

**Wes Jackson
The Land Institute
Narrator**

**Ron Kroese
Interviewer**

November 4, 2015

**Wes Jackson—WJ
Ron Kroese—RK**

RK: It's November 4, 2015. I've got the privilege today of interviewing Wes Jackson from The Land Institute. I think we'll get right into it. Wes, we've known each other for a long time, and I've been very much influenced by the books you've written and the speeches I've heard, several of the speeches. To get this going, I'd like to have you talk about your own background, going all the way to when you really first got interested in agriculture, in particular sustainable, and, ultimately, perennials. Give us some background on it.

WJ: Well, I won't begin by saying I was a planned child. I'm the last of six from parents that the father was 50 that year and my mother 42, and the last of six, born in 1936. So, I'm in my eightieth year. And it was on a farm in the Kansas River Valley, near Topeka. In fact, our address was North Topeka. It was a rather small farm, certainly by modern standards, a large farm from the point of view of the some 27 crops that were on that farm—a lot of diversity. Then I went off to college at Kansas Wesleyan, a Methodist college in Salina, Kansas. My highest aspiration there was to play football. I had a very misspent youth, so to speak. I suppose there's some Methodist in my madness, in that my middle name is Wesley, and my grandfather's name was Charles Wesley [Stover]. So there's some connection there to that tradition. After Kansas Wesleyan I majored in biology, got admitted to the botany department at the University of Kansas, was there two years, then went two years and taught high school, which was the hardest work I've ever done, and I was coaching football and track. Then I went to Kansas Wesleyan for two years to fill in for a prof that was going to be on leave. Then after two years there I went on and did a Ph.D. in genetics at North Carolina State in Raleigh College of Agriculture, the land grant institution, and was just interested in being a geneticist and still coaching football and track at Kansas Wesleyan. I went back there for four-and-a-half years, and while there I got tired of the coaching and got far more interested in the problems of the planet. It was in the '60s, and I had been in the South in the early-to-mid-'60s, and I went to hear Shelton of the Ku Klux Klan in the morning and Martin Luther King in the afternoon, and it was a moving experience for me. And then, of course, the Vietnam War was going on, and Dana and I had two children, living in Raleigh, and both concerned about the war, but then out at Kansas Wesleyan and continuing to be concerned about these issues and students were calling for relevance, and so I promised to weave in more relevance the next time around, and so I clipped and tore and Xeroxed and filed and put together what became an anthology, *Man and the Environment*. Only two things wrong with that—"man" and "environment." "And" and "the" are OK, I guess. And then a position came open at Cal State Sacramento to essentially start the environmental studies department, and somehow or another I got the job. I think the book had quite a bit to do with it. So I was there,

