

Rancho de la Inmaculada –

Prospering in the Desert

I love to get off the beaten track. That's not hard to do in old Mexico. Last March of 2002, Daniela and I, along with our friends Bryron and Shelly Shelton, headed south of the border for an off-the-beaten-track adventure. The goal: to find our way onto the remote and rugged ranches of some of northern Mexico's most successful practitioners of Holistic Management. This story, plus *Islands of Abundance*, highlight the lessons and insights gained from our journey.

Within a few hours of crossing the border, we found ourselves pulling into the tiny town of Pitiquito, in northern Sonora. We were on our way to Rancho de La Inmaculada, the home of Ivan and Martha Aguirre and their children Dacia, Ivan Jr., Aurelio, and Marco. Ivan had instructed us to ask anyone in Pitiquito for directions to the home of his uncle Hector, who would then join our expedition and lead us out into the middle of the Sonora Desert, delivering us to the doorstep of the La Inmaculada headquarters. After a few inquiries we found Hector, had lunch, inspected our vehicles to make sure they were up to the trip, and were on our way.

The road from Pitiquito to La Inmaculada only covers about 60 miles (100 km), but they are 60 of the longest and roughest miles any of us had ever tried to negotiate. Rocks, gullies, washboards, and ruts gave way to the occasional 50 meter (yard), much appreciated smooth stretch. Our only mishap was a dented flywheel housing, made apparent by a sudden, awfully dang loud clickitty clack. Luckily, Byron has a self-sufficient streak of ingenuity, and he took it off, banged out the dent, and away we went. The first two forks in the road were signposted, but after that you had to know where you were going. Good thing Hector was along.

We drove mile after mile through cactus, cactus, and more cactus, mixed in with all sorts of desert brush and millions of acres of bare, desert pavement. With just a couple exceptions, there wasn't a perennial grass plant in sight. After what seemed like an eternity, Hector assured us we were getting close. Still no grass.

This isn't the first article about La Inmaculada. I've read at least two others, and the photos I'd seen, which depicted a grass-covered landscape, didn't look anything like what we had been driving through. It was hard to imagine this was the same planet. We rounded the last bend, a fenceline came into view, and all of sudden there it was—grass-covered desert. How did that happen? Much of this story will cover those details, but first a little history.

From Industrial Horsepower to Horse Horsepower

Ivan comes from a successful business family. Ivan's father once owned the longest laying-hen house in the world—1.1 km long, to be exact—near the city of Hermosillo, about a four-hour drive south of the ranch. When the first oil crisis of the mid-'70s shot grain prices through the roof, the senior Aguirre decided he needed to diversify his assets beyond the egg business, and in 1974 he acquired Rancho de la Inmaculada. Originally part of a gigantic 150,000 ha (320,000 acre) estancia, the ranch now comprises 10,000 ha (25,000 acres).

Ivan's father was a great visionary, and was determined to create the model ranch according to the dominant industrialized culture of his time. He started by clearing the entire ranch of every single brush and cactus plant. These were all bulldozed into hundreds of windrows, forming a distinctly man-made grid across a previously diverse and chaotic landscape. The brush windrows were mixed with soil to create water diversion dikes, the intention being to

trap water on the ranch that would otherwise escape down the ranch's main channel, formed by the Rio (River) de la Inmaculada. As a result of all the dirt work, the rio's original meandering channel was obliterated. Some 2500 acres (1000 ha) were sown to buffel grass, an exotic, high producing, subtropical native of South Africa. Ten irrigation pumps were developed, delivering water to 12 center pivot irrigation systems. Feedlots were built, underground grain storage pits were excavated, and 10,000 liters (about 2,500 gallons) of diesel were consumed daily to keep everything running—all this in the middle of the Sonora Desert, way, way, way off the beaten track. It was hard to imagine.

