

# Back to Basics

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## 1. Introduction

Farmers, the backbone of India, are committing suicide in huge numbers. They say that the reason behind this is extremely low output, both quantitatively and qualitatively. So, the government is trying to help them wherever it can. The Green Revolution was started as a result of this. Fertilizers, pesticides, insecticides, water pumps and a lot of other supplementary resources were provided to farmers to make working in farms easy. Subsidies were given at every point so that poor farmers could make use of new technologies in the market. This led to extensive use of chemicals in the soil. The feedback cycle started. Farmers started using chemicals more than ever which ultimately brings us to today, when the quality of soil has deteriorated so drastically, that there is no going back. Or is there?

The Green Revolution increased the production of *wheat* and *paddy* multi-fold. At the same time, the amount of energy and time needed in the farm decreased significantly. This encouraged farmers everywhere to plant wheat and paddy. These crops were produced at comparatively cheaper rates and gave high returns. The consumers had adapted them in their daily diet well. These two crops were easy to grow and it almost turned into a fashion.

However, there are a few things to ponder. What did the farmers grow before this? Producing wheat and paddy without government intervention was quite a difficult task. They did not do it. They produced different types of millets, which were consumed as staple food in all parts of the country since long. This practice started fading with the entry of newer technologies and chemicals. Farming became so convenient that the farmers started forgetting their age-old practices. But, nature hasn't. It is not used to the artificial chemicals being pumped into it. It is dying.

Now that these new methods are not sustaining themselves, why not go back to millets?

## 2. Why Millets

Millets are small-seeded grasses that are hardy and grow well in dry zones as rain-fed crops, under marginal conditions of soil fertility and moisture. Millets are also unique due to their short growing season. They can develop from planted seeds to mature, ready-to-harvest plants in as little as 65 days. This is important in heavily populated areas. If properly stored, whole millets will keep for two or more years.

Millets are highly nutritious and non-glutinous foods and do not form acid. Hence they are soothing and easy to digest. They are considered to be the least allergenic and most digestible grains available. Compared to paddy rice, especially polished paddy rice, millets release lesser percentage of glucose over a longer period of time. This lowers the risk of diabetes.

Millets are particularly high in minerals like iron, magnesium, phosphorous and potassium. Finger millet (Ragi) is the richest in calcium content, about 10 times that of paddy rice or wheat.

### Advantages to consumers

1. **Highly nutritious:** All types of millets are highly nutritious in nature. Different millets specialize in different nutrients. A table of comparison is shown below. The nutrition qualities of paddy and wheat are also shown in end for better comparison.

Table 1: Comparative of Nutritional Content In Different Millets, Paddy & Wheat

	Protein (g)	Carbohydrates (g)	Fat (g)	Minerals (g)	Fiber (g)	Calcium (mg)	Phosphorous (mg)	Iron (mg)	Energy (Kcal)	Thiamin (mg)	Niacin (mg)
Finger	7.3	72	1.3	2.7	3.6	344	283	3.9	336	0.42	1.1
Sorghum	10.4	70.7	3.1	1.2	2.0	25	222	5.4	329	0.38	4.3
Pearl	11.8	67.0	4.8	2.2	2.3	42	-	11.0	363	0.38	2.8
Foxtail	12.3	60.2	4.3	4.0	6.7	31	290	2.8	351	0.59	3.2
Little	7.7	67.0	4.7	1.7	7.6	17	220	9.3	329	0.3	3.2
Kodo	8.3	65.9	1.4	2.6	5.2	35	188	1.7	353	0.15	2.0
Proso	12.5	70.4	1.1	1.9	5.2	8	206	2.9	354	0.41	4.5
Barnyard	6.2	65.5	4.8	3.7	13.6	22	280	18.6	300	0.33	4.2
Paddy Rice	6.8	78.2	0.5	0.6	1.0	33	160	1.8	362	0.41	4.3
Wheat	11.8	71.2	1.5	1.5	2.0	30	306	3.5	348	0.41	5.1

2. **Beta Carotene:** Millets contain Beta Carotene in good amounts. The human body converts beta-carotene into Vitamin A (retinol) - beta-carotene is a precursor of Vitamin A. We need Vitamin A for healthy skin and mucus membranes, our immune system, and eye health and vision.
3. **Gut Bacteria:** It is the bacteria that resides in our intestines. The bacteria helps improve immune health, mood and mental health; boost energy levels; improve cholesterol levels, regulate hormone levels, reduces yeast infection occurrences, supports healthy weight and improves oral health. **Non-glutinous:** People with coeliac disease, gluten intolerance, or the uncommon skin condition- dermatitis herpetiformis, can have nasty reactions if they eat glutinous food. Millets are a good option for them.

