

AGRICULTURE WORLD

ISSN 2455-8184

VOLUME 6 ISSUE 09 SEPTEMBER 2020 ₹ 100

the pulse of global agriculture

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Forest Regeneration
Agriculture Interventions
with Tribals in Bastar



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VOLUME 6 ISSUE 09 SEPTEMBER 2020 | RS. 100/- PAGES 36

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Shiny Dominic
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Abdus Samad

V. P. Intl. Business
DD Nair
(Russia & CIS Countries)
6 Mikluho-Maklaya STR,
Moscow, Russia 117198
Mob: +7903729 98 30,
Tel: +7499501 99 10
Email: ddnair@krishijagran.com

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Printed and Published by:
M. C. Dominic
60/9, 3rd Floor,
Yusuf Sarai Market,
Near Green Park Metro Station,
New Delhi 110016.
Tel: 011-26511845, 26517923
Mobile: +91-9313301029,
+91-9654193353
Web: www.krishijagran.com

Printed at:
Pushpak Press Pvt. Ltd.
Shed No. 203, 204,
DSIDC Complex Indl. Area
Phase-I New Delhi- 110020

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Media Group.
Agriculture World
is published
by Krishi Jagran
Media Group.
Editor in Chief: MC Dominic

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Cover Page, Cover Courtesy :
Sanjiv Valsan, Vanvadi

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C OVID-19 pandemic is revealing the disastrous consequences of the neo-liberal development policy that systematically undermined and dismantled the social and the collective responsibility of the State towards its members. In the neo-liberal development paradigm, market dictates vital national concerns such as health, food, nutrition, livelihood and human behaviour. In recent years, agriculture has become a central concern to ensure health, nutrition and immunity.

UBINIG report argues that the rich biodiversity, earth caring farming practices, and a biodiversity-based ecological agriculture farmer's movement (UBINIG, CULTIVATING 'ANANDA': Joy of Ananda & Healthy Living, 2017), is the most rational approach to deal and manage the health and the nutritional crisis generally, more so particularly during and after Covid-19 pandemic. Bharat Mansata, discusses how soil and forest regeneration can help in survival and well-being of many. He believes that re-generating forests, rejuvenating soils, recharging groundwater, and reviving human spirits, all go hand in hand! He writes in detail about how Vanvadi, a 65-acre clear land has been regenerated into a sumptuous forest over two decades.

Arpon Bhattacharje writes on Agriculture Interventions with Tribals in Bastar. The plan was underpinned by a vision to address the area's extremely pertinent issues of cash, food and nutrition insufficiency at the household level and getting the youths drawn to agriculture. The Editor Dr Lakshmi Unnithan elaborates on the efforts of Utthan, who helped in Diversification of agricultural production, overcome environmental challenges, help transition from 'calorie-rich' to 'nutrition-rich' food systems. Ritu Jain, Babita Singh, Prabhat Kumar and Prativa Anand discusses about new opportunities in Value Addition of Dehydrated Flowers and Foliage and Encouraging Entrepreneurship

MC Dominic
Editor-in-Chief





From the Editors Desk

The Diverse Challenges and Constraints of growing population, increasing food, feed and fodder needs, natural resource degradation, climate change, shifts in land use patterns, increasing desertification, decreasing factor productivity, agriculture becoming economically unviable, increasing farmer suicides, growing small and marginal farmers demand a paradigm shift in formulating and implementing the agricultural programmes in India. We actually need to analyse the challenges.

The challenges before the farmers are too many and too exhaustive. One side they struggle to tackle Pesticidal issues and on the other side they struggle to produce clean and healthy food. Its time we concentrated more on shift in ecological principles and also on new opportunities and strategies that makes agriculture more climate-friendly and the potential to save energy and water by making the soil healthier. The need is to shift more in to adapting sustainable approaches.

Join Agriculture World and its journey in creating sustainable footprints globally and also in the dissemination of knowledge to save Mother earth from destruction and over exploitation.

Dr. Lakshmi Unnithan

Reinventing

COVID-19: UBINIG Report Series 3/ 19 May, 2020



Agriculture

Need a paradigm shift to agro-ecological principles



COVID-19 pandemic is revealing the disastrous consequences of the neo-liberal development policy that systematically undermined and dismantled the social and the collective responsibility of the State towards its members. In the neo-liberal development paradigm, market dictates vital national concerns such as health, food, nutrition, livelihood and human behaviour. Systematic downplaying of the vital national concerns and its strategy to dismantle or reconfigure existing socio-economic relations and institutions contributed to among others the collapse of public health.

The onset of Covid-19 pandemic made this collapse instantly visible, signalling the precarious and vulnerable conditions of all other sectors. This report from is to rethink and review the current development policy and reinvent agriculture, an urgent task to reverse the degrading trend in the quality of food, health, nutrition and immunity in order to combat pandemic now and the worse still to come. It is part of a series of report from Bangladesh on the actual and potential consequences of the Covid-19 pandemic and possible ways we may deal with it.

In recent years, agriculture became a central concern to ensure health, nutrition and immunity. This report argues that because of the rich biodiversity, earth caring farming practices, and a biodiversity-based ecological agriculture farmer's movement (UBINIG, CULTIVATING 'ANANDA': Joy of Ananda & Healthy Living, 2017), is the most rational approach to deal and manage the health and the nutritional crisis generally, more so particularly during and after Covid-19 pandemic. From this perspective here is what we recommend for consideration.

Reinventing Agriculture Agriculture is the source of food, nutrition, medicine, renewable energy and construction materials. Most importantly, agriculture is a way of life and livelihood for large rural population of Bangladesh. Nevertheless, the national development policy has always been very explicit in turning agriculture into an adjunct to urban industrial sector, thus turning agriculture into industrial food production, disregarding the very distinctive role agriculture performs in sustaining life and biological cycles. The idea of factory production has re-



placed the idea of agriculture. Factory requires inputs to generate outputs. Similarly, agriculture received inputs from outside such as chemical fertilizers, pesticide, seeds, etc. to produce food.

