A Request for
$46,400
for

A Model Agricultural Development Project

in
Purulia District, West Bengal
India

Submitted by
Mary Friedman
for
Universal Family
315 S. Clay Street
Denver, Colorado 80219

(Short version)

A recent newspaper editorial in India (Times of India, 2/20/88) reports: "The mid-Eighties have seen Indian agriculture slide into a profound crisis marked by rising costs of cultivation due to increasing "addiction" to expensive pesticides and fertilizers, stagnant or erratic crop yields, and the growing misery of the poor.

"The Green Revolution with its reliance on high-energy, high-cost, industrial inputs, has done extensive damage which is only now beginning to be understood: steady depletion of micronutrients from the soil, klowering of the water table to new depths, proliferation of pests which are resistance to pesticides, destruction of the land due to topsoil erosion, spread of salinity and waterlogging, and the poisoning of the air, water, land and vegetation by toxic agro-chemicals on an extensive scale. All this must be placed in the context of deforestation, a misguided emphasis on large dams which disrupt whole watersheds, and unrelieved land and water mismanagement.

"The point is that "modern" high-input Indian agriculture has increasingly become economically unviable and ecologically unsustainable. The Green Revolution is now losing its attractiveness and meeting with resistance. It has already come up against what should be called the ecological barrier."

NEW AGRICULTURAL STRATEGY

The "crisis" in agriculture is rapidly becoming an environmental and social crisis as well. If existing croplands and irrigation water resources are not used well then with the rising population, agriculture will expand onto grazing and forest lands, resulting in the increasing impoverishment of farmers and graziers, in social conflict, and in accelerated deforestation with its concomitant cycles of erosion, drought and floods.

What India -- like all countries in the developing world -- now needs is a new agricultural strategy that employs low-cost inputs, systematic crop planning, novel land and water management techniques that maximally utilize these natural resources in a sustainable way, and the judicious use of scientific technology to enhance crop yields in a manner that can be easily adopted by peasant farmers.

Ananda Nagar, an integrated rural development project of the Ananda Nagar Development Society, comprises 110 square kilometers of largely barren wasteland on the Chhotanagpur plateau in Purulia District in West Bengal. The erratic rainfall, faulty cultivation practices, overgrazing and rampant deforestation have

carried away the topsoil and given rise to unabated erosion, which has robbed the land of its fertility. The entire district, situated in the heart of the tribal belt, suffers from chronic water scarcity and in fact exemplifies most of the problems which rural people face: malnutrition verging on starvation, chronic disease especially leprosy, illiteracy, total absense of electricity and lack of any type of industrial development. 65% of the 1.8 million inhabitants of this district suffer from malnutrition, and although agriculture is the primary means of support for the population, over 30% of adult males are unemployed for most of the year.

The agricultural projects at Ananda Nagar aim to provide an integrated new model for agriculture and land and water management that maximally utilizes the land, provides full employment to the local villagers, and is in ecological harmony with the earth.

MODEL FARM

The model farm at Ananda Nagar will be an experimental station and research centre to test new methods of cultivation and different varieties of plants best adapted to the local conditions, as well as an agricultural extension service centre to train the local farmers in maximum utilisation of land and water. The specific new agricultural strategy to be applied comprises the following:

(1) SYSTEMATIC INTERCROPPING AND ROTATIONAL CROPPING to utilise every inch of the land throughout the year and increase crop yields tenfold (for example, maize with groundnuts in the spring, millet with soybeans in the rainy season, potatoes with spices in the autumn, and cotton with sweet potatoes in the winter. At present the farmers in the area cultivate only one crop, for three months a year).

(2) INTEGRATED PEST MANAGEMENT (IPM) involving the use of biological control, crop rotation and intercropping, and natural pesticides like neem.

(3) SYSTEMATIC WATER HARVESTING TECHNIQUES: To replace the Green Revolution's over-emphasis on tubewell irrigation which has drained the water tables and increased salinity and waterlogging, a novel, integrated system of check dams, barrages and ponds is being developed to trap rainwater where it falls. Alternative energy-powered pumps such as solar pumps and windpumps have already been installed to utilise the stored rainwater for irrigation.

