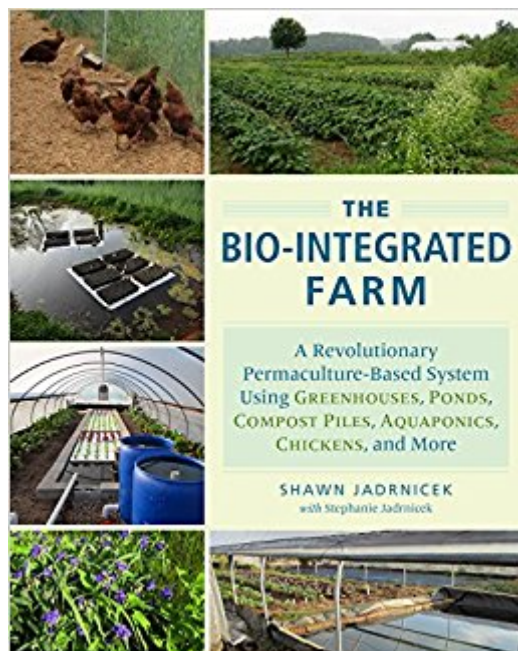




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# The Bio-Integrated Farm: A Revolutionary Permaculture-Based System Using Greenhouses, Ponds, Compost Piles, Aquaponics, Chickens, And More



## Synopsis

The Bio-Integrated Farm is a twenty-first-century manual for managing nature's resources. This groundbreaking book brings ecosystem farming and permaculture to a whole new level. Author Shawn Jadrnicek presents new insights into permaculture, moving beyond the philosophical foundation to practical advanced designs based on a functional analysis. Holding his designs to a higher standard, Jadrnicek's components serve at least seven functions (classical permaculture theory only seeks at least two functions). With every additional function a component performs, the design becomes more advanced and saves more energy. A bio-integrated greenhouse, for example, doesn't just extend the season for growing vegetables; it also serves as a rainwater collector, a pond site, an aquaponics system, and a heat generator. Jadrnicek's prevalent theme is using water to do the work. Although applicable in many climates, his designs are particularly important for areas coping with water scarcity. Jadrnicek focuses on his experience as farm manager at the Clemson University Student Organic Farm and at his residence in the foothills of the Blue Ridge Mountains. These locations lie at the cooler northern edge of a humid subtropical climate that extends west to the middle of Texas and north along the coast to New Jersey. He has created permaculture patterns ranging from raising transplants and field design to freshwater prawn production and composting. These patterns have simplified the operation of the 125-share CSA farm while reducing reliance on outside resources. In less time than it takes to mow his two-acre homestead, Jadrnicek is building a you-pick fruit farm using permaculture patterns. His landscape requires only the labor of harvesting, and the only outside input he buys is a small amount of chicken feed. By carefully engaging the free forces of nature—water, wind, sunlight, convection, gravity, and decomposition—Jadrnicek creates sustenance without maintenance and transforms waste into valuable farm resources. The Bio-Integrated Farm offers in-depth information about designing and building a wide range of bio-integrated projects including reflecting ponds, water-storage ponds, multipurpose basins, greenhouses, compost heat extraction, pastured chicken systems, aquaculture, hydroponics, hydronic heating, water filtration and aeration, cover cropping, and innovative rainwater-harvesting systems that supply water for drip irrigation and flushing toilets.

## Book Information

Paperback: 384 pages

Publisher: Chelsea Green Publishing (March 3, 2016)

Language: English

ISBN-10: 1603585885

ISBN-13: 978-1603585880

Product Dimensions: 8 x 0.9 x 9.9 inches

Shipping Weight: 2.3 pounds (View shipping rates and policies)

Average Customer Review: 4.5 out of 5 stars 34 customer reviews

Best Sellers Rank: #45,345 in Books (See Top 100 in Books) #1 in Books > Crafts, Hobbies & Home > Gardening & Landscape Design > By Technique > Water Gardens & Ponds #2 in Books > Science & Math > Agricultural Sciences > Irrigation #6 in Books > Crafts, Hobbies & Home > Gardening & Landscape Design > Greenhouses

## Customer Reviews

Publishers Weekly- "Jadrnicek, a farmer, educator (he teaches at and oversees Clemson University's organic student farm in the Blue Ridge Mountains), and perpetually tinkering designer and inventor, implements the permaculture principle of 'stacking functions' and pushes its limits. 'Something very special happens when a component within the design exceeds seven functions,' he writes. 'Once the odd magic number of seven is breached, the design takes on a life of its own.' With curiosity, imagination, and exuberant obsession, he shares his successful manifestations and ongoing experiments and shows readers how to implement them in their own agricultural pursuits, whether a market farm or steep urban yard. He provides both broad conceptual overviews and comprehensive specifics. Less committed growers may balk at the complexity of these living designs and the basic physics, chemistry, and algebra needed to realize them, but permies and others committed to developing a regenerative agriculture as well as ambitious weekend gardeners dreaming of an in-town, self-sufficient aquaculture greenhouse will likely be impatient to try it themselves. The Bio-Integrated Farm provides practical solutions for farmers and homesteaders facing the dual challenges of sustainably feeding an expanding global population and building resilience into their systems in response to climate disruption. Shawn Jadrnicek's designs for greenhouses, irrigation, composting systems, and more are based on the most enduring answer: let's look to nature. From experience, Jadrnicek knows how to create organic, resilient, and highly productive systems based on creative use of water, solar energy, and other free forces of nature. --Courtney White, author of Two Percent Solutions for the Planet The Bio-Integrated Farm is an invaluable resource for market farmers, homesteaders, and serious gardeners who are interested in improving their relationship with the land. Shawn Jadrnicek's creative use of materials, animals, and space, which he clearly and thoroughly explains in this book,