## Advantages to producers

1. **Rain-fed crop:** It is a rain-fed crop. There is a minimal requirement for irrigation through modern means, which saves farmers from renting out costly irrigation facilities. It does not use up too much water, and ground water can also be retained.
2. **Low inputs:** It requires very low amount of inputs like water, fertilizers, insecticides and pesticides compared to wheat and paddy.
3. **60-75 day cycle:** It has a short cycle of 60-75 days which allows more than one crop a year. Farmers are encouraged to take up as many as three cycles of crops for better utilization of land.
4. **Hardy crop:** These crops are quite rugged. They require very low inputs as mentioned, can sustain in all climates and weather and need little care during production. Also, they are not prone to damage due to insects and pests like other crops.
5. **Export market:** There is a huge export market for these crops. As of now, very few organizations are doing this, but it can be well anticipated that export of millets can be the next uptrend quite soon.

## 3. Earth 360

Through his years at the University of Mysore as an engineering student, Dinesh had been engaged with the amateur naturalists club and several environmental movements, like “Save the Western Ghats” movement, and regularly conducted environment education camps for students. Soon after completing his degree in 1992, Dinesh moved to live and work at Timbaktu Collective - a community working on farming and environment. Dinesh was one of the first people to join and settle in Timbaktu. Based in Anantapur, an extremely arid district, Dinesh anchored solutions in the conditions of water scarcity, poor access to markets, erosion of soil etc.

Between 1997 and 2002 Anantapur faced severe droughts. The farmer families lost almost half the cattle in this period. Living with the farmer communities during this time and working with them to mitigate the consequences of the droughts had made Dinesh think about long-term solutions for rain-fed agriculture.

This led to Dinesh working on millets, and eventually starting the Millet Network of India, promoted by Deccan Development Society in 2008, along with several like-minded people. The turning point for him came in 2009. Anantapur was again facing a drought with over 85% of the district land

being left barren; farmers were selling their cattle to butchers. Based on his knowledge of millets, Dinesh steered an effort to find and distribute millet seeds to the farmers as a contingency crop. As millet production in the country was nearly non-existent, finding seeds proved to be a challenge. However, Dinesh mobilized funds and a support network to distribute 15 tons of millet seeds to farmers, covering the area of 5000 acres.

It was the first time in 20 years that this crop has been sown in the area. Despite severe shortage of water, 50-60% of fields were harvested to provide food and fodder. Trying to investigate the reasons for which farmers abandoned this seemingly highly beneficial crop, Dinesh realized that the absence of appropriate processing and marketing was the main gap. Determined in his belief that millets were a sustainable solution for rain-fed agriculture, Dinesh set out to fill existing gaps by formally starting Earth 360 in 2010.

### **Vision**

*To be a leading organization in millets value chain activities and to create an easily replicable sustainable model for all villages.*

To respond to the growing demand for millets and support local farmers, Earth 360 is creating a network of entrepreneurs who can set up local processing units. It is catalyzing ‘small-scale rural millet economies’ that are equipped to produce, process and distribute millets locally.

Earth 360 mainly works in three areas:

#### **1. Production**

Network Sanghas of farmers were made stronger. With this, it was easy to disseminate information, have them produce the same kinds of millets, and match their times of harvest. This led to ease in providing inputs with benefits of huge scales and use of the learning curve. They provided training in millet cropping practices to ensure that there is maximum output and no information asymmetry. They encouraged local production of organic inputs to further reduce the costs. Earth 360 also prepares organic inputs from the husk waste it generates during millet processing. Every area, depending upon the climatic and agricultural land, has the best conditions to produce a particular type of millet. Earth 360 encourages farmers to grow those millets and incentivizes farmers for village level seed production and storage.