and then, just as I got tenure and full professor, I quit and started The Land Institute. Dana and I started The Land Institute in '76, June the 16th, the day after my fortieth birthday. In '77 I had read a General Accounting Office report on money that was spent for soil conservation by the Soil Conservation Service. The General Accounting Office report looked to me like soil erosion was as bad as it was when the Soil Conservation Service was formed in the mid-'30s, under the energetic and imaginative Hugh Hammond Bennett. And then I took my students on a field trip to the Konza Prairie, Lloyd Hulbert, good ecologist up there. The Konza wasn't really up and running yet, but it looked like it was going to happen. While there I saw here's the prairie with no soil erosion, and I'd just been reading about soil erosion. No fossil fuel input—and I was concerned about the problem of running out of fossil fuels, which was sort of misguided on my part, but everybody was thinking that at the time. Now we realize we've got too many. And no chemical contamination, no fossil fuels, no soil erosion, and all around me we could see that our crops were dependent upon the extractive economy. I went home and on the back of an old grocery sack, I think it was, I filled out the dichotomy involving four different characteristics. There were four contrasts: There's herbaceous as opposed to woody, perennial as opposed to annual, seed production versus vegetative of what humans eat, and polyculture versus monoculture. There were four of those categories that are irrational because there's no such thing as a woody annual. But of the twelve combinations, one was a blank. There were no herbaceous, perennial, seed-producing polycultures, and so that's what set me off, and I wrote this paper. I think I first called it "The Search for a Permanent Agriculture." I think that's what was published in *The Land Report*. And then the next I changed the title, and when I put it in the ... *Not Man Apart*, a Friends of the Earth publication, an environmental organization. And there I think I called it "The Search for a Sustainable Agriculture." And so that, then, became sort of mostly what we were about. I said this was going to take 50-to-100 years in that article, but there was very little support for this idea among my fellow scientists, at the time. We were also, Dana was primarily responsible for the garden and looking after interns in that way, and I was trying to get something going with the research, and so on, the inventory phase. And we went along like that for quite a ways, not gaining much traction, but keeping an idea alive and connecting with our fellow environmentalists that I have a great affection for, people that are clearly on our side. Land Stewardship Project, for instance, and Ron Kroese was one of those early friends. So was David Orr. It wasn't long after that David started the Meadow Creek Project in Fox, Arkansas, and we were friends of the folk at New Alchemy, and we had maybe a connection or two with the Fairlawns Institute out on the West Coast. And we were Kansas Natural Resource Council, KNRC, existed within the state, the Kansas Rural Center. You know there were allies and people that I count as our early spiritual allies on all of this, all of us recognizing the need for alternatives. You know, The Land Institute, then I think we called it "devoted to a search for sustainable alternatives in agriculture, energy, shelter, and waste management." I don't know why we didn't continue on to the mind of God or something. [Chuckles] We did a lot of things that were, I suppose, kind of squirrely, but we had wind machines and solar collectors and sun housing construction. A lot of stuff is embarrassing to me today, but we were casting around. That one central idea, though, I think is what has carried us the most and which we've now been able to have the resources to get behind in a more profound sort of way, and here we are now with the first perennial grain in the history of Homo sapiens, the first new significant new crop in 3,500 years. Cacao was the last, I guess, although my daughter Laura says that we had blueberries, I think, 650 years ago, but who cares about blueberries as being able to feed the world. We're wanting to solve the 10,000-year-old problem of agriculture, and 70 percent of our

calories come from grains, grown on about 70 percent of our acreage on a global basis. So anyway, to solve the 10,000-year-old problem of agriculture, we've got to address the fact that we're primarily grass seed eaters, secondarily legume seed eaters, and dependent upon oil seed crops in the whole inventory. So it's really three families—grass family, legume family, and mostly members of the compositae, although there are some other oil seed crops.

(12 minutes: 14 seconds))

RK: Would you touch a little bit on that central idea. I have an idea what it is, but in two or three sentences, what is that central idea?

WJ: Well, the central idea is that we want to use nature's ecosystem—in this case the prairie—as the standard, or measure, for an agriculture that would be perennial polycultures, but grains. In other words, we want those processes that we find in wild nature brought to the farm, and that we think we can do. And that is a big overturn of the underlying assumptions of agriculture for 10,000 years, because for 10,000 years nature has to be subdued, ignored, ground torn up, if the seeds are going to germinate, and to do that every year. And what that does, of course, is disturb the soil resource, and a lot of those processes that stand behind the fact, what Chris Field says—he's at Carnegie Institute of Washington in Stanford—that nature's ecosystems generally on a global basis—not all of them, but generally—have greater net primary production than the human-managed systems that follow. And so what this does is sort of re-set the dial, change the standard enough that mostly what we could say in a sentence is that we want to change the standard, and that requires the perennialization of the major crops and domesticating wild perennial candidates, and then grow them in mixtures that will bring those processes that have been with nature for millions of years to the farm.

RK: And you know I think the way a lot of this came clear to me was your book, *New Roots for Agriculture*, which I think was your first major book, wasn't it?

WJ: Yeah, about 1980.