will inspire and teach you how to improve the efficiency and resiliency of your farm or garden. I can't wait to implement some of Shawn's designs at my site. While reading through this book, I was reminded of the ancient gardening techniques mentioned in F.H. King's *Farmers of Forty Centuries*. Shawn has integrated these simple and effective technologies into his modern-day working farm; his book will allow readers to access some of that ancient wisdom, too.

--Jerome Osentowski, author of *The Forest Garden Greenhouse* "Harvesting, multiplying, capturing, conveying, sloping, fertilizing, irrigating, heating, cooling | at least seven functions" is the genius of Shawn Jadrnicek's stacked systems in *The Bio-Integrated Farm*. Shawn turns almost everything we think we know about farming on its head, beginning with the notion that the odds are stacked against the small farmer and permaculturist. Instead, he stacks the odds in our favor by requiring every component of a farm to serve at least seven functions. These stacked systems create biological and mechanical efficiencies that maximize production and ecological diversity. While innovators abound in the permaculture world, Shawn is unparalleled in the practicality and detail of his innovative designs. As a connoisseur of college farms, I've visited several dozen such operations across the United States, and I have yet to see another academic farm demonstrate the level of careful design and innovation found on the Clemson University Student Organic Farm, one of several permaculture masterworks Shawn has helped create. As much an engineer as he is an ecologist, Shawn teases out nature's secret systems with a covey of collaborators—students, prawns, soldier flies, chickens, and thermophilic bacteria—to name but a few—and he shares all his best designs in this paradigm-altering guide. Be prepared to have your vision of a farm's limits shattered. Fear not, Shawn shows you how to reassemble those broken pieces into a 7-plus mosaic that can take any homestead or farm to the next level.

--Philip Ackerman-Leist, professor, Green Mountain College; author of *Rebuilding the Foodshed* "What is unique about permaculture, at its heart, is integration of elements like fish ponds, greenhouses, chickens, and crops. The Bio-Integrated Farm highlights real-world farm management experiences, including particularly innovative practices such as raising freshwater shrimp in greenhouse tanks that also provide thermal mass. The authors also respect and acknowledge the ancient roots of many of these ideas."

--Eric Toensmeier, author of *The Carbon Farming Solution* "Nature knows no waste, and cutting-edge farmers should start today to incorporate the bio-integration principles that Shawn Jadrnicek describes in detail in this book. Shawn shares his in-the-field experience using easy-to-understand formulas and charts to encourage the reader to develop a plan and translate project descriptions into hardworking results. I have seen Shawn's transformational power in person at Clemson University, and his visions

are addictive, teaching you not just to “think” outside the box by harmonizing natural systems but to “act” outside the box to create inexpensive and highly functional growing environments that are much more profitable and efficient than traditional growing systems. Even at our mushroom farm, we are incorporating Shawn’s design approach with aquaponics, black soldier fly composting, and passive heating. Farmers need all the financial help they can get, and The Bio-Integrated Farm will help readers prevent costly experimental failures. Every farm’s needs and layouts are unique, and this book allows the reader to customize and hybridize systems that harness the power of nature to transform ordinary farms into models worthy of world-class learning centers for permaculture.

—Tradd Cotter, author of *Organic Mushroom Farming and Mycoremediation*

As climate change drives increasingly challenging weather variability and extremes, ecosystem-based strategies such as those presented in *The Bio-Integrated Farm* will be crucial to successful adaptation efforts. In this practical, clearly written, and beautifully designed book, Shawn Jadrnicek shares his unique ability to conceptualize, design, and manage water for whole-system benefits at multiple scales. A must read for anyone interested in design and management of water systems for resilient homesteads and farms.

—Laura Lengnick, author of *Resilient Agriculture*

Shawn Jadrnicek has spent the last decade getting his hands dirty and taking risks, experimenting with how to create systems that actually work. *The Bio-Integrated Farm* covers areas often neglected in the current permaculture literature. Shawn’s systems-based designs show permaculture’s relevance beyond typical gardening scenarios. He offers a load of detailed practical advice based on personal experience, demonstrating how to make connections that result in greater yields and ease. His zeal for making the most out of the resources on hand has inspired me to find ways to further integrate my own permaculture homestead!