#### **2. Processing**

To sustain millet production, it is necessary to have proper processing units so that the produce can be sold. Earth 360 provides full services for millet

processing, from cleaning to grading to de-husking. The final product it sells to customers is in the forms of millet rice, semolina and flour.

### 3. Propagation

The last stage is the propagation of millets. This is mainly done by arranging awareness programs with consumer groups. Training sessions are arranged to teach millet cooking and to share recipes. Special diets for chronic diseases are highlighted. A strong network is established and maintained with congruent entities and people.

## 4. Millet Processing

Earth 360 was one of the pioneers which worked intensively to revive millets. But just encouraging farmers to grow millets would never bring the expected revolution. There should be a robust infrastructure in place that can sustain millets in everyday lives. This situation made Earth360 work on the entire value chain of millets. It starts from the beginning by providing millet grains to farmers, according to their needs of cultivation. The cost of this seed is quite nominal compared to that in the market. This is to ensure that the farmers use only those millets for production. They are of supreme quality and give exceptional returns.

This produce is more often than not bought back either directly from the farmers or through traders. Due to logistical difficulties, buying millets from traders is desirable. They directly deliver the goods in the factory warehouse with less lead time and without letting the quality degrade.

Depending on the demand and supply of different kinds of millets, their processing is queued up. It has been seen that typically, the same kind of millet is processed for 3 to 4 days in a loop. But then again, it primarily depends on the inflow and outflow of different millets.

After the decision is made on which millet should be processed, the millet grains are shifted from the storage area to the plant. The storage area is kept clean and dry to avoid damage of goods. There are 2 to 4 men employed for this task. The storage area is in the factory itself, about 200-300 meters from the plant. Processing starts immediately after this.

The first step is **Grading**. This step separates millets from waste on the basis of size. It is done in a machine called grader. The grader continuously vibrates in an eccentric motion to give the required result. There are 2-3 women with each grader for feeding millets as the input and collecting the output from the machine.

After this, the graded millet goes through a **Destoning** process. Here, millets are differentiated on the basis of their weight. This helps to remove small pebbles which are slightly heavier than millet grains. The machine is called destoner and typically, 2-3 women work with it. It has a sloping plane and moves in a continuous eccentric motion to get the desired result.

Next in line is **Hulling**. This is done to remove husk from the millets. For this, millets are first passed through an **Impeller** which is attached on the top of a machine. It rotates with an extremely high centrifugal speed and so after the millet grain collides with the lining of the machine, the impact removes the husk from the grains. The huller then separates the husk and the millet grains.

Typically, these three steps are repeated several times to get quality output.

The next step is manual verification, which is done by 6-7 women in a traditional way. Then the output goes for packaging.

The output is in three forms. Chiroti Rava is the finest in texture. Less than that is idli rava and then the least is upma rava. All these are packed and sold. Apart from that, the waste byproducts are used as cattle feed and husk is primarily used as a fertilizer. Thus, broadly, we have three outputs - rice, nuka (broken rice) and feed.

## **Ravindra's Story\***

Ravindra was associated with Rural Education and Development (RED) society since his early days. In the year 2008, Timbaktu collective had arranged a seminar to promote the nutritious goodness and benefits among farmers. Dinesh was the main spokesperson of this seminar. Ravindra attended that meeting along with his acquaintances Maula and Devendra. All three of them got so interested in millets that they decided to join Dinesh in the revolution that was about to begin.

These four were the initial leaders in the community who encouraged other farmers to grow millets and spread awareness of its nutritional benefits. In the first year itself, they distributed about 3 tons of millets in 5 villages to the farmers for cultivation. Apart from that, they provided farmers with knowledge and training for millet cultivation using the Nagu method. About 25% of the farmers who were introduced to this new crop and method opted to sow millets in the first year itself. With this, Ravindra started working with Dinesh for Earth 360.

