, and center ring with traditional Mongolian designs.

Cost: $5,500

All proceeds support our projects in Mongolia.