RK: I learned a great deal from that, and that came of ... what I was so interested in that book, a lot of it was, indeed, about the roots of plants, these perennial plants, because there was, I think, a big consciousness-raising around the problems of erosion that were still endemic in American agriculture that was bad as the '30s, as you pointed out. So that became a very important book for me.

WJ: Yeah, well, that book needs to be redone now, and I haven't really made a change since, well, there was another edition, but not much of a change in that edition.

RK: I wanted to also touch on another book that gets at this issue that you were talking earlier about, your upbringing, the Wesley and the Wesleyan that came through and all of that. Another book that followed on that was the *Altars of Unhewn Stone*. I love that title; I understand it's comes from Exodus and the notion that in God's eyes if you actually touched and manipulated or tried to improve that stone altar it diminishes it. It gets at that idea of the hubris of human beings when in God's eyes an unhewn stone is the perfect.

WJ: Well, my interpretation of that scripture—and we’re all given to our own exegesis on these things—but my idea is we’re to be more mindful of the original materials of nature on Planet Earth than we are of the artist or the scientist. That is, you know, this came right after Moses had delivered the law, and that Yahweh, or whatever he was called, said, “Make me an altar of unhewn stone and put not a tool to it, lest thou pollute it.” So it was, I think, in the early stages in the making of a people, so to speak. Let’s get it straight what we’re about. That coming out of Egypt, coming out of the Pharaohs, where there are man ... there was a human God presence in that mind. And then here they are, the time in the desert, and having been led there, so to speak by Moses. I mean, I don’t know, there are some scholars say that Moses never existed, that Moses, I guess you would say, is a kind of a Paul Bunyan sort of a guy that was an embodiment of movement, because anthropologists say that movement was going on not just 40 years, but had been strung out. But whatever, the important thing is there’s an attempt at codification, of the making of a covenant. Aldo Leopold said, “Nothing so important as an ethic is ever written, rather it evolves in the mind of a thinking community, and only the most naïve student of history actually believes that Moses wrote the Decalogue.” Leopold said that what he did is summarize an already existing ethic for a seminar.

RK: I think for me, at the same time that you were writing this, there was also a growing awareness within the established churches that there was something going on here that needed to be dealt with from that ethical standpoint, and they came at it from a religious view.

WJ: Right.

RK: And for me that book had an effect of bringing something of the sacredness of nature into agriculture...

WJ: We keep sort of rewriting as our understanding evolves, and what is interesting to me is how much of the old architecture is able to stay in place, the architecture of our thinking. We may be evolutionary biologists and don’t believe the Adam and Eve story of the creation, but if one looks at the richness of that mythology in there. I was talking to Wendell Berry here—we talk frequently—but we were talking about the Big Bang and the formation of the universe, and Wendell says—well, it ain’t going to compete with Genesis, you know. I mean, Genesis is a far-richer story than that. [Chuckles]

(19:35)

RK: You touched on something I was just going to ask you. It would be nice to hear—Wendell Berry had quite an influence on you, didn’t he?

WJ: Oh, yeah. Wendell is my primary guru. I wrote in an acknowledgement section of my book, *Consulting the Genius of the Place*, I began by ... was actually quoting my brother Elmer, who is dead now; he died at 94 a year or two ago. He, in a state of exasperation said—you’re always quoting somebody else—don’t you have a mind of your own? The fact of the matter is I don’t, and I think of how much of that mind that I have is the consequence of the interaction with

Wendell and so many other people, and thinking about it hard. In that acknowledgement, nobody has their own mind.

RK: That's right, and you and Wendell moved it along, since a lot of the work that we're looking at with this project, involving the National Sustainable Ag Coalition and public laws and policy in general, you and Wendell were the main people, I think, that I'd heard about who had come up with an attempt about, what? eight years ago or so now, for proposing a 50-year farm bill, and to get people thinking out further than just the next four- or five-year cycle.