(4) AFFORESTATION: Around the cultivated area trees will be planted to prevent soil erosion and by retaining rainwater in their root systems, recharge the groundwater reserves.

(5) THE USE OF ORGANIC FERTILIZATION OF 3 TYPES to restore and not destroy, as chemical fertilizers do, valuable micronutrients in the soil:

1-BIOGAS SLURRY: Two large (45 cubic metres and 15 cubic metres) biogas plants have already been installed at the dairy farm to generate electricity and provide slurry fertilizer for the fields

2-BIOFERTILIZERS: A small laboratory will be established to produce biofertilizers, pellets containing bacterial cultures that increase the availability of the nitrogen and phosphorus in the soil

3- BIOLOGICAL TRANSMUTATIONS: The same laboratory will explore the ability of plants to transmute, for example, calcium into phosphorus or sodium into potassium, by the enzyme-induced alteration of structural arrangements within the atoms (see C. Louis Kervran, "Biological Transmutations," Beekman Publishers, New York 1971). Field experiments will also be conducted regarding the practical application of biological transmutations to regenerate minerally depleted soils.

This integrated agricultural strategy at Ananda Nagar will provide a replicable model for integrated development in harmony with the earth, for all the projects at Ananda Nagar are inspired by the Neo-Humanistic philosophy that all creatures are linked together in an inseparable web of life.

BUDGET

With a first year budget of US 129,500, the project will train 500 villagers in this new agricultural strategy, and distribute seeds, tree seedlings, and biofertilizers to all farmers.

Thus far Ananda Nagar Development Society has collected a total of US $46,400 in donations in cash or kind from individuals and government agencies who are committed to supporting this model for development. This $25,400 and a projected first-year income of $10,000 leaves $73,100 needed from the foundation community.

After two years of operation the model farm and research centre will be self-sufficient based upon the sale of the crops produced. The profit in crop production will be used to subsidize continued training in agriculture as well as distribution of agricultural imputs to the local villagers.

FIRST YEAR BUDGET

EQUIPMENT

Dam & Barrage construction	US $ 15,460
Fencing	11,950
Research Centre & Laboratory	15,800
Terracing	7,690
Agricultural Equipment	6,500
Biogas plants & generator sets	21,000
Buildings	8,500
Irrigation	10,750
Solar Pumpset	4,150
Windpump	1,000
Seeds & Seedlings	2,100
TOTAL EQUIPMENT:	$ 104,900

PERSONNEL

Labourers salaries	$ 19,000
Agricultural Expert	5,600
TOTAL PERSONNEL:	$ 24,600

TOTAL EXPENSES:	$ 129,500
PROJECTED INCOME FROM CROPS:	10,000
PRIVATE DONATIONS:	46,400
AMOUNT NEEDED:	$ 73,100

[The research and development work for this project will be conducted with the collaboration of scientists from the Indian Agricultural Research Institute, New Delhi; Birsa Agricultural University, Ranchi, Bihar; and Rajendra Agricultural University, Pusa, Bihar. The directors of the project at Ananda Nagar will be Shrii Balram Singh, MSC in Agriculture, former Deputy Director of Agriculture from the State of Uttar Pradesh and director of a large government research farm at Azamgarhup; and also Shrii Ram Lakhan Bhagat, former Deputy Director of Agricultural Planning for the State Government of Bihar.

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TABLE OF CONTENTS

STATEMENT OF PURPOSE

A recent newspaper editorial in India (Times of India, 2/20/88) reports: "The mid-Eighties have seen Indian agriculture slide into a profound crisis marked by rising costs of cultivation due to increasing "addiction" to expensive pesticides and fertilizers, stagnant or erratic crop yields, and the growing misery of the poor.

"The Green Revolution with its reliance on high-energy, high-cost, industrial inputs, has done extensive damage which is only now beginning to be understood: steady depletion of micronutrients from the soil, lowering of the water table to new depths, proliferation of pests which are resistance to pesticides, destruction of the land due to topsoil erosion, spread of salinity and waterlogging, and the poisoning of the air, water, land and vegetation by toxic agro-chemicals on an extensive scale. All this must be placed in the context of deforestation, a misguided emphasis on large dams which disrupt whole watersheds, and unrelieved land and water mismanagement.