Economists, debating development pathways, questioned the wisdom of imposing development model from the west, on biodiversity-rich countries like Bangladesh branding them as under-developed! The debate circled around the relative role of agriculture and industry as index of development as well as generation of employment. The modern development paradigm views agriculture as traditional, fragmented, low productivity and a backward unit of 'subsistence' operation. Such view obliterates the agro-ecological foundation of farming and totally ignores complex environmental and ecological functions done by non-industrial agro-ecological food production systems. Modern development policy assumes that more the food pro-



duction is industrialized; more the agriculture will release 'surplus labour'. These labours, free from farming, will gradually migrate to the industrialised urban centres looking for jobs with higher pay. Consequently, the small household farming will wither away and large-scale industrial production units will emerge. Europe and USA has traversed this way. According to these economists, Bangladesh should also follow the path in order to catch up with the industrially advanced countries.

Rampant degradation of environment, ecology and the rise of both non-communicable and infectious disease compel us to rethink industrial model of life, profit-maximizing economic relations and ego-centric institutions. Covid-19 has nakedly exposed the vulnerability of the paradigm that dictates our development goals and foundation of thought. Therefore, while observing the disastrous effect and anticipating

more during and beyond Covid-19, it is time to rethink growth-centric development paradigm and strategies and reinvent agriculture at the centre of thought and planning.

Reinventing agriculture means first, deepening our understanding how agriculture is the foundation of our biological life and the safeguard from economic collapse, which is threatening us now and imminent beyond the pandemic. Reinventing agriculture is urgent in terms of defence against imminent threat to our biological existence as well as economic vulnerability. We must prioritize the role agriculture plays in food, nutrition and immunity, and at the same time reorder the relation between agriculture and industry to combat the imminent collapse of the biological as well as the economic life.

We must free ourselves from the conventional prejudice that agriculture is merely an exten-

sion of industry, a sector for industrial food production, but insist that economic activity must prioritize the production and reproduction of our biological and agro-ecological existence. Agriculture is the only sector that can reduce unnecessary medical intervention. Nutritious and healthy diet produced by biodiversity-based ecological farming can prevent non-communicable diseases in most cases and consequently halt medicalization of life.

In order to grasp comprehensively the role of agriculture in our life, we use the term ‘food sovereignty’ and not the narrow ‘food security’. Food sovereignty focuses on the decisive role of the farming communities to decide what and how food should be produced in order to feed the nation. ‘Food sovereignty’ therefore is integral to national sovereignty, the right of people to defend their biological and economic lives. Reinventing agriculture requires new awareness, both by the people as well as the governments, of global concentration in the seed and pesticide sector.

Multinational companies like Bayer (after the merger of Bayer and Monsanto in June 2018), Corteva Agriscience (the previous mergers of Dow and DuPont) (now Corteva Agriscience) and Sinochem (soon to be merged ChemChina and Syngenta) and BASF are four corporate giants controlling an estimated 63 % of the global industrial seed market and more than 70 % of the global pesticide business. Transformative new technologies and arrival of new competitors will further concentrate MNC’s power and control over global food chain (Mooney, n.a).

Reinventing agriculture recognizes the strength and potentialities of bio-diverse ecological farming. This is the ideal model of agriculture capable to feed human beings affirming life in general and caring all life forms. Bio-diverse ecological farming contributes significantly to address food and nutrition requirements and create rural employment. The United Nations Food and Agriculture Organization (FAO) recognizes the importance of agro-ecological approaches.

In countries like Bangladesh, Nayakrishi Andolon demonstrated how farming could enhance the agro-ecological diversity and ensure higher economic returns through the leadership of the

small-scale farmers. According to FAO, “Good nutrition is very important before, during and after an infection. Infections take a toll on the body especially when these cause fever, the body needs extra energy and nutrients. Therefore, maintaining a healthy diet is very important during the COVID-19 pandemic. While no foods or dietary supplements can prevent COVID-19 infection, maintaining a healthy diet is an important part of supporting a strong immune system”.

Agro-ecological approaches as solution

Current threat to life is multi-dimensional; therefore, rhetoric or fragmented quick fix will not solve problem. Immediate priority is to protect the most vulnerable and marginalized groups not only in cities but also in rural areas. Solution of local crisis is now dependent on global food production and distribution (Harvey, 2020).

Bangladesh claims to be self-sufficient in food, but the immediate problem is not production but internal distribution. However, the challenge is conceptualising, planning and implementing the shift from quantitative to qualitative paradigm covering all aspects of production, processing and distribution. This is where Bangladesh is in an advantageous position because of its agro-ecological base of farming, still rich in biodiversity. The policy makers must be determined to implement what has already been declared and promised”.

It says, “we are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations” (SDG, 2015). There is also strong consensus that agro-ecology offers local solutions and empowers local economies and markets by keeping farmers in the field with improved livelihoods and a better quality of life (FAO, 2020). It is imperative that what has been agreed upon by our Governments is implemented immediately.

There are many examples of how ecosystem disruption causes diseases and outbreaks, as described in depth in some early warning reports, such as the (UNEP, 2016). Most pandemics in

fact, including HIV/AIDS, Ebola, West Nile, SARS, Lyme disease and hundreds more, have their roots in environmental change and ecosystem disturbances. These infectious zoonotic diseases originate from animals, wild and domesticated. Erosion of ecosystem health, deforestation, biodiversity loss, ecosystem destruction and the removal of essential, natural, protective barriers magnify these diseases (ACB, 2020).

Nayakrishi Andolon in Bangladesh

In the COVID-19 pandemic and the present crisis of industrial food production, food producers of Bangladesh is attracted to Nayakrishi approach to farming. The practice involves in grounding food production on the biological foundation of farming according to the potentiality of local agro-ecological situations. Nayakrishi farmers follow ten simple principles that can be summarized as reclaiming the science, power and the fertility of nature to produce more food, nutrition and elements essential for immunity against diseases from both cultivated and uncultivated landscapes.

Higher productivity from per acre of land without compromising quality is achieved through developing simple to complex ecological systems that can sustain animal, poultry and fish. Secondly providing the groundwork to absorb surplus human resources and integrate rural industrial activity in such a way that does not destroy life but sustains an enriched living. To shift away from industrial farming, Nayakrishi strictly follows the principle of no use of pesticide, herbicide or any chemical that is toxic to life and nature.