—Rain Tenaqiya, author of *West Coast Food Forestry*

Shawn Jadrnicek has nourished his interest in sustainability through work as an organic farmer, nursery grower, extension agent, arborist, and landscaper, and now as the manager of Clemson University’s Student Organic Farm. From his earliest permaculture experiments with no-till farming in the Santa Cruz Mountains of California to his highly functional bio-integrated designs in the Southeast, Shawn has learned how to cultivate food in a variety of climates and landscapes. He shares his creative solutions through teaching, consulting, and design work. Stephanie Jadrnicek is an award-winning columnist and journalist. She writes for *The Journal*, a newspaper based in Seneca, South Carolina. Her passion for sustainability stems from her roots in the Shenandoah Valley of Virginia, where her family taught her to grow, can, and preserve the precious things in life.

Over the last twenty years, she has played the role of assistant, critic, muse, and guinea pig in Shawn's farming experiments. Shawn and Stephanie live in Anderson, South Carolina, with their daughter, Sage.

This is an interesting book. It is packed full of clever ideas, but you better love plastic. It's everywhere. Also, you better love plumbing, pumps, and digging trenches. It spends much of its efforts giving the reader some real-world examples and advice. It clearly doesn't expect the reader to implement all or even most of the ideas, but I am confident that there are a few things just about anybody could apply to their situation, whether you are a suburbanite, urbanite, or a rural dweller. I was surprised by the extensiveness of instruction in chicken and pond fish rearing. I think this book would be a decent chicken primer, though not as thorough as Harvey Ussey's book. But one must realize that most of the advice and the schemes in this book are all very site specific. For example, his chicken coop wouldn't be nearly large enough in most of this country where weather gets cold enough a few or more weeks per year that chickens must be protected in a shelter. Also, I was surprised that he feels that bleach washing eggs is a given. From my perspective washing eggs is needed because of a defect in the management, usually putting too many chickens in too small of a coop or too few of roost boxes or not changing the bedding frequently enough. The book is very upbeat, enthusiastic, and friendly while not condescending, arrogant and self-congratulatory. When there is insufficient information, the reader is at least pointed in the right direction via a reference, but usually there is enough information to actually accomplish many of the projects in the book. Like all Chelsea Green books it is well produced, has an index, and is generally attractive. Why not five stars? Because, like many books of its kind, it is mis-titled in my opinion. The projects in this book are so capital intensive (basically all the plastic, plumbing, structures, and ground work) that it demands very intensive, high profit growing to break even. The intensity is far greater than what most Americans would expect on a "farm." And I am not so sure the vast quantities of plastic (liners, barrels, pipe, etc.) and frequent reliance on pumps and engines are really all that bio-integrated. I honestly believe that a more extensive (the opposite of intensive), but equally thoughtful, agriculture is more bio-friendly if you want to put it that way. Getting animals to feed themselves, food to grow itself, and agricultural systems to operate with minimal material or energetic inputs (rather management or decision making inputs) is more bio-integrated in my opinion. It might take a bit more land, however.

I have over 30 years experience on farms, but this book took me to school! It describes how to use

nature to work for you or keep you from working against nature. Excellent information and a pleasant read!

This is a very well-written book on how to actually implement Permaculture principles (especially stacking functions). This book tells you exactly how to do tons of really useful stuff, like building ponds (inside and outside of greenhouses), find out if a proposed building site will be shaded at any point during the year, the exact distance to build your pond from your house to maximize the amount of sunlight reflected in the winter and minimize the same in the summer, and tons of more super useful things. There are lots of formulas for very specific calculations that I found very helpful. When you are trying to plan a farm or homestead, you want to KNOW (not be guessing) that what you are about to do will work--and this book will help you do that. I highly recommend it to anyone who wants to implement Permaculture principles on their land.

For those like me wanting to start a permaculture farm, this book is one of the best out. Very informative well written and can give the novice like me all the info needed to start.

This book is very informative. It was purchased for a college class but we will keep it forever.

This is the most fascinating book I have. The density of information is the highest I can imagine. I bought this book to study systems theory, and systems of systems. I've only read a few dozen pages skipping around but it is exactly what I've been looking for, a real-world system documented. This appears to be a textbook written by Clemson University SC. It contains years of experience of their Agriculture department with acres of greenhouses, ponds, and gardens. Expect it to take several months to read it and perhaps a year to re-read it and turn it into your own knowledge and experience.

I love the ideas in this book, and hope someday to get my farm to this level of integration! Someone put a lot of time, study and experience into this book.

I've been hopping from chapter to chapter the last few nights. I've done quite a bit of research in planning an aquaponics business. But this book has already given me several, 'ahh, good idea' moments. It will be defaced with sticky notes and on my bookshelf for some time.

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vegetables ever. The Permaculture Promise: What Permaculture Is and How It Can Help Us Reverse Climate Change, Build a More Resilient Future on Earth, and Revitalize Our Communities

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