"The point is that "modern" high-input Indian agriculture has increasingly become economically unviable and ecologically unsustainable. The Green Revolution is now losing its attractiveness and meeting with resistance. It has already come up against what should be called the ecological barrier." [See newsclippings A and B, "Indian Agriculture in Crisis" and "Indian Agriculture In Trouble: Consequences of Green Revolution."]

This crisis in agriculture is rapidly becoming an environmental and social crisis as well. As existing croplands and irrigation water resources are not sufficient to feed the growing population, agriculture is expanding onto grazing and forest lands, resulting in the increasing impoverishment of farmers and graziers, in social conflict, and in accelerated deforestaion with its concomitant cycles of erosion, drought and floods.

NEW AGRICULTURAL STRATEGY

What India -- like all countries in the developing world -- now needs is a **new agricultural strategy** that employs low-cost inputs, systematic crop planning, novel land and water management techniques that maximally utilize these natural resources in a sustainable way, and the judicious use of scientific technology to enhance crop yields in a manner that can be easily adopted by peasant farmers.

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The agricultural projects at Ananda Nagar aim to provide an integrated new model for agriculture and land and water management that maximally utilizes soil, energy and water, provides full employment to the local villagers, and is in ecological harmony with the earth.

MODEL FARM

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IMPROVED USE OF WATER AND SOIL RESOURCES

1. Water harvesting microcatchments
2. Small dam on nearby river
3. Large pond to trap rainwater with systematic plantation to prevent evaporation
4. Terracing
5. Use of vetiver grass to prevent soil erosion

IMPROVED SOIL FERTILITY

1. Biological nitrogen fixation through biofertilizers
2. Use of biogas slurry
3. Phosphate rock soil mineralization
4. Biological transmutations

IMPROVED CROPPING PRACTICES

1. Intercropping
2. Rotational cropping
3. Agro-forestry

IMPROVED IRRIGATION SYSTEM

1. Sprinkler system
2. Trickle-drip irrigation using low-cost technology

ALTERNATE ENERGY SOURCES

1. Biogas plant to supply electricity for irrigation and methane gas for methane-powered tractor
2. Solar-powered pump for irrigation
3. Wind pump for irrigation

INTEGRATED PEST MANAGEMENT

1. Cultural controls of intercropping and rotational cropping
2. Biological control
3. Natural pesticides such as neem

THE ANANDANAGAR AGRICULTURAL PROJECT

A model farm will be established on a 50-acre tract of land in Purulia District on the Chhotanagpur plateau, a drought-stricken wasteland of laterite soil where the agriculture is extremely backward. Normally due to lack of water, the farmers in the area plant crops only three months out of the year, during the rainy season, and the rest of the year the fields lie fallow. Since scarcity of water is the essential problem of the area, the water strategy of the project is a most important component.

SOLVING THE WATER PROBLEM

The prevalent means of supplying water to agriculture throughout India today is tubewell irrigation, highly promoted by the Green Revolution. But the proliferating tubewells are creating a water crisis by draining the underground water table. The Director General of the Indian Council of Agricutural Research (ICAR), Dr. N.S. Randhawa warned that the entire area of Punjab and Haryana (the showcase of the Green Revolution in India) will turn into desert if the underground water sources continue to be over-exploited at the present rate.

In fact, due to the overuse of ground water and the intrusion of saline water in wells, thousands of villages throughout India that are dependent on tube wells now have no source of drinking water; and in the dry summer months entire villages are being evacuated by thirsty villagers. [See newsclipping C, "The Price of the Green Revolution."]

Another prevalent means of providing irrigation is through the construction of large dams, which are also proliferating in India. But even Prime Minister Rajiv Gandhi stated in 1987 that "almost no benefit has come to the people from these projects -- no irrigation, no water, no increase in production." In fact, these huge dams have come to be symbols of environmental destruction, social injustice and economic folly. Not only are they exceedingly expensive, but they displace huge populations, destroy the local ecosystem, and increase the salinity and waterlogging of the soil. [See newsclipping D, "Big Is Ugly."]

In contrast, Ananda Nagar's water harvesting scheme depends on utilising surface rainwater through a system of ponds, small lakes, and small dams. India is blessed with an abundance of rainfall: the average annual precipitation is higher than every other continent in the world except South America. But it uses only one-tenth of the precipitation it receives annually, and the

rest runs off to the sea. Proper catchment of rainwater is thus essential to solve the nation's worsening water crisis.

