

On February 24th, 2007, our ThinkQuest team had the privilege of interviewing Dr. Richard T. Wright, author of *Environmental Science*. We asked him a series of questions to gain a further our understanding of the topic.

Q1a: What is a sustainable community?

A sustainable community is a community that has the characteristics of a sustainable system. A sustainable system is a system where the capacity to continue on through time is maintained in that system without depleting its energy or materials it needs to go into that system. The basic concept of sustainability is that this can go on indefinitely through time.

Q1b: Could you give any examples of a community that could be sustainable?

Probably the best examples are from the natural world because there we know that these ecosystems, for example, have sustained themselves for eons. So we have, for example, a beach maple forest that sustains itself over time and though trees grow up, get old, die, fall over, there are young trees that replace them and the forest ecosystem continues on indefinitely. It's based on the fact that there's a source of energy – the sun – that is non-depletable, and the materials that go into the tree are provided basically by the soils and the decay of those tree leaves and other things that have been part of the tree in the past, so it continues on through time and does very well.

Q2: What areas of human activity need to become more sustainable?

I think the three that come to mind first are population, resources, and our use of technologies. If we think of population, for example: no animal, plant, even microbial population grows indefinitely. But we are faced with a human population that continues to grow. That simply cannot go on because sooner or later we're going to run out of stuff. And so, at some point the human society's going to have to reach an equilibrium. And that's an important one, since it involves many countries in the developing world where population growth is so rapid. Then if we think of the second, or resources, we can think for example of all of those ecosystems that we depend on for our livelihood, for our life support: natural ecosystems, managed ecosystems like the agricultural ecosystems that provide us with all of our food, and the natural ecosystems that provide us with a lot of our fiber and building products as well as some of our food. And also, these same systems perform a lot of services for us in that they clean the air, absorb pollutants, and provide flood control. They do a lot of things that are really essential to human societies. And the third one is technology. Technologies, especially that involve our use of energy – it's becoming more and more clear to everyone that we cannot continue to depend on fossil fuels into the future as our major source of energy, that we are going to have to make a transition to renewable sources of energy. Because, obviously, it's not sustainable to keep using fossil fuels: they're going to run out. A renewable energy source like solar or wind (a derivative of solar energy, hydropower, same thing), these will provide us with a sustainable energy system. It's these same energy systems [fossil fuels] that produce pollutants, and the renewable sources are essentially non-polluting. So we have not only

the ability to have a continuous source of energy, we also have a system which doesn't produce global warming; doesn't produce the air pollution that makes people sick.

Q3: How can transportation and housing become more sustainable?

Transportation currently is a really hard one since virtually all of our transportation depends on the use of fossil fuels – in particular, oil – oil is the fossil fuel that is probably to be the first to run out. In another thirty years it's going to become so expensive its going to be impossible to use it for something like driving our cars. But there are new systems in the wings, and one of them is the hydrogen car, it's a system that runs on fuel cells, and the fuel cells are fueled basically on hydrogen and combining hydrogen with oxygen to produce electricity. The only question is where you're going to get the hydrogen. Of course, the world is full of hydrogen, but virtually all of it is tied up in water, H²O. So you have to find some sustainable way to split hydrogen from water. This is something plants do very well, so if we can do very well. If we can figure out how the plants do what they do in photosynthesis, then somebody using the same enzymes or something, and use solar energy as another possibility for splitting hydrogen from oxygen, because it's an energy-demanding process. We can generate the hydrogen, and then you put it in a tank in the car, and the car runs perfectly well. So everybody agrees that this is probably the transportation energy source of the future. And it's already with us in some demonstration projects. There's some buses running around Vancouver for example, that have fuel cells that supply their energy. The other question was buildings. Here, a lot is being done to make buildings more efficient in their use of the energy that we do have to put into them to keep them warm and cool, but also to make use of the energy that's around them. There's energy coming from the sun, and there's energy deep in the earth, so we have geothermal energy in the form of heat-pump systems, and more houses now are using that. Of course, the way you cite a house and the windows you expose to the sun makes it possible for you to capture a lot of that solar energy even in the winter. Energy-tight houses are being built in a lot of places around the world.

Q4: Are there any cities today which are really sustainable?