Farmers select species and varieties of crop that is best suited in an agro-ecological zone. The challenge they face is not knowledge or technology, but unplanned and environmentally destructive policy followed for food productions. Such policy favours food merchants and not the food producers. On the other hand, the agricultural research priority is not to invent technology suitable for different agro-ecological conditions, but genetic manipulation of seed for a homogenised production of monoculture.

It is contributing to crop failure and increase risks for unpredictable climate variability. It is

imperative that policy makers take heed of the concerns of small-scale farming communities. The right of people to determine their own food and agricultural systems and their right to produce and consume healthy and culturally appropriate food must prevail over the commercial interests of food dealers. Market must not dictate the nature and structure of food production and distribution, but policy should enable the farmer to shape the market to the benefit of healthy food production systems to grow and expand.

Nayakrishi is based on the principles of 'food sovereignty' that is linked to the country's economic and biological survival. Nayakrishi farmers participate in the market and are able to create demand for their diverse, seasonal and culturally appropriate produces.

Nayakrishi has shown in the COVID-19 pandemic that the non-dependence of external inputs of fertilizer, pesticides, irrigation and other mechanical and chemical inputs has saved them from indebtedness unlike the conventional farmers. They learn from natural, environmental and biological sciences, particularly agro-ecology and landscape management in order to unleash the power of nature.

Conventional farmers practice mono-cropping of vegetables, wheat, rice, fish etc. They now have to think about the next Aman crop, for which they have to buy seeds, fertilizers, pesticides on credit from the dealers. By contrast, Nayakrishi farmers never depend on single-crop; they have mixed cultivation of rice and other crops. They never keep their land fallow. There are always some crops to harvest. After winter crop harvesting, they planted Aus in the medium and high land in the drought-prone agro-ecological zones.

In other areas, after Boro rice harvesting, they already started seed-beds for different local varieties of Aman rice based on land types and geographical conditions. Thus ensuring seed genetic diversity, reclaiming lost varieties and ensuring food and fodder for human as well as for the domesticated animals, poultry birds etc. They ensure seasonal variations and availability of food; and ensuring the food for cultural and social occasions. Women's knowledge, experiences and leadership play a significant role in Nayakrishi farming.

A Testimony to The Magic of Forest Regeneration



Vanvadi, Maharashtra



Bharat Mansata
Environmental Activist, Author



Forest foods walk with Ambibai and Mahadu Bua, local adivasis

Our lonely living planet harbours in its biosphere – as thin as the dew on a lotus – millions of life forms evolved over aeons. The earth’s soil is the mother of all life ... desertification a spiral of its death. Spreading desertification, induced by man, ushers an age of great, rapid extinctions. Nearly 170 countries are affected by desertification. The earth already has over 2 billion hectares of degraded land. According to FAO, at current rates of soil degradation, the world’s topsoil could be completely eroded in 60 years. And then there a few who battle relentlessly against this growing trend and regenerate the degraded lands around us. One such novel attempt is Vanvadi, a forest farm just two-hours drive away from Mumbai.

Over the two decades, this 65-acre clear land has been regenerated into a sumptuous forest. On the occasion of ‘World Day to Combat Desertification and Drought’ on June 17, one of the owners of Vanvadi, Bharat Mansata, discusses how soil and forest regeneration can help in survival and wellbeing of many. He believes that regenerating forests, rejuvenating soils, recharging groundwater, and reviving human spirits, all go hand in hand!

The Story of Vanvadi

Musing quietly by himself, Bua suddenly laughed. “Last night, 9 of them – sons, daughters-in-law, grandchildren – rushed out into the pouring rain. Soaked to the skin, they laughed, sang and danced for a good half hour!”

It was the first rain-shower after a long, dry, scorching summer, with its daily trudge to fetch a few pots of water from far away. Last year, the summer ritual started early ... in winter! The Adivasi village open well, on the table-land above Vanvadi, usually dries by March-end. It now ran empty in January.

The Vanvadi open well built by us has not dried since over a decade. This year, with the monsoon around the corner, it is still more than half full. The earth under the Vanvadi forest is a dense maze of plant roots, teeming with zillions of soil-dwelling creatures. The pores they make in the soil turn the forest floor into a massive sponge that soaks in rain. This then percolates down to recharge groundwater aquifers from which humans draw for much of their needs. Twenty-five monsoons ago, when we first visited the land, most of the trees had been clear-



Sample collections from forest foods foraging walk at Vanvadi

felled just a year or two ago. Over two dozen of us pooled contributions to collectively buy about 65 acres, with the primary objective of ecological conservation and regeneration.

In 1994, the hand-pumps in village Vare, below us, ran dry by peak summer. But within just 10 years of our protecting and regenerating the Vanvadi forest, the downstream pumps began to yield round the year. Chinchwadi, the Adivasi village above us, did not have this benefit, as water flows and percolates down gravitationally.

The rain that falls on forested land is buffered by multiple canopies of trees, climbers, shrubs, understory vegetation and dry leaf litter on the ground. The wrenching force of the monsoon downpours is significantly reduced by the time it reaches the soil, which is bound too, by the densely growing roots of the various forest plants. The rain run-off from such land largely flows as clear water. In stark contrast is the dark red runoff, bleeding the fertility of all bare, cleared, JCB-ed land on which rain falls.

Inexorably creeping desertification and summer droughts are not startling in very low rainfall regions; though even here, the decline in the rain

has usually followed deforestation. In very high rainfall regions like the Sahyadri foothills of the Konkan Western Ghats, where Vanvadi is located, water scarcity is sheer madness, self-created by the 'ecological sins' of modern man, ravaging nature. Bereft of vegetation and soil life, the rainfall on sloping terrain not only runs off but also wrenches off massive quantities of topsoil. The eroded fertile soil flows away to deposit in stream beds and water bodies, reducing the space available to hold water, which then flows further away over silted river-beds into the salty sea.

The land thus faces a double whammy of soil and water loss, draining the 'ecological capital' on which the survival of humanity depends. Water scarcity is currently plaguing almost half of India; and according to FAO, the world's topsoil could be completely eroded within the next 60 years if current soil degradation rates continue. Regenerating forests, rejuvenating soils, and recharging groundwater ... all go hand in hand! Massive quantities of carbon released in the air by modern industrial man can be recaptured and sequestered to mitigate/counter global warming and climate change, while efficiently harvesting and storing the sun's energy.