JK: Right. Well, Bob Kerrey, the former governor of Nebraska and senator from Nebraska, he was the president of New School in New York City, and my friend and colleague and board member, Strachan Donnelley, had a meeting there and I saw Bob again. I'd seen him years before, and he was trying to get me involved in the five-year farm bill. And I said—look, I don't care about those five-year farm bills. The commodities people, we got plenty of folks that are working on them—you know, Ferd and you and others. I said—we need a 50-year farm bill. He says—well, let's do both. Well, I went to work on my part of the bargain, and called together several people in Washington, DC, and we had a meeting at Nora's, upstairs, Nora's famous restaurant, and we began to draft a farm bill, 50-year farm bill. Most of the heavy lifting of it, though, was done after we got away from there. So we did it, and we took it to Washington, and we didn't see the secretary, Kathleen Merrigan. We were supposed to see her—we did see her, but she was entertaining somebody else, some Whole Foods guy or something, and so we kept getting escalated downward. But, let's see, was that when Wendell and I and Fred Kirschenmann went to the White House and to the White House garden and so on? Anyway, it didn't work. However, it did teach me one thing: Get it out there. I actually put it in my book, *Consulting the Genius of the Place*. And a lot of people have seen that, and it has increased the imagination. And now I am hearing a lot of people talk about 50 years and 50-year time frames, 50-year farm bill. I think if there's anything The Land Institute has done, is change the time perspective in people, because when I said 50-to-100 years for a perennial polyculture to manifest itself, and in fact that we're a little bit ahead of schedule right now, that this has been an important phase change in people's thinking. So it hasn't failed in the absolute sense.

RK: No, I remember that. I thought that was the biggest thing that brought to the debate was the need for longer-term thinking. It's not the immediacy of the farm crisis or what particular issue was on the hot plate.

WJ: Well, I think there's a little more something to be said. For instance, "The Buffalo Commons," by the couple from New Jersey, the Poppers. That increased the imagination. There are a lot of bison being grown out there on the Great Plains now. I am sure that it didn't take the form, because you'd have to take all the fences down, and everybody move, [Chuckles] but nevertheless, there are these kind of things that let's get the ideas out there and let them vibrate within the culture.

RK: Well, I want to move, before we close, to what policies are needed to bring about this future that you'd like to see. But I did want to touch on one other subject, and that's around the issue of ... I can remember, if I'm right, that you talked about, in one of your talks—at least this is what I took from it—about how you were sorely tempted, as it were, to think about gene splicing and

that sort of thing, to make some shortcuts to make that 50-to-100-year vision come true faster, but you decided basically not to. But at the same time, one of the good things I think has happened is that the Institute has benefitted from some of the technologies or techniques that have come with the computing power and everything. I'd like you talk a bit about that.