The Aguirres followed this intensive industrialized model from 1975 until 1983. In the middle of it all, Ivan's father unexpectedly passed away in 1980. At the time, Ivan was in the middle of his collegiate years at Texas Tech University, preparing himself to return home and manage the whole show. Ivan and his brother took a semester off and returned to the ranch in the fall of 1980, only to realize that their father's dream was hemorrhaging money and sinking fast. Along with their mother, they made the decision to lease out the ranch and let someone else take the financial hit. After graduating from Texas Tech in 1982, Ivan worked as a nature guide in the Sea of Cortez' Kino Bay before coming home and taking over in July of 1983.

With one horse and one hired man (his mentor and teacher Don Jesus), Ivan started custom grazing 300 mother cows. He was paid with livestock instead of cash, and by the late 80s had accumulated 350 of his own cattle and had paid off the ranch's debt through the sale of all the abandoned idle pumps, center pivots, and diesel engines. He was also taking in 2,000 to 3,000 stocker cattle on a seasonal basis, and things were going well.

Holistic Highs and Lows

A big turnaround came in 1985, when Ivan heard Kirk Gadzia give a presentation on Holistic Management at a Mexican agricultural conference. Kirk talked about the beneficial effects of time-controlled, well-planned grazing and animal impact, and about how ranchers in this sort of desert country were actually increasing their stocking rates while also improving the ecological health of their land. Ivan returned home that night to Martha, and with tears in his eyes, exclaimed that "we have found someone who can show us how to do what we've been dreaming of." Since hearing Kirk's talk, both Ivan and Martha have attended numerous Holistic Management courses. They've even had Allan Savory conduct a special course right out on the ranch itself. Ivan's dedication to the study and practice of Holistic Management eventually led to his accreditation as a Holistic Management® Certified Educator.

Like all of us, the Aguirre's holistic journey has been filled with both lows and highs and lots of learning. In 1990, when Mexican interest rates plunged to between 10 and 12 percent, the Aguirres dove in and bought 750 heifers. Ivan laughs at that purchase today, calling them a "tuity fruity" blend of about every imaginable type of bovine. By the end of 1992, they had accumulated 1800 head of their own (but highly leveraged) cattle. Their year-long average stocking rate worked out to 4 ha (10 acres) per stock unit, which is nearly unheard of in this sort of country. The land was improving, the ranch was profitable, they were living their dream. Then came the inevitable crunch. By 1994, interest rates had skyrocketed and the rainy seasons started to become less rainy. Suddenly they were faced with insufficient grass to feed 1800 cows and an interest payment the cows couldn't make. According to Ivan, "they weren't doing their homework." Things had been so good that an attitude of invincibility had crept into their routine. Daily monitoring wasn't happening, let alone long term careful planning. Dormant season forage assessments went out the window, and by 1996, well into the extended drought that affected all

of the Southwest and northern Mexico, the Aguirres were out of grass. For the first time since taking over the ranch, Ivan had to buy in outside feed.

Cattle were sold to pay off debt, and their stocking rate decreased 50 percent to 8 ha per stock unit from 1994 to 1996, and then down to 9 ha from 1996 to 1999. Ivan calls the mid-'90s "a down time for the ranch," emotionally and otherwise. Their biological monitoring transects didn't get done in 1994. Things were so frustrating that it just didn't seem worth the effort. But sometimes it takes a crisis to shake us back into reality. The Sonora Desert is an erratic place weather-wise, and Mexico is an economically unpredictable country. That is reality. Over-extending both ecologically and economically will eventually come back to bite. It seems like most of us have to learn this the hard way, like the Aguirres.

Not all of us buckle down and survive, though. Ivan and Martha, instead of giving up and moving on to less demanding pursuits, analyzed their situation, revised their holistic goal, and got back on track. By 2000 they were debt free and working within the ecological realities of their arid environment. According to Ivan, it wasn't until then that they and their staff finally began to internalize the decision making framework of Holistic Management, and things really began to click.