Tribal women, trudging uphill to their village with drinking water from Vanvadi open well; the little girl too, with an innovative 'rollable' water container



Forests also bring rain, replenish and cleanse our rivers and water bodies, buffer against floods, and provide habitats for rich biodiversity. They also provide a huge variety of useful produce ... free gifts of Mother Nature ... who we now torture!

The Vanvadi forest harbours a botanical wealth of over 120 traditionally useful species, including more than 50 edible plants, over thirty medicinal species, over 20 timber species ... and then there are plants which yield oils (edible and combustible), gums, resins, natural dyes, botanical 'pest control' functions, cattle fodder, firewood, fibre, craft materials ... and a precious gene pool of seeds for birthing more forests!

The Western Ghats are recognized as a global heritage of vital ecological significance, with a highly evolved biodiversity of flora and fauna. The traditionally prosperous and happy indigenous communities of the region have a correspondingly rich bio-culture with knowledge of several thousand traditionally useful species, including many hundreds of wild/forest foods. A hefty volume, 'The Useful Plants of India' (Publications and Information Directorate) provides capsulated information on 5,000 traditionally useful plant species, distilled from the older and far more detailed 12 volume encyclopaedic compilation, 'The Wealth of India'.

But tragically, this real wealth, contained in

our fabulously rich biodiversity – evolved over millions of years – is now sorely neglected and indeed, destroyed. The Western Ghats and its adjoining coastal region are in a steroidal rush to chase cancerous economic/monetised growth, masquerading as 'development'. Paradise is under heightened assault!

While the forest wilderness covers 90% of its area, Vanvadi also has a quarter acre of irrigated farmland for cultivated crops like fruit, vegetables; and about an acre of rainfed (unirrigated) area for growing field crops like rice and various millets: nacchni/ragi (finger millet), varie (common millet), and kangu (foxtail millet) Vanvadi has been hosting, particularly since 2016, a number of workshops and activities which serve as nature sensitization gatherings that also spread ecological awareness and understanding, especially among youth. Since the last 15 years, Vanvadi has also been hosting every October an annual Vanutsav (forest festival) – "to celebrate nature and community, and to share creativity". This is an 'open agenda,' multi-generational gathering, where the participants themselves volunteer to conduct any workshops or activities they like, that others can choose to attend or skip, according to their interest.

"Why every year? Why not every month?" declared little Zui at our very first Vanutsav, when told that we would have it every October.

KRISHI UPKARAN, LAAYE PARIVARTAN

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Agriculture Interventions with Tribals in Bastar Priorities in the wake of the Pandemic



Arpon Bhattacharjee

- PRADAN



The surge in COVID-19 cases in India has become the chief reason to worry about. Not just for the imminent risks of losing lives, but equally or perhaps more for losing livelihoods at a massive scale. Some experts are arguing that the likely toll claimed by the latter would surpass the former especially under the probability that the virus could linger on for quite some time in the foreseeable future. The crisis induced by the pandemic has hit hardest on the poor communities, because for many of them, remittances made up a good share of their annual earnings. It is highly unlikely that the unfortunate migrants would prefer to go back to their faraway work destinations again after bearing the unprecedented

brunt of loss of jobs, staying in shelter homes under subhuman conditions, walking long distances to reach homes and so on.

No surprise, the story is no different in Bastar in Chhattisgarh. Early trends indicate that each administrative block (out of 32) would have 1500-2000 migrant workers returning mostly from neighbouring Telangana, Andhra Pradesh and Maharashtra which adds up to at least half a lakh for the entire region. Fuelled by the rising aspirations especially among youths and less local job opportunities, each passing year has seen a gradual rise in the number of villagers migrating to find work seasonally between December and June. Since we can anticipate a post-



of Chhattisgarh's total tribal population . Mostly living on subsistence, the survival challenges confronting these tribes today are not the same as before. Traditionally and culturally these tribals were not agrarian communities and they still identify themselves more with forests.

Bastar is no exception with more than 50% of its geographies covered by forests, making its rural population highly dependent on forests for survival. However, in today's macro context of the dominance of the market economy, having all their needs supported by only forest-based activities is far from reality.

In all likelihood, not just one or two amongst forests, farms and markets, but all of these (in varying degrees) do have/would have contributions in a tribal family's livelihoods and life for them to be able to fulfil the needs and the rising aspirations of its members, especially youths. Amongst the three, the share of agriculture in household income is, currently, the highest. However, the current level of returns from agriculture is precariously low. A survey conducted by PRADAN , a nonprofit working in Bastar district for a decade now, revealed that the annual household income of the tribal households in one of Bastar district's blocks - Darbha is INR 52,000 (average for 1240 Households) where the share of agriculture was as low as INR 17,700 (34%).

Another data from the state government's official portal reveals that the average productivity of paddy, the most important cereal crop, in all districts of Bastar taken together, is as low as 1.13 MT/Ha . This rather pitiful state of tribal agriculture is by no means attractive for the farmers, especially youths to have them tied to this occupation. This picture needs to be changed.

**Experience from Block Darbha, Bastar:
Initial Interventions for Increased Production and Return:**

The example of the work of a PRADAN team, in the above context, in one of the tribal dominated blocks - Darbha in district - Bastar, is worth considering. Since last 3 years, the team has initiated an intensive agriculture programme with women SHG members from the tribal communities as the primary clientele. The team was successful in popularizing the livelihood not

COVID new normal with less number of people preferring to migrate long distances for work, the imperative, now, is to provide livelihoods locally. And by far, farm-based livelihoods make the most potential option available in the rural spaces of Bastar. The challenge, however, is to invent or develop farm-based interventions that can effectively contribute in sustainably providing decent and dignified livelihood opportunities for these downtrodden tribal communities.

Rural Bastar and The Current State of Agriculture:

Rural Bastar is a land of tribes like Maria Gonds, Murias, Halbas, Dhurwas etc who make up 25%

only among the SHG women, but many of the youths in that area too started taking serious interest in agriculture.