WJ: Yeah, I was aware—and partly as a result of the thinking of Stan Cox—that perennialism is a way of life. That there's no gene for the perennial. There are some that have worked on the idea that with wheat that we'll find a gene. I think that we have to acknowledge that things are interacting across the whole genome—all genes interact is the way to say it. But what happens when you're taking a gene, or, say, resistance to Roundup? You will get your reward. You may not have your reward for very long. What I'm far more concerned, however, about that company in Saint Louis than I am in a toxic effects of the DNA itself. I am concerned about the fact that you're spreading Atrazine, or you're spreading Roundup, glyphosphate, all over the landscape. That's the bad part, is what it allows. And so it's once again a part of that sort of reductive thinking, that has its origins at least since 1600, that I oppose. So I got talked into giving a talk at Monsanto, and we were sitting around with vice presidents all over the place, and I said that I did not see moving genes over long evolutionary distances, that I was big on context dependency, you know. But I sort of had to change my mind a little bit on that, because genes are moving around apparently—at least I've heard—I've never checked up on this, but the gene for hemoglobin is in the soybean plant, and probably carried there by viruses. Viruses are able to snip DNA and carry it around. However, one thing I want to do is be faithful to the movement, and I think that there are some serious problems coming from the gene-splicing approach. Now, we have been big beneficiaries of gene sequencing. I mean, we're probably—well, probably?—we are, we've got the money set aside to sequence Kernza, intermediate wheatgrass or thinopyrum intermedium, whichever is ... our trademark is Kernza, after kernel, Konza, Kansas, and ends in ... anything with a Z in it is memorable. That's going to be about a half million dollars, and the value will be huge in terms of the breeding. Because there's a lot of breeding yet to be done, even though it's now being grown by farmers and being sold. That will be an important ... and it's not the half a billion dollars, you know, it's more like \$500,000. And it may be even less, and it won't be done by any one lab. We won't do it. But I'm amazed at the sophisticated work with molecular genetics that our guys are doing. I mean, we've got this very nice laboratory now, research building, and Shuwen Wang and Lee DeHaan and those guys—they're back there messing around with DNA and learning things. We're looking at molecular markers to speed up the breeding. But as far as being gene jockeys, we're not. And so that's what saves us. We're still slugging it out. Our guys are still slugging it out. And I have to say that those ... I finished in '66, actually got the degree in '67 in genetics. You know, fancied myself as pretty well up to speed. But my golly—what these young guys know and what they're able to do is just—it's phenomenal. And how, relatively speaking, inexpensive it is to do things. Just going out into the field tied into the satellite, and put it by a plant and be within two centimeters and take the data on that plant with bar codes and it goes immediately to the computers in our research building. My golly, that's not The Land Institute of 1978 or '80. But having young, smart, mission-oriented scientists—and that's the key. And they came in at a time in which they could have got more money somewhere else. They are mission oriented. And, in fact, I told the board, I said—they were talking about how much money they were going to have to pay my successor. I said—well, maybe you ought to do with him like was done with these scientists—make them come through that screen of low income. I don't think they'll do it, but anyway these

people are dedicated, they're collegial, and one of the things I insisted on in the design is their offices are around the periphery, the coffee pot's in the middle, and they can go from one to the other in a rather small group, and that's one thing I hope to do is keep a small organization so that they remain collegial, mission oriented, and we're not hiring hired guns.

(32:14)

RK: This is what stuck in my mind, and I remember when I heard you talking about this though, underneath this is the idea is, as I understand it, trying to avoid the hubris of having the audacity to try to actually make things meld together that haven't been proven out and filtered through evolutionary processes.

WJ: Yeah, right.

RK: Isn't that still underneath this all?

WJ: Oh, yeah. I think that the ... well, here's the wonderful thing about the fact that three of our guys, and they have published in papers, have answered why our ancestors did not develop perennial grains and why we can now. And it comes around to the fact that annuals will self-accept their own pollen, the tightest form of inbreeding. If a mutant arises, it gets immediately eliminated. If there is a desirable trait, like shatter resistance, it gets quickly fixed. Perennials tend to out-cross, and therefore you take all the offspring of a mother plant, they're half-sibs. You try to start crossing those half-sibs and you're going to have a whole bunch of aborted embryos. We now know how to clean out, to get rid of, purge that genetic load, what we call mutational load. It's published in two important journals, both refereed journals. And they know how to do that. We can grow out thousands of plants now, and with our modern computational power we can deal with it. The fact that we know how to do that, and then now we've gone to the Missouri Botanical Garden in Saint Louis University, and we've got a deal with them—it's a half-a-million dollar project to be spread over three years—and do an inventory, all the way from the tropics to the temperate zone any plant that's herbaceous, perennial, in the grass family, legume family, sunflower family, and a few others—hard-seeded plants, without fleshy ... in other words, not apples or whatever. What that is allowing us to do—and finally I get to what interested you—what that allows us to do is to bring ecology and evolutionary biology, knowledge that's been accumulating for 150 years on the shelf, to agriculture. You know, agroecology is really kind of pipsqueak ecology. I mean, it's mostly doing things that we've known since the Romans or the Greeks. So we can now, in our time, begin to get the true merger of ecology and agriculture because those perennials are going to be there. The soil microbes, the soil invertebrates, those crumb structure developing, so that we get those efficiencies that are inherent within the natural integrities of the system, as Wendell put it many years ago. So that is using nature as a standard or measure versus the way we've been operating for 10,000 years or so. That is big, and I think that has implications all the way from saving wild biodiversity to ... and that dualism of there's humans and then there's nature. There's agriculture and then there's nature. And even the Millennium Ecosystem Assessment Report came out saying that in order to save the wild biodiversity we have to intensify where agriculture already is. In other words, that's treating that as—go ahead and screw that up some more with chemicals or whatever in order to save the wild. Well, so they were essentially saying it's either conservation or it's