The place of operations was narrowed down. Kadiri was chosen among all the villages because farmers still practiced growing millets here; though the practice hadn't died here, it had slowed down drastically. This gave Earth 360 a platform they could build upon. As they had already worked with the villagers in this area before, it would be easier for the people to encourage millet farming. Taking these things into account a small room was rented in Saidapuram, which would serve all the needs of the project. A month-long discussion for future plans led to the installation of a 100 kg capacity de-stoner. They went to Pulliviadella to check an old de-stoner machine and tried to modify it to suit millet processing. The main problem with these de-stoners was that they were designed to work for grains like paddy and wheat, which are quite big compared to millets. It could not separate them both effectively. Due to this, in later stages, stones got crushed along with the millet grains. This gave a low quality output, making the produce unfit for sale. This was a big problem. All the machinery required for millet processing needed to be modified.

In 2010, Dinesh went to Selum where he carried out research along with Bhavani, a designer, to create a processing machine fit for millet de-stoning. The new machine had a capacity of 500 kg. While they were working on this, the rest of the team was busy encouraging farmers to grow millets and was distributing raw material required for it. Along with that, the main aim was to conduct a market study to check the response of the product in the market, and work towards improving its quality. Finally in 2011, after being satisfied by the output they had obtained with new machines for processing, a step ahead was taken. New value-added products were introduced in the market and the consumer base was increased.

In all this time, the working of Earth 360 had been quite flexible. Though the roles were not well defined at the time, Maula was the factory in-charge, Ravindra kept up with procurement and village interface and Devendra mainly handled administration issues.

All of them continuously tried to decode the market information they collected. At a very early stage they realized that returns are the most important parameter for a farmer to choose what to grow. Returns from millets were quite less compared to that of cash crops. This was the main reason why farmers used to shy away from growing millets. They got about Rs 8 per kg for millets during the early years. So, in total, they just grew 5 to 6 tons. The team then decided to buy back the millets from farmers at Rs 10 per kg to encourage farmers to increase production. During this time, there was a sudden rush of awareness about millets in the market through different means like media, news items, health awareness programs, etc. This made it easier for them to sell millets. This also led to an increase in the price of millets, which reached the peak price of Rs 35 per kg in a short time of 3 to 4 years.

Four years ago, in 2016, about 350 to 400 farmers entered their eco system. This gave them enough raw materials to process. This led to one unavoidable problem. The shelf life of processed millets was only one month. So, the inventory

turnover needed to be high. This meant that they needed a big market for their outputs.

In the year 2014, Ravindra left Earth 360 to work as a trader. He buys from farmers and sells to processing units. He has 8 to 10 clients, Earth 360 being the major one and taking 30% of the share. The other clients have processing plants and the millets are not polished. These clients are mainly from Hyderabad and Tamil Nadu. He works with about 330 farmers from 15 villages and collects their produce. He has appointed an agent to help him with 3-4 villages. He plans to grow organically and wants to make millets the staple food. This is what makes Earth 360 so special. Once you get a glimpse of their ecosystem and know about their values, you just cannot ignore them.

### **Kaulige\***

Narayana and Arun were members of the core team of Earth 360. They loved the idea of bringing millets back to the plate. After working with Dinesh for a few years, they realized that something was missing. They loved Dinesh's intensions. But, they weren't sure if that was enough. Dinesh, having worked in an NGO in his past years, had no business experience. Thus, most of the work done by him revolved around preaching the cause and working towards it. He did little about showcasing the idea.

To bridge this gap, Narayana and Arun started Kaulige for good business. Though an independent entity by itself, they like to think of themselves as the front end of Earth 360. Earth360 and Kaulige Foods is a unique collaborative initiative dedicated towards the revival of millets. They buy almost 10 tons of millets every month. It is based in Bangalore, with a pretty good market, and they don't have any plans of expanding geographically beyond Bangalore in the near future. They

promote a good cause and earn well too. Kaulige Foods works towards reintroducing millets to the mainstream diet of Bengalurians by conducting awareness workshops, offering catering services, tiffin services, supplying millets and millet based bakes. The above collaboration offers a sustainable business ecosystem that promotes the philosophy of “farm-to-table”. In this model, the farmers get the right price for their produce and the consumers get nutritious whole grains grown in a traditional, sustainable way.