The team successfully demonstrated the potential of growing vegetables during the Kharif season in many of its operational villages in the first year of the intensification programme. It also demonstrated changed practices in other crops such as paddy and millets. The following years saw a gradual rise in the number of new farmers adopting the new practices and crops, so also the number of farmers securing better profits out of farming.

In the initial phase of the team's intervention, the farmers barely had any market-orientation. As is the case with subsistence farming, the investments in agriculture were minimal, of the order of INR 5-7,000, during the entire farming season including activities such as procuring inputs, hiring labour from outside family, hiring machineries (tractors) and so on. The team carefully designed the interventions that are market-facing, suitable to the agro-climatic conditions and causes minimum disruption of the traditional practices as well.

The plan was underpinned by a vision to address the area's extremely pertinent issues of cash, food and nutrition insufficiency at the household level and getting the youths drawn to agriculture. It underlined high value vegetable farming in homesteads as a core intervention for securing the household cash needs. It further maintained that all other crops such as cereal crops, pulses, oilseeds etc would be promoted with no or little material inputs purchased from the market.

For such crops, use of local seeds, manures etc would be encouraged and few of the conventional farming practices like broadcasting, low use of farm yard manures, quality of manures, pest management measures etc would be changed to the extent possible. Given the demand for investment, rigour and intensity in the case of high value vegetable farming, its area of cultivation was by design, limited between 10-20 decimal of homestead lands. Homestead lands became an important piece of farmland that needs attention and further husbandry. As a result, installing irrigation facilities, and layering orchard

plantations (like Mango, Cashew) along with vegetable cultivation were listed in the menu of interventions as well.

The remaining crops like millet, maize, oilseeds, pulses etc were grown in the rest of the homestead and uplands and paddy was grown in the levelled and bunded medium and low lands. All of these were designed after careful consideration of the existing volume of the family's labour-work and by observing the past trends.

Achieving this however, was quite a challenge. For a typical tribal farmer, especially a woman farmer, learning the necessary skill-set to bring changes in her farming practices, appreciating and finally adopting those was no easy task confronting the intervener. The team employed multi-pronged strategies like preparing video documentation of success stories, disseminating



these videos using pico projectors in the field areas, organizing mass exposures to demonstration sites, arranging credit from banks and NRLM grants as working capitals, promoting agri-entrepreneurs to facilitate backward and forward linkages with the market, strengthening the pool of community service providers and resource persons for extension support to the farmers and so forth.

By the end of three years from initiation, the team outreached close to 5000 women farmers with the above interventions, which includes 2000 farmers under high value vegetable crops across 40 villages in Darbha block. Vegetables grown by tribal farmers unprecedentedly flooded the village weekly Haats and were supplied to neighbouring and distant Sabji Mandis, something the tribal communities never dreamt of. The farmers ramped up their investments and

secured additional cash income in the range of INR 10-30,000 within a span of 3 months and more importantly have had their motivation high. The results extend beyond the direct benefits to the farmers. Many of the village youths who acted as trainers under PRADAN, turned agri-entrepreneurs and marketed the produce in the local and distant Sabji Mandis.

Kharif Agriculture Interventions - Just a Launchpad:

This is an important learning from the above experience. Bastar's tribal farmers need to become 'farmers with some market orientation'. This requires promotion of a farming system that ensures marketable crop yields at levels much higher than the current ones (desirably with no/low chemical inputs) by changing some of the older practices and seed quality and at the



same time, maintaining cropping diversity and not losing those local varieties that yield more or contain nutritional values.

When a family is deprived of assured irrigation facilities, agricultural interventions can be started in the Kharif season as well. In the tribal contexts, generally, Kharif season is a potential entry point for promoting improved Agri interventions and is also a launchpad for further interventions like the creation of irrigation infrastructures and convincing and readying the farmers for winter and summer farming. Besides having some of the conventional practices improved/changed with some better land husbandry, one or two market-oriented high value hybrid or high yielding vegetable crops in homestead lands is critical for boosting their annual income from farming.

One or two experiences of significantly high production and return in Kharif helps the farmer gain confidence in farming as a potentially viable economic activity. She, with the help of her peer group of other farmers, then starts exploring ways to further improve her farming practices and making it more lucrative. She has now embarked on the positive spiral of growth from a regular tribal farmer somehow growing just enough to feed her family, to an entrepreneur farmer with a forward-looking attitude. This is the stage when the farmers are ready to go for the second and the third crops and start aspiring for irrigation facilities, fenced homesteads etc to support these.

Interventions that Followed: (1) Securing Irrigation Facilities, (2) Conservation:

Interventions during the Kharif season, as mentioned above, takes at least a couple of successful cycles to have the tribal farmers gain enough confidence and adopt these. The positive experiences in the PRADAN case motivated the farmers to aspire for double cropping and they started demanding irrigation facilities. The team then worked in coordination with the SHG federations and the block and district administrations in surveying and planning for irrigation facilities across about 20 villages which culminated in the approval of a large number of micro irrigation projects by the government.

Soil and water conservation works too, were implemented under MGNREGA. Now that the community has learnt some new farming practices and has developed a commercial orientation vis-à-vis farming, the interventions around increasing irrigation coverage and conservation are increasingly being appreciated and demanded. Still miles to go, such achievements in a hardcore tribal context holds tremendous significance and generated lots of lessons to learn from the perspective of making farm-based interventions attractive for its farmers. This is particularly important in the current context when COVID-19 induced crisis would deter many of the regular migrant workers from moving out of their villages again.