Growing Grass in the Desert

At 2500 feet (820 meters) of elevation, the patch of desert embracing La Inmaculada is blessed with an average of 13 inches (330 mm) of annual precipitation. Since Ivan has been back on the ranch, annual totals have ranged from 6 to 25 inches. About 50 percent comes during the summer monsoons in July and August, their main growing season. Because there is an almost total absence of cool-season grasses, winter rains do them little good in terms of grass growth, but they do add to the bank of soil moisture critical to brush green-up in the spring. Even though every brush and cactus plant had been bulldozed in the '70s, much of it has fortunately returned. Today it's regarded as a fantastic resource rather than a worthless pest. The main brush species include two types of paloverde, ironwood, and mesquite, all of which are legumes. With the exception of extreme drought years, they all flower and leaf out in spring, several months ahead of the summer monsoon season, providing valuable forage during the time of year that the grass is at its worst.

Much of the South African buffel grass planted by Ivan's father still persists. In fact, it has spread from the original 2,500 planted acres and can now be found across much of the ranch. But everywhere, it coexists with a fantastic diversity of native warm season perennial and annual grasses and forbs. Many of the grasses are high quality members of the grama genus, *Bouteloa*, with the most abundant species being *Bouteloa aristidoides*, known as needle grama north of the border.

The ranch has been gradually developed into 78 paddocks, with an average size of 320 acres (128 ha) per paddock. To create higher stock density, cattle are day herded within the existing fence infrastructure. Ivan says this is all the fence he will ever build, and ideally would like to have no fenced paddocks. He is excited about doing a lot more herding, and envisions a return of the herding culture that once dominated ranch life in Sonora. One of his workers is from the goat herding culture that still persists on the nearby coast of the Sea of Cortez, and Ivan would like to let his family and their goats graze the ranch in exchange for their herding knowledge. Ivan simply states that "we need to learn to herd."

The return of all the perennial grasses, and the spread of the buffel grass, has primarily resulted from careful holistic grazing planning. During the summer growing season, Ivan plans

to graze each pasture only once, but the plan never works out as expected (as Allan Savory often states, that is precisely why we need to plan!). The erratic nature of summer thunderstorms creates very uneven growing conditions across the ranch. His basic rule of thumb during this time of the year is to “go where it’s good,” but to make sure grazing periods stay short enough to minimize second bites on recovering regrowth. Because warm season grasses can grow so fast when moisture is present, this often means grazing periods of a day or two. Such short grazing periods usually mean that very little forage gets harvested during the growing season. In other words, the cattle are never in one place long enough to make much of a dent in the new season’s growth. So even though the cattle are taken to where the best grass is, most of it escapes grazing during the fast growth months of July and August and is saved for the long months of the dormant season.

Ivan also varies his grazing management based on the inherent productive capacity of each paddock. Some paddocks are predominantly in low-lying areas that receive the benefit of spreading flood waters during heavy precipitation events. These areas are several times more productive than the higher country above the floodplain. Through experience, Ivan has learned that these low-lying areas have to be grazed at least once during the growing season. Otherwise they become too rank and provide very low quality forage during the dormant season. During dormant season grazing, he plans two selections on these high production paddocks, claiming that the cattle perform better with two shorter grazing periods than one long grazing period.

On the higher areas, he plans to use them fairly intensively for two to three years, grazing once during the growing season (assuming adequate moisture), and once during the dormant season. Because the grasses are less lignified and higher in quality in these areas, one long dormant season grazing doesn’t stress the animals. After these two or three years of use, Ivan plans to take them out of the grazing plan for at least an entire year, and thinks that recovery periods of up to three years may even be necessary on the driest, least productive sites. This will enable plants to develop deep root systems and excellent vigor, and will allow older material to accumulate which will eventually add to the soil-covering litter bank.

Ivan emphasizes that his overriding, number one grazing management rule is to stay flexible. We can never know what nature is going to throw at us. Careful daily monitoring and constant adjusting are therefore vital to successful management of plants, animals, and the soil surface. Monitoring and adjusting, and occasional replanning, are just as important as doing the plan in the first place. Back in the mid-’90s, the Aguirres learned that lesson the hard way—a lesson that will last a lifetime. Has all this careful management paid off on the ground? Well, since the Aguirres began running biological monitoring transects in 1991, total litter has increased from 23 to 63 percent and the distance to the nearest perennial has dropped from 66 cm (26 inches) to 32.5 cm (12.8 inches). I’d say they’re doing something right.