(1) POND WITH EXTENSIVE PLANTATION

At the Ananda Nagar Development Complex, more than 200 small ponds have already been dug to trap rainwater. At the model farm, a large half-acre pond will be dug, and surrounded with extensive and systematic plantation to prevent water evaporation, recharge the underground water table, and fully utilise every inch of space for food production. This unique plantation scheme includes five types of plants:

1. SURFACE PLANTS such as lotus, water lily and water chesnut, which not only slow evaporation but fully utilise even the surface of the water for the cultivation of profitable and nutritious crops (lotus seeds, water lily seeds and water chesnuts).

2. SLOPE PLANTS along the slopes of the pond to store water in their roots during the rains, check soil erosion and siltation of the pond, and also provide economic benefit: for example, asparagus, aloe vera, pineapple, chilis, and brinjal.

3. RIM PLANTS, specifically coconut palms, around the rim of the pond, to hold water in their roots and prevent evaporation.

4. BOUNDARY WALL PLANTS covering the walls surrounding the pond -- creepers such as melon, pumpkin, and gourd.

5. SURROUNDING PLANTS such as cabbage, cauliflower, tomatoes, etc. on the flat area around the pond, inside the wall.

The pond will be filled with fish, which will also provide an additional source of income. The fields will be irrigated with the pond water by means of a solar photovoltaic pumpset which has already been supplied by the Government of India's Department of Non-Conventional Energy Sources.

Thus the pond will not only store water for irrigation and recharge the underground water table, but will be embedded in a lush network of green growth that will provide extensive economic benefit for the farmers.

(2) SMALL CHECK DAM

A small dam on the Paragati river just beside the fields will harness the runaway flows of water in the rainy season and store it in a reservoir that will be approximately 30 feet by 1000 feet. The entire encatchment area around the dam will be extensively planted with trees with fibrous roots such as tamarind, margosa, palmyra and banyan, to check the flow of silt into the reservoir.

(3) WATER-CONSERVING IRRIGATION METHODS

Traditional surface irrigation wastes 50-70% of the water through seepage, evaporation and drainage, and often causes waterlogging and salination. Fifteen percent or more of India's irrigated land is now threatened by this problem. However, at the model farm the fields will be irrigated by the water-conserving methods of **sprinklers** for the vegetable crops, and **trickle-drip** for the horticultural crops. A novel, low-cost earthen trickle-drip system will be introduced, which can be economically produced by the villagers themselves.

Sprinkler irrigation does not waterlog or compact the soil; it sprays only the necessary amount of water and can thus irrigate double or triple the area -- an important benefit in arid areas like Purulia District. Germination and crop yield is improved, and no land is wasted in digging channels or making bunds. Drip irrigation is even more economical, especially for tree fruit crops, since it irrigates only the roots and gives maximum yield with minimum water.

The water from the reservoir will be lifted to the irrigated area by a series of two windpumps (also supplied by the Government of India's Department of Non-Conventional Energy Sources). This irrigation system will be alternately powered by diesel fuel if there is no wind.

Thus by these two ecological methods of water harvesting, pond and dam, with water-efficient irrigation techniques, the critical water problem of the area will be solved, and a replicable model will be presented to the village farmers in an organized water-management training course.

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SOIL CONSERVATION METHODS

Terracing will be employed to prevent erosion, specifically with the plantation of vetiver grass (vetiveria zizanioides, popularly known as "khus" grass) in rows across the contour of the fields. Rainwater rushing across the fields and down slopes is slowed by the grass, causing it to drop the topsoil it carries. The grass's dense roots grow nearly ten feet deep, anchoring the soil firmly in place. They also contain oils that repel rats and other pests. In addition, its foliage is unattractive to grazing animals that often destroy other plants used in erosion control.

This grass provides a more natural, cheaper, and longer-lasting way to reduce soil erosion than expensive, engineered earthen embankments, which the average Indian farmer finds too difficult to construct. [See newsclipping E, "Grass with Deep Roots Fights Soil Erosion."]