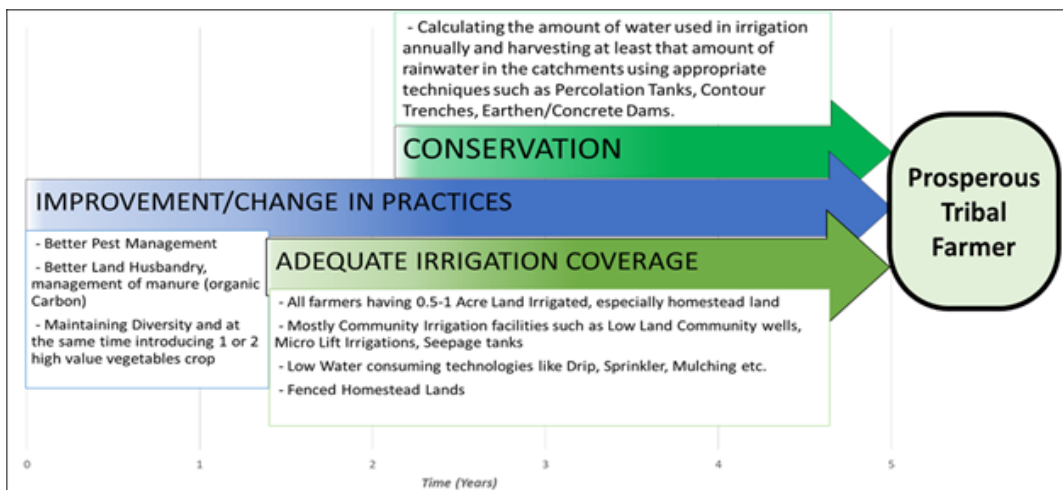
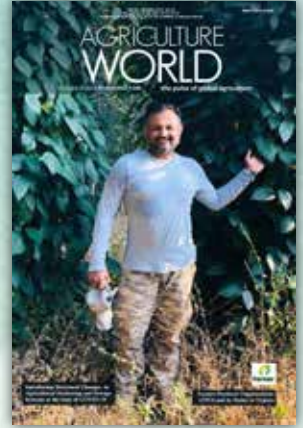
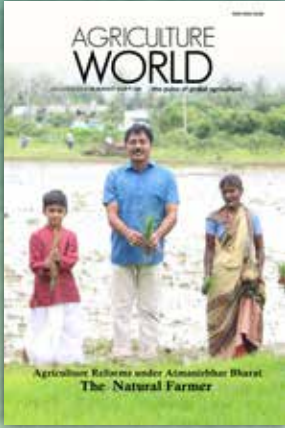


Fig. -2 : Intervention Framework with a Tribal Farmer

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India is characterized by a complex mosaic of diverse agro-ecosystems, differentiated by their climatic, soil, geological, vegetation, and other natural features. India is the leading producer of several agricultural products like fresh fruits, vegetables, major spices, crops in the world. People of this country are predominantly skilled in farming and merchandise, as a result of which the agricultural sector of India has an overwhelming size of nearly 3 million metric tons.

Since the supply of potential workers is so large, the labor costs are steeply low, therefore the agricultural sector is ever blooming. In a developing country like India, farming is an integral part of the economy, hence technology has been introduced lately to boost

productivity. For several years, farmers have been relying on the conventional methods of producing and yielding the crops. In the past few years, Andreas STIHL has played a pivotal role in the farming industry. STIHL has taken farming to a new high with the help of their innovative and latest farming equipment. Their excellent innovations have set a benchmark in the industry where the quality, durability and credibility of the products speak for themselves.

In addition to the machinery tools, there are training facilities where authorized STIHL dealers can receive training for the same, along with direct communication with the customers. The company is not only focusing on just selling its products, but it is taking long strides to reach out to potential new

customers, hoping that they would see and understand the added value that machines and technical aids could bring in to the agricultural sector. With a road show customized for this purpose, called the 'Parivartan Yatra' (Journey of Transformation), STIHL dealers are visiting even remote areas, using videos to explain product applications on-site, holding machine demonstrations in the field and seeking direct dialogue with farmers.

Farmers can now afford branded products like the STIHL MH 710 much more conveniently. These are widely used by various end users related to Professional logging, Landscaping, Horticulture, Agriculture, Plantations and government institutions like Railways, Disaster management, Emergency Services, Health Services, Municipal Corporations and Defence Establishments inclusive of Army, Navy, Air-force, Police and Forest services.

The modern techniques like SRI – System of Rice Intensification has increased the production units in recent days by using STIHL equipment. Another new addition in the list of machineries is the STIHL MH 710 power tiller. Also for the generous requirement in the Indian market are machines for cultivating and harvesting tea leaves, with a varied demand of harvesting other seasonal crops. The tools are credible, economical, robust, and versatile and are easy to repair, by the owners themselves. It offers several other important equipment, such as the STIHL FS 230 clear-

ing saw and STIHL MS 180 chainsaw. STIHL records the world's biggest selling chainsaw brand since 1971. A special mention goes to the STIHL professional range chainsaws which were essentially used during cyclone Amphan in the busy metropolitan cities. It's a 90 years old Germany based company, & one of the leading global firms in the field of outdoor handheld power tools that include chain saws, brush cutters, hedge trimmers, blowers, backpack blowers, vacuum shredders, telescopic pruners, earth augers, rescue saw & cut-off saws and a whole range of cleaning equipment.

With a combination of improved technologies, increased mechanization, new irrigation procedure and government-supported pricing policy, the Indian agricultural sector is now creating new growth figures. It has brought in a revolution, a far-reaching change in the farmers' lives and working conditions.

In the words of Parind Prabhu desai, Managing Director of ANDREAS STIHL Pvt. Ltd, STIHL knows the farmers, the growing conditions and the equipment they need. That serves as an advantage to them. India, with a varied topography, offers a wealth of opportunities for the specialized tools of STIHL in the areas of forestry, agriculture, horticulture and landscaping. Their innovation has created a path breaking impact in the farming sector, thus becoming the future of farming and irrigation in the country.



A Promising Intervention By Utthan in the POST COVID Scenario



Dr Lakshmi Unnithan
Editor - AW



Kitchen Gardens

The COVID-19 pandemic has affected the entire globe. It has nevertheless unfolded the most challenging health risks and economic burdens on those communities, women, men and children, who were already on the margins. The immediate effect has been the loss of daily wages and the inability to access basic needs of food and nutrition. Government relief alone is unable to meet household requirements. Women headed households, pregnant women, Dalits, minorities, backward castes and nomadic/denotified tribes as well as people with disabilities are the most vulnerable.

Bhavnaben Makwana, Ranadhar vadi vistar, Morchand village, Ghogha block, Bhavnagar, Gujarat shares with us that although the Panchayat organized to ensure they received their share of the announced ration relief, it did not last long. Due to the COVID crisis she shares us that her husband also lost his daily wages due to closure of the diamond polishing unit he used to work at. The Unit has at present started functioning but it is a very crowded working space but they fear infection, she says.