production. Well, that era's got to end. We say that the system that we've been working on is conservation as a consequence of production. And that's a big new thing. That's a big new thing. But wilderness, then, we know has answers to questions we've not yet learned to ask. And wilderness stays as our standard, so there's more of a reason for keeping it as though—ain't it nice to hike through? It has the practicality associated with how we're going to live here in a sunshine future.

RK: And to pick up on the last thing I want to touch on. In order to achieve this sunshine future, one of the things that this project's looking at is what sort of policies, particularly federal policies, do you think are needed to stimulate that? Get the right research or whatever—what would you do to try to ... and quite practically, what could NSAC and Ferd Hoefner, and all these good folks who are working with him, put on the table to try to advance this sunshine future?

WJ: I think that one thing, first of all, put on the table the successes that are already underway, that tell what's happened with Kernza, tell what's happening with silphium. Tell that we now know why our ancestors did not develop perennial grains, and that this physiological trade-off idea which originated with the hatch and the clutch size in birds—that idea is not relevant for what we're talking about here. Got to forget that. It's too bad that got brought over from clutch size in birds to plants in the first place, that physiological trade-off. And so here is sort of a new way of thinking about the potential. All right, that is a given now. And given that we have lots of Ph.D.s now—in Estes Park a year ago, in October of '14, we had 50-some mostly young scientists from all over the world, a lot of different countries, assembled at Estes Park and we were there for almost a week, and man, those folks also are going to have students. Now let's have some funding for let's say people that will domesticate this wild species and domesticate that one, as a result of this inventory. That's one thing. Let's get cracking on that. This is far more exciting than whether we've found another planet that's about like Earth, that's maybe got a moon or two. I mean, these exo-planets that they keep finding out there. You got a few hundred of them, now we've kind of got the idea there's a lot of them, so why do we need to keep doing that? And look at the billions of dollars going into that. So it's a matter of if we could ever get a grip that we now know what's going to be necessary to live here without disrupting this ecosphere's processes. And then, our universities, we've got to start teaching ecospheric studies kind of as a substitute for environmental studies. I think environment is kind of a bad word. *Man and the Environment* was my first book. As I say, there are two things wrong with that title. Ecospheric studies is looking at the ecosphere as having ecosystems embedded within. If we can get students out there that appreciate that important distinction and why it's necessary to drop the term biosphere and adopt the term ecosphere, and we have got to get this ecosphere of ours in shape that will sustain us. It begins with saving soil, stopping the greenhouse gasses from going into the atmosphere and putting chemicals into our agricultural land. If we can ... we will have plenty of congressmen and senators that will want to get behind that if we have a constituency that will say—we want this. That's what it takes. I mean, today I was talking to at least one—I don't know if he was a senator or a congressman, but he was wanting to know what he could do. He says—what you had to say seems very difficult—how do I do it? And I said—when you're talking casually to others—not on the floor—when you're talking casually to others acknowledge that there are things that we can do that will make big differences.

RK: Well, I think that really gets at it. These are the points I really wanted to cover. So I think we have a good interview here.

WJ: All right.

RK: I appreciate that, Wes. Thank you very much.

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