Narayana is the program manager, Arun is the operations head and Aditya is the marketing head. The three of them make up the core team. Apart from that they have a trained cook who prepares delicacies from millets, and a delivery manager.

Kaulige has its own strategies to promote millets. The most important of its jobs is to tell people about consumption of millets. They employ various ways to promote them. A large part of Kaulige’s work is conducting workshops in corporate offices and apartment complexes. These workshops demonstrate the use of millets in simple everyday recipes, and show the participants what millet seeds and final products look like. They provide catering services to give a taste of millets. They sell bakery items like cakes and cookies to create liking in youth and children. Every Sunday is celebrated as Millets Sunday, where they teach cooking millets based on different themes. The theme of diabetic friendly recipes is liked the most. As of now, Kaulige has 100 regular customers and 500 listed ones. It has been almost one year since they started in 2015 and are growing organically as planned. One of the highlights of Kaulige is that the millet grains it sells are affordable and they don’t gain much profit from these sales. But, with value added consumables like cakes and cookies, the margins are safe enough to sustain them. This way, millets can be included in everyone’s diet.

Though in its inception phase, people at Kaulige have started anticipating problems. With further increase in sales, there are going to be logistics issues. The supply chain on the customer side still needs to be developed. As food is a perishable item,

inventory handling needs to be done in a proper, scientific method for optimal returns. Good manpower will be needed for that. Getting people who are driven by the same cause as them are very hard to find and retain. This is the major challenge for people at Kaulige which needs to be crossed.

### **Kalyani Akka\***

A loving mother, a perfect wife, a caring human, an awesome cook and a humble being - she is all that and more. Kalayani akka is like a super woman.

She started work as a teacher. She was working with the Timbaktu collective along with Dinesh. When Dinesh got interested in millets, she was the one who played a major role in experimenting with the recipes. She shifted from a town to stay in village Kadiri to help Dinesh in his cause. "I never thought I'll give up teaching to be part of a business!" she recollects. But then, when it came, it was so obvious that the role was meant for her. Apart from Dinesh, she is the only one who has been with Earth 360 since the idea was incepted. While Dinesh is mostly chasing the cause, Kalyani akka works better on managing the cause. Quite sincere herself, she clearly knew what her role needed to be to make this venture more successful.

During the initial stages of Earth 360, while Dinesh was encouraging producers to grow millets, Kalayani akka made it a point to encourage customers to try out the recipes by giving demos wherever possible. A great cook herself, she cooked everything she could think of using millets. She even published her recipes of Andhra-cuisine that had everything made from different types of millets. She used her skills to encourage people to taste millets. She made a point to have the visitors of melas get a taste of millets. She organized workshops

and seminars that gave an encounter to millets as well as its delicacies. Now when Earth 360 is past its initial stage, her role has changed and she is flexible enough to adapt it. Apart from being in the board of directors, she has now taken the responsibility to formalize the way Earth 360 works. She is trying to bring professionalism among all stakeholders of the organization. The major role for her, now, is to coordinate between different teams and bring coherence between them.

Kalyani akka gives you an impression of true women empowerment. She shows us a success story by creating a work-home balance. Cheers to this form of womanhood!

## 5. Opportunities

The cofounders have already worked in the area before and know the socio economic and political conditions. They have also worked with millets through different agencies and know it well. This gives them an upper hand of established ground work in terms of implementation.

While the environment is degrading at a faster rate than it can be replenished, there are agencies and government organizations that are encouraging alternate cropping methods. Millets are best suited for this scenario. There is a potential for at least one kind of millet in all the regions. They can be grown even in arid regions and are suitable where ground water level is low because of less requirement of water.

Increased health awareness has led to new try outs of healthy food and people are ready to substitute them in their daily diet. It was successful for oats. Millets, on the other hand are locally grown, come in different varieties and are comparatively cheaper. These traits must encourage people to bring millets into their daily diet. This opens up a huge virgin market to cater to with the first mover's advantage.