They are 25 families in Ranadhar hamlet (vadi vistar), and Bhavnabens home is 6kms away from the village, Morchand. They would commonly purchase vegetables from the Ranadhar crossroad shop, 4 kms away, which was closed due to the lockdown. Not all families grow vegetables in their hamlet and during the lockdown, they were unable to buy any. With Utthan's support, they decided to take up kitchen gardening since they have some water available from the joint family well. They generally share vegetables with their neighbours and in this crisis only we can help each other says Bhavnaben.

She continues to say that the Kharif crop needs to be taken care of too so we both are engaged in that. We have about 0.8 acres of land, where we grow cotton, some bajri for consumption and

some vegetables. Our cotton crop from last Rabi failed due to the pink bollworm and we incurred losses. We have grown some groundnut this season. Especially after this crisis, I want to grow more Bajri on my land and ensure my family's food security."

Bhavnaben has been trained in sustainable agricultural practices in the past 1.5 years. She has enthusiastically trained several other women. Her willingness to share her learning's and motivate others is commendable. She herself demonstrated to other relief recipients on sowing seeds and application of scientific methods in vegetable cultivation.

Utthan's continuous contact with the communities it serves brought out that many villages did not have easy access to vegetables or quality sustainable seed varieties. Being cash strapped, most families would not prioritise vegetable purchase. The worst sufferers would be women and children, as patriarchal practices in families lead to prioritisation of others. Many landless families do not even have the option to grow vegetables. Diversification of agricultural production can help address these environmental challenges and transition from 'calorie-rich' to 'nutrition-rich' food systems. Developing sustainable food value chains could drive food system transformation.

Nutritious Food became the only priority during Lockdown and we hope that continues. There are many Organisations who came forward to encourage nutrition gardens and all the more incorporation of Local vegetables to improve the nutrition and health, community, culture and ecology. Utthan, an organization from Gujarat was in continuous contact with the communities it serves and they noticed that in the Covid times many villages did not have easy access to vegetables or quality sustainable seed varieties. Being cash strapped, most families would not prioritise vegetable purchase. The worst sufferers would



be women and children, as patriarchal practices in families lead to prioritisation of others. Many landless families do not even have the option to grow vegetables.

Intervention: Kitchen garden kits were provided to 2514 families across 53 villages. Six varieties of seeds were provided to 864 families in coastal and 1650 in tribal areas. The bio fertilizer requirement is being collectively produced by women's groups/ sustainable agriculture women trainers. The kit was apt for around 1000-1500 sq.ft. of designated land area or for land around people's homes. Locally researched and truthful seed varieties of lady's finger, cluster beans, black eyed pea, bottle gourd, bitter gourd, sponge gourd/ridged gourd were distributed under safety guidelines developed by Utthan wherein use of masks, gloves and distancing by team and village volunteers were ensured. Panchayats and village leaders were roped in with good results. The complementary efforts to ensure good practices included use of digital awareness through pamphlets, videos on package of practices and bio pesticide production by women trainers in 'sustainable agriculture practices'.

The Pallavi Sobti Rajpal, Deputy CEO, Utthan says initial process of identification was through

community leaders of panchayat network, who helped in ensuring an open process of selection. Physical monitoring was done by field team and community leaders. A quick exercise was done to understand the outcome and also to motivate the participants to grow vegetables.

Category of Relief recipients

The consciousness building efforts for compassion needed during this crisis has led to a commitment by 2514 families to support another 7500 families, especially those who are landless and are unable to grow vegetables due to lack of land or water resources. This is estimated to support nutrition security of 700 grams/ day of vegetable supplies to 7500 families for 2.5 months between mid-July to September'20. This quantity suffices for the needs of an average family size of six. We hope there should be more organisations that should come forward for encouraging and making women understand the importance of adding nutrition by the growing diverse food baskets through nutrition gardens near homes. Utmost importance should be given to the well-being of women and children at these challenging times and none other than a kitchen garden around home spaces.



Value Addition of Dehydrated Flowers and Foliage and Encouraging Entrepreneurship

Ritu Jain, Babita Singh, Prabhat Kumar and Prativa Anand
 Division of Floriculture and Landscaping,
 ICAR-Indian Agricultural Research Institute, New Delhi 110012



Flowers have long been admired by humans to beautify their environment. These are also an object of ritual, religion, romance, medicine and source of food. Around the world, people use flowers for a wide range of events and functions that are most important in one's lifetime like as tokens of love or esteem, or remembrance, flowers for the party, wedding, decorations. Floriculture has become a lucrative business in many parts of the world including India. Even garden lovers and amateurs grow flowers around their homes; dedicate entire part of their living space to flower gardens. Fresh flowers though quite attractive; are very expensive and short lived as well as available only during a particular season. Sometimes farmer cannot get the price of the produce due to glut in the market, therefore, flower dehydration and value addition is one of the best alternatives under such circumstances. Flowers can be dried with a high precision so that they look like natural fresh flowers and can be cherished for a longer period of time.

Dehydrated flower and foliage products are long lasting and retain their aesthetic value irrespective of the season. The shelf life of dehydrated flowers and foliage may be reasonably long if protected from moisture and dust. Dried flowers and plant parts have been exported for the last four decades and today these are in very high demand and add an enriched value to the flourishing industry. India is one of the leading country and export more than 60% dry flower products and major export destinations of Indian floriculture products are Europe, USA and Asian countries.

Different types of colourful flowers and foliage are grown in rural and hilly areas at different seasons but are wasted under natural process; therefore, to conserve these beautiful vegetations for longer time, dehydration technique seems to be very beneficial. Dehydration of flowers and foliage by various methods can be used for making decorative floral crafts items like

greeting cards, floral segments, wall hangings, landscapes, calendars, potpourris etc. for various purposes. Extensive plant parts like stems, roots, shoots, buds, inflorescences, fruits, fruiting shoots, cones, seeds, foliage, bracts, thorns, barks, lichens, fleshy fungi, mosses etc. are used by drying them. There are many flowers like anemone, zinnia, allium, sweet William, carnation, stock, freesia, narcissus, chrysanthemum, pansy, daffodils, marigold, rose, lilies etc. and foliage like ferns, aspidistra, eucalyptus, ivy, laurel, magnolia etc. responds well to different types of drying techniques.