No, there aren't any. There is a program that the UN has sponsored called the 'Sustainable Cities Program'. That program gives cities some of the resources that they need to at least move them in the direction of sustainability. That's really all that we can expect to accomplish right now. That is, if we can expect to get cities moving in a sustainable direction instead of status quo or worse which is happening around the world unfortunately in the opposite direction of sustainability. Then I think we will have achieved something for our generation and hopefully future generations can do even better in making things more and more sustainable. But no, there is no society right now which you could really call a sustainable society. Maybe way back in our past there were sustainable societies that lived in the jungles in settlements like the Indians did when we first came to the US. But not right now. It's not happening.

Q5: Are there any cities moving in the right direction?

Yeah, there are, in fact, and one of the best examples that I know of is the city of Chattanooga, Tennessee. Chattanooga used to have the reputation of being one of the worst and dirtiest cities around, and this was about four years ago or so. A group of citizens – some of them leaders, some of them just common citizens – got together and decided to start a process called visioning. And it's a very interesting concept, and what it means is people are able to say what they would like to see happening in their city. Thankfully a lot of the thinking was influenced by the concepts of sustainability – what would last, what would make this city more livable, because being more livable means being more sustainable, since you won't degenerate into an urban slum. So they got together in this visioning process and imagined what this city might be like, what they'd like to see happen. They had tons and tons of ideas that people threw out, thousands of them, and then they would get together and meet in small committees and figure out which of these were at least feasible, which ones could actually be done. They would agree on those and they went on to a lot of corporate interests and people with money and got some support for starting these projects. In time, the city of Chattanooga has become one of the most livable cities in the United States because of this process. They've done it again, they've called it revisioning, because you don't want to stop. If you're improving you don't want to say this is all we're going to want to improve. They've done revisioning and done the same process, and should certainly better fine-tune because they have a lot of experience going for them. So that's what you have to do, you have to involve leaders in the community but also people from all walks of life, and that was the good thing about this, they involved the people who would be most affected by the changes in the city.

Q6: What's the difference between "self-sustaining" and "sustainable"?

That's an important distinction, I think. The self-sustaining system is one that doesn't need resources from the outside to continue through time. With our modern societies that's not going to be possible. So, we can still apply the concept of sustainability to a city because we recognize that any city requires a broader area of land and resources to support it and as long as that broader area is itself sustainable then the city can become sustainable. The concept of the ecological footprint has been used to describe the relationship between a city and all of the area of the area on earth that is needed to support that city. For example: the area you need for agriculture and raising the food that the people in the city need or the area needed to produce the trees that are needed for the lumber that is used in the building city things. In that sense you can have a sustainable city as long as you recognize that the other areas, the other resources, the other ecosystems are themselves being maintained in a sustainable way. But to have a self-sustaining city... nice idea, but maybe not possible.

Q7: How did you become interested in the field of sustainability?

Sustainability is such an important concept to the whole field of environmental science. I've been working on creating environmental science textbooks since the early 1990s, and it occurred to me that sustainability could serve as part of what I call the 'strategic themes' that can hold the subjects of environmental science together. You can trace

sustainability through every subject that I include in that book. Sustainability is the concept that we should be aiming towards as we carve out our lives and as we carry out our plans towards the future. But then, the other two themes are also interesting: the idea of stewardship, which is the concept that has to do with how we should carry out sustainability, that is, to be caring for the earth and to be caring for each other, and then science, which provides us with the knowledge, the information base on which we can make our decisions about what is sustainable and how we can carry this out. So sustainability really is a fundamental concept. It is a very popular topic these days and certainly deserves to be thought of and planned for in the future.

Q8: What can we do to help?

I guess first of all I would say you need to learn. There's an awful lot to know in this whole arena of sustainability. The more you know, the fewer mistakes you yourself will make. Perhaps as you get to the point where you may be in an influential point in society, those mistakes won't be made either. So knowledge is very important, but the other thing is to act. I think even now everyone can recycle. Recycling is quite sustainable. The whole idea behind recycling is sustainability so that the resources that went into the manufacture of say cans and bottles can be reused to make those same cans and bottles again. And I would say you need to be thinking about "okay, what kind of transportation am I going to be using in the future? Can I look forward to buying a 400-horsepower SUV to drive around and impress the girls with or should I be driving a gas-electric hybrid like the Prius or something like that?"

Well, Dr. Wright, I'd like to thank you for your time and for coming here to answer our questions.

It's been a pleasure, Ben. I've enjoyed talking with you and explaining a little about what it means to have a sustainable system and what it means to be sustainable. There's a lot more to environment science, of course, but sustainability's one of the important principles.