Desert-Bred Beef

The La Inmaculada bovines are currently split into three herds. This isn’t ideal, admits Ivan, but it’s temporarily necessary. One herd is ideal, since it allows a much more effective graze/trample to recovery ratio than several separate herds. But the last few years have brought reasonable precipitation and grass growth, which has left them with more forage than cows. To strengthen this product conversion weak link, Ivan is custom grazing two herds of outside cattle, the owners of which don’t want to mix bulls—the reason for three herds this year. One herd will be gone later this year, while the other is contracted for six years. Ivan gets 50 percent of the calf

crop as payment. With the outside cattle, the stocking rate has been bumped back up to 7 to 8 ha (17 to 19.5 acres) per stock unit.

His own herd, which started out as that 750-head mixed up bunch of tuity fruity cull heifers, has been bred to Beefmaster bulls for the past six years, so they're starting to even out a little. Culling is based mostly on fertility. Though managed as a single herd for grazing management purposes, Ivan manages the La Inmaculada brand cows as two herds from a reproductive and culling standpoint—the A herd and B herd. The A herd is bred to calve in spring, with the bulk of the calves coming in May.

There's a good reason for that. Remember all that brush that flowers and puts out tender new leaves in the spring? Well that's prime feed for lactating cows. The calves can't get at it too well, but they don't need much high quality nutrition from the land for the first couple months. By the time the monsoon rains start in July and the grass comes on, the calves are big enough to start popping on that new growth. Ivan's neighbor has been gathering weaning weight data for years. May-born calves are historically always the heaviest at weaning, and breed back percentages are the best as well.

All the yearling heifers are initially bred in August to October (at 14-16 months) to calve during the spring calving season. Those that conceive stay in the A herd, and the rest go to the B herd. If they miss again, they're out. If a mature cow from the A herd misses, she goes to the B herd as well, and stays there as long as she keeps having a calf. All these A herd cattle that miss during their late summer breeding season are put back to the bull as soon as winter wears off during the following spring, and they're now considered to be B herd cows. They calve from December to March. About 60 percent are A cows and the rest are Bs. Including yearlings and two-year-old first-calf heifers, the A herd conception rate has averaged 76 percent over the years, and those cows milk all the way through the winter till weaning in April, with no outside supplement but a little sea salt. That's awfully good for a Sonora Desert ranch carrying such a high stocking rate. The herd only gets one 3-way vaccination a year. The occasional sick animal gets put in the sick pasture. If she starts to get better, she goes back with her mates. If she starts to look worse, she gets sent down the road before she falls over.

Mesquite Miracles

That's the scoop on the cows and the grass, but there's more to this story. The Aguirres are mesquite farmers, too. Starting in 1985 and continuing through 1997, La Inmaculada was a mesquite charcoal-producing machine. Remember all those windrows of piled up brush and cactus from the brush clearing days? Well the mesquite trees were snagged out and turned into barbecue fuel. Some 8,000 tons of it were shipped off the ranch over the course of those 13 years. The charcoal paid for all the fencing and stockwater developments. Now that the Aguirres have pretty well muscled their way through all the dead mesquite, and now that lots of new mesquite has grown back, their focus has shifted to figuring out how to transform this renewable resource into value-added products.

For those of you not from the American Southwest or northern Mexico, the mesquite is a leguminous tree or bush that produces copious quantities of seed pods in late spring/early summer, especially if it's been a wet year. A bumper "bean crop" in the southwestern deserts refers to mesquite beans, not soybeans. In more productive areas of the Southwest, such as the Edward's Plateau of Texas, the mesquite is generally maligned as a grass-killing, moisture robbing noxious weed. But in the drier parts of the Southwest, most ranchers are tolerant of their mesquite plants due to this abundant production of high protein, high energy pods, only they

don't call them pods, they call 'em beans. They are a fantastic source of desperately needed nutrients at a time of year usually characterized by a nearly depleted bank of quality forage. The Aguirres value their beans as cattle fodder, but are also tapping into other economic uses for this abundant legume, one of which is the production of mesquite flour.