* * * * *

IMPROVED CROPPING PRACTICES

To feed its rapidly increasing population, now estimated to be 800 million, India has had to place more and more land under cultivation -- about 40% of its total territory. This has resulted in the depletion of grazing lands and extensive environmental destruction through deforestation, with the concomitant cycles of droughts and floods. And even with so much land under cultivation, most of the agricultural lands can usually support little more than subsistence farming. Instead of bringing more lands under cultivation, what is now necessary is the maximization of crop yields with limited land use and minimum soil degradation, through intensive cropping patterns.

At the Ananda Nagar model farm, systematic crop rotation and intercropping will be practiced to enhance soil fertility and productivity and reduce pest infestation. Moreover, the cropping strategy will emphasize not cash crops for export but local self-sufficiency in food, including all the necessary items in the diet of the villagers and their animals. To this end 20 acres will be planted in cereals, 10 in vegetables, 10 in fruit trees and fruit crops, 5 in pulses, and 5 in fodder.

Extensive intercropping will utilise literally every inch of the land, including fruit trees lining the fields and spice plantation in the shade of the trees. In an area where the land lies fallow three-fourths of the year, the villagers will be

taught to utilise their lands every day of the year, with four rotations according to the seasons.

The specific cropping pattern to be employed at the model farm, the most suitable for this particular agroclimatic region, is as follows:

	WINTER	SUMMER	RAINS	AUTUMN
PULSE	SOYBEANS + MAIZE	GREEN GRAM + MAIZE	ARAHAR PULSE + MAIZE	ARAHAR + SWEET POTATO
GRAINS (1)	WHEAT + MUSTARD	WHEAT + MUSTARD	AUS PADDY + RADDISH	AUS PADDY + RADDISH
GRAINS (2)	BARLEY + MUSTARD	BARLEY + MUSTARD	MAIZE + SOYBEANS	MAIZE + SOYBEANS
VEGE-TABLES	PUMPKIN + POTATO + CAULIFLOWER + SPICES	LADYFINGER + BRINJAL + CHILIS	RADISH + BRINJAL + CHILIS	CAULIFLOWER + SPICES
FRUITS	GRAPES + GROUNDNUT + LEMONGRASS, CARDAMOM, IPECAC & CINCHONA [medicinal plants]	GRAPES + GINGER + LEMONGRASS, CARDAMOM, IPECAC & CINCHONA	GRAPES + TURMERIC + LEMONGRASS, CARDAMOM, IPECAC & CINCHONA	GRAPES + GROUNDNUT + LEMONGRASS, CARDAMOM, IPECAC & CINCHONA
FODDER	AUS PADDY	MAIZE	MILLET + GREEN GRAM	MILLET + GREEN GRAM

ENHANCING SOIL FERTILITY

For the past twenty years the answer to India's chronic food shortage seemed to be the Green Revolution, which heavily promoted the use of chemical fertilizers and pesticides. But this was accompanied by an exponential increase in the consumption of non-renewable forms of energy and a progressive decrease in the valuable micronutrients in the soil. Indeed, the high-priced chemical fertilizers are far beyond the means of most Indian farmers, and so as a result any increase of production has been confined to pockets of prosperity populated by rich farmers.

It is essential now to adopt a strategy of integrated and low-cost nutrient supply by using a judicious combination of chemical fertilizers, organic manures and biofertilizers. Ananda Nagar's agricultural strategy employs such an integration of fertilization techniques that will restore and not further destroy the fertility of the soil, and be economical enough for every Indian farmer.

(1) BIOFERTILIZERS

A small laboratory will be established to produce biofertilizers in both pellet and granular form, containing bacterial cultures to increase the availability of nitrogen and phosphorus in the soil. These "microbial inoculants," as they are called, containing live strains of nitrogen-fixing, phosphate-solubilizing microorganisms, will be used to coat the seeds that are provided to farmers as part as the extension services programme of the farm. Thus the number of microorganisms in the soil will be increased and microbial processes accelerated, to augment the availability of nutrients in the soil.

These microbial processes are not only quick but consume much less energy than industrially-made chemical fertilizers, and will thus avoid costly inputs from non-renewable sources of energy. Furthermore, when chemical fertilizers are applied to the soil, only about 10% is able to be utilised by the plant, and the rest is transferred to insoluble forms and becomes unavailable to the growing plant. With the application of biofertilizers only one-fifth of the amount of chemical fertilizers is necessary, resulting in a huge savings for poor farmers, and a 10% increase in production besides.

