Anita Roddick, Founder, The Body Shop
If you landed from outer space, chances are you’d end up in a paddy field. Sounds surprising? But not when you realise rice helps feed almost half the planet and that almost a billion households in Asia, Africa and the Americas depend on rice growing for their livelihood. Hands On wades through the paddies to see how rice systems and rice products are leading the fight against world hunger and poverty.

NARRATOR
Nepal, a landlocked kingdom of mountains and temples where rice is the most important staple crop. Chitwan Valley at the foot of the Himalayas is the nation’s rice bowl. In the 1990s farmers noticed the native rice strains were losing their potency, lower yields and more susceptible to pest and diseases. To forestall a potential disaster the UK Department for International Development funded a scheme to safeguard rice production.

Hundreds of farmers were involved in developing new hardier strains and many are now experimenting on their own.

Agronomists from a local non-governmental organisation, Libird, at the Centre of Arid Zone Studies surveyed 648 farmers to assess individual needs for rice seed.

Farmers have created hybrids for thousands of years but now they can search the world for rice with specific characteristics to match local needs.

Krishna Joshi, Centre for Arid Zone Studies
We have tried to understand what their priorities are, what their problems are and what type of rice varieties they want to grow.

Based on that then we started looking into, into different rice gene pools.

NARRATOR
Gene banks in Nepal, India and the Philippines offer a choice of over ten thousand traditional varieties of rice. Just twenty-four were selected for the Nepalese farmers to try out. The goal was to find two parent types to create a brand new variety ideal for Nepalese conditions.

Devraj Sadkota
What people wanted was to have rice in their own fields which is best suited for our climate and our soil. That’s why this project is so important.

NARRATOR
The farmers recorded data on maturity rates, disease resistance and yields. Appearance and taste were also checked to make sure the rice would sell.

Krishna Joshi
Mostly the colour rice is high price in the market.

NARRATOR
The harvested rice was then collected from the farmers and their feedback evaluated. Two varieties, one from Nepal and one from the Philippines, emerged as ideal parents for the new seed stock.
After cross breeding it at IRRI's labs in the Philippines, a new variety was born, named JUDI 572. The new rice passes the agronomists’ tests but how did it go down with farmers and their customers?

The taste and aroma are a hit here too.

Inspired by the project many farmers have started experimenting with their own varieties.

Devraj Sadkota
I chose to breed a cross between Karinga 3 and IR 64 and although these were not selected by the project, at that time I decided to do an experiment under my own initiative and I introduced the seed myself and named it Devraj, my name.

NARRATOR
Encouraged, Devraj is now trying to create another breed. Success breeds success and not just for Devraj. Thanks to this project there are now over eighty new high yield rice strains being grown in Nepal’s Chitwan Valley.

Phul Kumari Mahato
With the old variety I was planting I was only getting a yield of ten to twelve quintals but with the new variety called Swana I’m getting twenty to twenty-two quintals. That’s almost 100% higher yield.

Devraj Sadkota
The seeds we used in the past were old and mostly infected with disease, but what we have now are resistant to pests and that’s why we have a higher rice production.

NARRATOR
The rice industry is seldom associated with Europe but rice is grown in Europe’s southern countries and is a staple food from Stockholm to Sofia.

NARRATOR
Not far from Cologne in Germany is a small factory that transforms rice grains into a popular and healthy drink, while a Belgian factory puffs them into cakes.

Rice drinks are gaining popularity as alternatives to dairy milk, boosted by their no fat and allergy free qualities.

Bruno Fischer, Natumi AG
A lot of people have too high cholesterol levels and Rice Dream is a cholesterol free product.

NARRATOR
So how do you turn a grain into a drink?

This organic rice is milled and cooked: fermenting produces natural sugars for a sweet taste. Sunflower oil makes the drink cloudy, just like cows’ milk.
Rice milk won’t put cows out of business but demand is rising for healthy alternatives.

**An Fonteyne, Biovita**
In the last five years there has been a much stronger demand amongst young people.

**Vox Pops**
Well it’s healthy for the family and known to be a quality product.

Rice milk is refreshing and it’s got a better taste than soya milk.

**NARRATOR**
There’s more proof that rice is big in Europe.

Another rice product, another European factory. This one’s in Belgium.

Here the rice grains are puffed like pop corn, pressed into rice cakes and marketed as a healthy snack. As well as being free from lactose, rice also has no gluten which in other grains can provoke allergic reactions.

**Wim Dekeyser, Lima**
Rice is in fact gluten free, and therefore it enables us to give people good quality foods they can use at breakfast but also as a snack.

**NARRATOR**
The puffed rice grains mean these snacks are light and popular with dieters.

**Wim Dekeyser**
Puffing machines allow at high pressure and heat to unlock the starch so that the rice cake is formed almost every seven seconds.