The demand for dry flowers, dry foliage, attractive plant parts, dried floral arrangements and floral crafts is increasing day by day. There is a large potential to develop the dry flower industry in every country to provide employment to house wives, school dropouts, rural women etc. This concept of using dried plant material, which is known for their long-term beauty and elegance, has given hobbyist and entrepreneurs a new, exciting and profitable ornamental business. In other countries, the dried flowers industry is quickly developing and gathering demands among clients who prefer the natural looks in their surroundings like homes office etc. Dried flowers also offer a value-added opportunity for producers who supply raw materials to wholesalers, retail florists and craft retailers.

There are different techniques of drying for obtaining good quality flowers and foliage:

1. Air drying: This method of drying is very common where the plant material is tied with rubber bands and attached to rope or wire in hanging position in well ventilated dark area. Flowers may also be dried if are spread over blotting paper or newspaper etc. and kept in dark or in the sun for quick drying. Slightly immature stage of good flowers should be selected for air drying.

2. Press drying: In this method, the flowers and foliage are placed between the folds of blotting papers and newspaper sheets. For quick drying these can also be kept in oven at an appropriate temperature. Floral crafts items like greeting cards, floral designs etc. are made by this method as by doing so flowers and foliage becomes flat and these creations may be framed also. There

are different types of plant materials which are used in press drying at different temperatures and time period as follows:

3. Embedded drying: Embedded drying is one of the most important methods of drying flower as the flowers retain good shape and colour. Different desiccants like sand, borax, silica gel, saw dust, perlite and their combinations are used for embedding material and it vary for cultivars. Silica gel is considered ideal for delicate flowers like roses, dahlia, carnations etc. Deep containers for embedding drying also plays important role in maintaining shape and form of different plant materials. Embedding of rose buds in silica gel is considered to be the best as it retains its colour and shape. Sometimes fine sand is also used which seems to be the best because it is easy to handle, heavy and doesn't react with water vapours.

4. Oven drying: In this method plant materials are kept at controlled temperatures for a specified time period to the objective of retaining original colour, shape and texture etc. Microwave oven is considered to be the best for drying in which flowers and foliage kept in the embedding material in non-metallic or glassware's .

5. Glycerin drying: This method is mostly used for preserving leaves. Different concentration of glycerin and water and methods are used for foliage drying. Immersing the thick foliage (Silver oak, Rubber Plant, Cordyline etc.) in glycerine solution in a concentration of 1:2 or 1:3 results in preservation in 7-10 days, while thin textured leaves (Boston fern, Asparagus etc.) are dried by uptake method in 4-6 days. Once the colour of leaves turns darker, it indicates that foliage is glycerin dried and can be stored after wiping with wet tissue and subsequent drying in air. Traces of antibiotics are also necessary in glycerin so as to prevent the microbial growth as it serves as a good source for microorganisms. Different spp. etc. is used by this method.

6. Freeze drying ornamental plants like *Aspidistra* spp., *Fatsia japonica*, *Mahonia* spp., *Magnolia* spp. and *Eucalyptus*: It is the most effective method of flower preservation which relies on the principle of sublimation. Hence, colour and even fragrance are retained. In this method flow-



ers are placed into a refrigerated chamber below the freezing and vacuum is created which causes the moisture to sublime, or to change from solid to gaseous form. Several varieties of different flowers can be successfully dried and remained naturalistic in appearance.

Once the flowers and foliage are dehydrated these can be converted into many exquisite value added dried flower products like:-

a) Dry flower arrangement: Dry flowers may be arranged in bouquets or wall displays after fastening them to decorative bands. Pressed leaves and flowers may be laminated (which extends the life of the product) and arranged in an album. e.g. Helichrysum, Delphinium, Helipterum, Amaranthus, Nigella, Carathmus, Gypsophilla and Rose etc.

b) Bouquets: A flower bouquet is a collection of flowers in a creative arrangement. Bouquets are arranged in vases, urns using floral bricks. The style of flower arrangement can be either traditional or modern.

c) Potpourri: Potpourri is a mixture of dried,

naturally fragrant plant parts, used to provide a natural scent. It is usually placed in a decorative wooden, glass or plastic bowl, or tied in small bags made from sheer fabric.

d) Floral Jewelry: The dried flowers can be electroplated with gold and platinum to make exquisite jewelry. Orchid flowers are widely used in Thailand, Singapore and Malaysia to make electroplated jewelry.

e) Press dried flower products: It includes a wide variety of products suitable for different purposes like wall hangings, greeting cards, collages, book marks, paper weights, value added paper bags, diaries, file covers etc.

For developing the entrepreneurs, value addition through dehydration has a great potential to develop new market, as there are many opportunities of diversification of products. Moreover, there is a need to create awareness among people and to impart skill for this technology. So that the house wives, unemployed youth, school dropouts, amateurs, enthusiastic etc. can utilize this technology to earn their livelihood.

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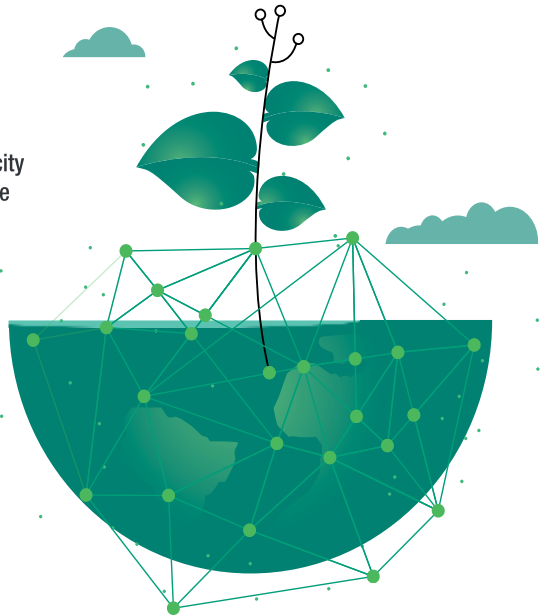
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