From the first of July until the first big summer storms, outside labor is contracted to harvest the ripening mesquite beans on Rancho de la Inmaculada. The Aguirres have about a three-week window to get the job done, and the beans aren't harvested where the cattle happen to be, or where the cattle are planned to be. This is because the beans are a great source of energy and protein for the animals during the hottest and toughest time of year.

The beans are hand-harvested directly off the tree. Any that fall to the ground are left there to prevent soil and bacterial contamination in the main crop. The beans are then sun-dried down to 5 to 7 percent moisture before being crushed in the hammer mill. The whole ground-up pods then pass through three sieves of increasing fineness.

The final product is a powdered, sweet mesquite meal. It's high in soluble fiber, contains 16 percent protein, and is packed with all kinds of vitamins and minerals. The Aguirres mix it with their coffee and use it as a wheat flour substitute in a wide assortment of stews, breads, and cakes.

After processing, the meal is stored in 110 kg barrels, and currently is being shipped to health food stores in Tucson and to a gourmet baker in Minneapolis. The Aguirres are currently receiving US\$8/kg, and their costs are US\$2/kg. This year they're shooting to produce and market 10 tons (10,000 kg) of flour. That's a pretty good seasonal income-earner from a plant many ranchers spend money trying to kill.

Some 35 percent of the pod gets caught in those first two screenings, and the Aguirres are determined to find an outlet for it as well. The Peruvians, who manufacture flour from a very similar plant called algarrobo, use the coarser screenings to manufacture cardboard. The second mesquite enterprise utilizes the wood itself to make attractive, durable flooring. Small diameter limbs—down to about 2 inches—are pruned from living trees. The smallest parts of the limb (about 30 percent) are left on the soil surface to add to the soil cover, another 15 percent of the limb (not suitable for flooring) goes to make charcoal, and the remainder goes to the sawyer in the recently constructed woodshop, where the limbs are milled, glued, and sanded into the finished product.

The Aguirres are currently marketing through the San Pedro Mesquite Company, based in Tucson. This is the first time anybody has tried to produce this sort of product from small diameter mesquite, so the whole enterprise is still in the prototype stage. San Pedro Mesquite provided the machinery, know-how and marketing expertise—now it's up to the Aguirres to get the whole process running smoothly out on the ranch.

The whole family is excited about the potential of this new venture, and Martha is keeping close track of every step, from pruning to marketing. In addition to the flooring, the Aguirres are experimenting with other products, such as welcome mats made from the scraps of wood that don't fit the flooring specifications, and cutting and serving boards. They're even looking into marketing the sawdust as smokehouse fuel.

The Aguirres and their staff are true stewards of the land. They have a sense of place rooted in their love for every detail and intricacy of their environment. They have an uncommon commitment to the piece of the world they have been entrusted to care for. They are the type of people who deserve to be living on the land. In fact, if we are to reverse the decline of biodiversity and the spread of deserts across the world's brittle ranges, they are the sort of folks

who have to be on the land. They exude the passion, the love, the vision, the discipline, and the “stick to it” attitude to which we would all do well to aspire. Many thanks to the La Inmaculada team for sharing your generous time, knowledge, expertise, incredible home, and inspiration.

Sidebar:

--Jim Howell

Photo cutlines:

Photo 1. *Like all of us, Ivan Aguirre's holistic journey has been filled with highs and lows and lots of learning.*

Photos 2-3. *There is a sharp contrast between the majority of the country in this part of Sonora (to the right of the road) and the perennial grasslands of La Inmaculada, to the left.*

Photo 4. *The Aguirre's herd of Beefmaster-cross cows heading back out for their evening graze. These and several hundred more were being loose herded to concentrate grazing and animal impact toward the back of the paddock.*

Photos 5, 6, 7. *These three photos show the diverse plant community dominating Rancho de la Inmaculada--a variety of warm-season perennial grasses and forbs, growing under a diverse leguminous shrub community of mesquite, paloverde and ironwood.*