There is a proposition to include millets in the PDS. There have already been some pilot projects regarding the same by the government before. Dinesh was one of the participants of a pilot project in one of the areas. There is a lot of opportunity for Earth 360 to sell millets through government interventions in such cases. Also, if millets do get included in the PDS, there are high chances

of government schemes for production and processing of the same. This would incentivize farmers more to grow millets.

## 6. Challenges

The biggest challenge in the process is the unavailability of proper machines. After the Green Revolution, because of exponential increase in production of wheat and paddy, a lot of investment was done in research and development of the processing machines of these two grains. Millets, on the other hand, are quite small and light compared to wheat and rice. It is not feasible to use same machines for millets. This leads to a circular problem - as processing machines are not available, millets are not grown in huge volumes; as production is not in huge volumes, there is no investment to design processing machines for millets. With proper machines, the processing costs will further go down and people will be encouraged to buy more millet.

A paradigm shift has been seen in the food mosaic in the recent years. The staple food of every region has changed and is mostly either wheat or paddy. There is a misconception that millets are heavy to digest. Due to reasons like this, people shy away from consuming millets. One needs to change the core eating habits to include millets in the diet, which is indeed a big challenge in itself.

The problem quite specific to Earth 360 is very low employee retention rate in the upper crust as the returns are not as high as expected and better prospects are easily available. It is also very difficult to find someone who is driven by the same cause and is ready to work with the same enthusiasm and abilities as its co-founders. This mismatch doesn't really work well in the ecosystem where coherence among its employees is very important for survival.

## 7. Future Plans of Earth 360

The future of Earth 360 depends on how well the model is replicated. As India is a diverse country in terms of climatic conditions, agricultural land, food habits, cultural activities, etc., it is very difficult and not feasible to implement the same model everywhere. So, Earth 360 plans to create a model that is rugged enough for millet production and flexible enough to adapt to different conditions. It wants to create an ecosystem that can bring out professionals who can successfully implement replicable models of the millet value chain across villages.

Diversification and extension in the millet value chain is possible and shows good prospects. This model is easily and effectively replicable for oil and daal. Thus, it is easy to increase the scope. The same established channel of millet chain can be used for both without much disturbance. This will give economies of scale in terms of logistics.

Millet restaurants of different models have failed in previous attempts. Though the idea still remains as fancy as before, it is difficult to have a business plan in place that can be implemented properly and give a successful restaurant.

# Annexure

## Time-Line\*

Pre 2008: Engaged with farmers and studied millets, its market and its nutritional benefits.

2008: A pilot was started to include millets in the PDS

2009:

- Draft business plan was prepared.
- Presentation in XIMB - small grains, big benefits: Jab we Millets
- Ground work was done for the establishments.

2010:

- 1<sup>st</sup> May - Try to get incubated by XIMB
- 23<sup>rd</sup> April - Formalization and registration of the organization
- June - Production started
- 30 tons of seeds worth Rs 10 lakh were distributed among farmers of 5 villages
- 4<sup>th</sup> July - Product co-ordination office was established and de-hulling process was tried
- 14<sup>th</sup> December - Supported ALC with marketing issues of millets; got first interns from XIMB

2011:

- October - Earth 360 took part in 'Aadhaar', a mela that was put up in Mysore
- Jowar Pops were sold the most
- Took part in one more mela in Bangalore.

2012:

- Ravi got on board as auditor and advisor to formalize the business
- Cooking demonstration was done in Lal Baug mela in Bangalore
- A recipe book in Kannada was prepared
- 13 value added products were introduced

2013:

- Became part of a long-time exhibition at Ongola for the first time. It was 15-days long.
- Millet-based food was prepared for 300 people. Ram babu was one of the guests

- He planned to make an organic food restaurant - Aahaar Kutir
- Earth 360 collaborated with Aahaar Kutir in Hyderabad
- Peter came aboard for improvising processing machinery
- Recipe pamphlets were distributed with 2 kg packets
- More people got engaged with Earth 360
- A local millet based restaurant was started by a couple in Kadiri

2014: December - Got Ashoka fellowship

2015: Got institutional loans of Rs 20 lakh

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\*Based on primary data. Interview taken in June 2016 at Kadiri, Anantapur.

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