Specifically, Azotobacter and Azospirillum inoculants will be used for non-leguminous crops and rhizobium inoculant on legumes, to promote seed germination and vigour of plants. Small 100-gram packets of biofertilizer will be produced in the laboratory, costing 2 rupees per packet (approximately US 12 cents), one packet to be applied to a half-acre of land each

year.

Pellets containing nitrogen, phosphorus, potassium, calcium and manganese in organic forms, costing 5 paese each (approximately one-third of a cent) will also be produced to be planted at the roots of fruit trees. These pellets will release their nutrients slowly into the soil, thus preventing leaching and enhancing the young tree's utilisation of nutrients. An area of fruit trees thus fertilized with pellets will cost 150 times less than an area fertilized with chemical fertilizer.

The laboratory to produce these biofertilizers will be staffed by one microbiologist who will train local villagers in the production methods, thus providing stimulating employment for village youth.

(2) BIOGAS SLURRY

A small dairy farm with 50 cows will be established at the model farm, and a 15 cubic meter biogas plant will be constructed (75% subsidized by the Government of India's Department of Non-Conventional Energy Sources, DNES). The cow dung fermented in the biogas plant will produce methane gas, which will in turn operate a generator to pump water for irrigation; and the slurry from the plant will be utilised as rich, clean, organic fertilizer for the fields.

The Indian Agricultural Research Institute (IARI) has tested and proven the superior nitrification in the soil by biogas slurry over raw cow dung and even chemical fertilizers. Thus the biogas technology will demonstrate the optimal use of waste materials presently unutilized, causing huge economic loss, pollution and lack of sanitation. The model farm extension service will educate the villagers in this renewable technology and provide biogas slurry cheaply to fertilize their fields. It will also work in conjunction with the DNES to disseminate the biogas technology to the surrounding villages.

(3) SOIL REMINERALIZATION

Remineralization is the incorporation of finely ground original rock to nutrient-exhausted and eroded soils. Rocks (basalt, lava, granite, shale and slate) supply the nutrients necessary for plant growth by restoring the original balance of fertility, and thus increase the production of food.

A rock grinder will be constructed at the model

farm to produce rock dust from the local rocks, many of which are over 300 million years old and extremely rich in minerals. A series of experiments will be conducted in demonstration plots to test the effects of various types of rocks on crops. This rock dust, rich in mineral nutrients, will be combined with the biofertilizers for maximum results.

(4) BIOLOGICAL TRANSMUTATIONS

The same laboratory that produces the biofertilizers will also explore the mysterious ability of plants to transmute one element of the soil into another by the enzyme-induced alteration of structural arrangements within the atoms [see xerox F, from the book Biological Transmutations by C. Louis Kervran, Beekman Publishers, New York 1971; and also xerox G, "Alchemists in the Garden," from The Secret Life of Plants by Peter Tompkins and Christopher Bird, Harper and Row, 1973.]

Experiments conducted in Japan proved that sodium could be transformed into potassium by two species of mould and two species of yeast. As Kervran wrote, "If potassium fertilizers were not available it would not be a catastrophe...yeast and microscopic algae could produce it from sodium through enzymatic means, by a fundamental alteration of the nucleus of the elements. Cultivation based on classical chemistry alone fails wherever intensive and abusive methods are employed...To give plants chemical fertilizers only is simply giving them drugs to achieve higher crop yields for a time." If yeasts and penicillins are already being produced on an industrial scale, asks Kervran, why not start laboratories for growing microorganisms for the transmutation of elements for agriculture?

Kervran's research into biological transmutations has shown conclusively that certain plants can transmute elements useful for their own growth and the growth of other plants. The research at the laboratory at Ananda Nagar along this line will add a great deal to our understanding of rotational and mixed cropping, and may even make a breakthrough in sustainable biological farming methods, that are so essential in today's chemical-drenched world.

INTEGRATED PEST MANAGEMENT

The early enthusiasm about the Green Revolution in India has been transformed to bitter disillusionment as Indian crops are attracting pest infestations on a mass scale [see newspaper clipping H, "Death Harvest."] In the losing battle to fight off the increasingly resistant pest species, Indian agriculture has become addicted to chemical pesticides. Although foodgrain production has stagnated or fallen over the past two years, pesticide consumption has risen by 23%. Toxic agrochemicals seeping into the soil and water are contaminating food and drinking water; and as a result Indians store more DDT in their bodies than people anywhere in the world.* Poisoned by these harsh chemicals, two-thirds of the country's soil suffers from a deficiency of microorganisms that is cutting crop yields by 10-30%.

Ananda Nagar's integrated pest management scheme will provide a viable and ecological alternative to harmful chemical pesticides through biological control, crop rotation and intercropping, and natural pesticides such as neem. Neem (margosa) has been proven to be a powerful natural pesticide, effective against 123 species of insects, that unlike chemical pesticides is non-toxic to humans and animals and does not damage the environment. Neem seed extracts act as an insect feeding deterrent and growth and development disruptant, thus making it impossible for pests to develop resistance. Neem cake has an equally inhibiting effect on nitrifying bacteria, thus reducing nitrogen losses. At the model farm's extension programme, the villagers will be trained in the use of safe and effect natural pesticides like neem.

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* The permissible limit established by the World Health Organization is 1.25 parts per million; the average Indian's body contains 20 parts per million!

CONCLUSION: NEW HOPE FOR INDIA

According to Professor V.K.R.V. Rao, while India requires a minimum agricultural growth rate of 4% to meet its basic food requirements in the coming years, the rate of agricultural growth between 1950 and 1985 has been only 2.5%. How can India and other developing nations increase their agricultural production in the shortest possible time to keep pace with their rapidly growing populations and the mounting demand for food? This is the burning question of the hour.

The proper utilisation of resources is the key; for a study done by the United Nations Food and Agricultural Organization in 1983 revealed that by the year 2000 if India's lands are managed properly, they could feed a population of 2000 million -- twice the projected population for that year.

If India's people go hungry, it has nothing to do with their numbers, but rather with the gross mismanagement of the country's natural and human resources. The development of a progressive new agriculture at Ananda Nagar using simple, inexpensive and appropriate technology which can be easily mastered by farmers, will provide a fresh hope for attaining self-sufficiency of food in rural areas. Further, the Ananda Nagar model farm will demonstrate a viable alternative to the high-cost, high-input, toxic and environmentally polluting Green Revolution methods.

By releasing the full resource potential of water, soil and plants, this integrated agricultural system will convert barren, arid wastelands into fertile fields, and set an example for farmers not only throughout India but in the entire developing world.

BUDGET

With a first year budget of US$ 129,500, the project will train 500 villagers in this new agricultural strategy, and distribute seeds, tree seedlings, and biofertilizers to all farmers.

Thus far Ananda Nagar Development Society has collected a total of US $46,400 in donations in cash or kind from individuals and government agencies who are committed to supporting this model for development. This $46,400 and a projected first-year income of $10,000 leaves $73,100 needed from the foundation community.

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Buildings for storage and training	8,500
Irrigation system	8,550
Solar Pumpset	4,150
Windpump	1,000
Seeds & Seedlings	2,100
Rock grinder	2,200
TOTAL EQUIPMENT:	$ 104,900

PERSONNEL

Project Director's salary	$ 6,000
Agricultural Expert	5,600
Teacher	1,000
Laboratory staff	6,100
Labourers	5,900
TOTAL PERSONNEL:	$ 24,600
TOTAL EXPENSES:	$ 129,500
PROJECTED INCOME FROM CROPS:	10,000
PRIVATE OR INSTITUTIONAL DONATIONS:	46,400
AMOUNT NEEDED:	$ 73,100

PROJECT PERSONNEL

PROJECT DIRECTORS AT ANANDA NAGAR:

1. Shrii Balram Singh

   MSC in Agriculture from the University of Uttar Pradesh
   Former Deputy Director of Agriculture in the state of Uttar Pradesh
   Director of the government research farm at Azamgarhup, Uttar Pradesh

2. Shrii Ram Lakhan Bhagat

   Former Deputy Director of Agricultural Planning for the State Government of Bihar

PROJECT ADVISORS

1. Dr. A.K. Sarkar

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