**NARRATOR**
The cakes can be given a sweet or savoury topping before being packed and sent to market. The growing popularity of rice based foods and drinks in Europe shows that this cereal shows vast potential as a money spinner.

**NARRATOR**
Rice is already the staple food for almost half the world’s inhabitants and with world population increasing by the size of Germany every year, the pressure to produce new ever more productive and disease resistant varieties will grow.

IRRI, the International Rice Research Institute, was set up in the Philippines to do just this and as one of the consultative group of international agricultural research, CGIAR Centres, its germ plasma bank houses a staggering ten thousand traditional varieties of rice which are available for cross-breeding into new strains. Now digital technology means that farmers the world over can have global rice expertise at their finger tips.

**NARRATOR**
As well as being the world rice germ plasma bank, it’s the biggest centre of knowledge for everything to do with rice but these days the library is quiet. IRRI has begun putting this
information into digital form with a new system called the Knowledge Bank and they have made it as accessible as possible. Step forward the Rice Doctor.

**Julian Lapitan, IRRI**  
You are going to the doctor. The doctor will ask you where, where the symptoms occur, when it occurs and what is the extent of the damage and perhaps he will select amongst these indicators the possible cause of the disease or the illness of the plant.

**NARRATOR**  
There are programmes giving advice for each stage of the growing cycle.

**Julian Lapitan**  
For a successful production meaning increasing yield, farmers have to undergo several decision-making process or processes to enable him to make the right decisions at the right time.

**NARRATOR**  
By replicating situations farmers are likely to encounter, they can work on solutions to their problems.

**Joe Rickman, IRRI**  
The other major problem that we also have on this, this farm here is with snails, and you’ll see here, this is a pretty good indication. These lines were all full lines and now you can see the gaps and snails are a problem because they like water. Also the reason we have water in the fields are to try and stop our weeds. So it’s a trade off.

**NARRATOR**  
But IRRI is best known for developing new varieties of seed for more efficient crop production even under difficult conditions.

**Joe Rickman**  
These trials are here looking at trying to select varieties which have a better drought tolerance, so basically we’re looking for a variety that actually uses less water but still can yield under a droughted situation.

**NARRATOR**  
There’s hard science research too. Investigators can work at the molecular level. It’s now much quicker to analyse and chose the huge variety of properties from drought resistant to nutritional quality. Here on Los Banos, an hour’s drive from Manila, IRRI can pass that knowledge direct to farmers.

**Eugenio Castro Junior, IRRI**  
Most of the technologies that we introduce are I would say are, there are some which are really location specific so in the case of our experiment at IRRI so this are the real needs in the field so that’s what our project’s usually targeting at. Definitely it would help the farmer to solve their problem.

**NARRATOR**  
Eugenio Castro is meeting a local rice grower who’ll be collaborating on trials of new seed types and growing techniques.
But this farmer had had great results in cutting out one of the most expensive and over-used inputs: pesticides. This means the natural predators of pests like these spiders can get on with the job of eating the rice pests.

Sesinado Masano
After more than thirty-two years growing commercial rice without having to barter deals, any drop, any single drop of insecticide on our crops we did not observe any loss like two percent, or never did we have serious infestation.

NARRATOR
Farmers here are unusual in having direct access to IRRI’s huge resources but the knowledge banks individual country sites give tailor made information and advice to farmers across the world.

Although access is free, most farmers working dawn ‘til dusk can’t afford the time to learn to use this system and even if they could, few rural areas have the luxury of the internet.

The programme is aimed at extension workers to take master classes in new techniques and bring the knowledge back to farmers in their own countries.

NARRATOR
Rice is usually associated with Asia but it’s been grown in Africa for over three thousand years. Although rice provides food for millions throughout the continent, Africa cannot produce all it needs.

Rice imports cost one billion US dollars a year. The challenge was to create a new strain of rice that could stand the rigours of the African climate and reduce the dependency.

NARRATOR
Experiments were carried out in laboratories at the West Africa Rice Development Association known as WARDA near the town Luwaki in central Ivory Coast.

It’s been under the control of rebel forces since the 2002 Civil War.

Dr Frank Abamu
Nerica is a cross between the African Glaberima rice and the Asian type of rice. Nerica rice is an output of many years of research so what our scientists decided to do was to see how they can combine the robustness of the African rice with the high yield rates that are coming from Asia.

NARRATOR
They came up with Nerica, a new rice for Africa.

After years of trial and error, the African/Asian fusion became reality and ……Nerica many varieties were bred to suit all kinds of regions and climates. Samples of each are selected, labelled, dated and stored in this refrigerated gene bank. They’re available to farmers worldwide, and seeds have been sent to both the US and Germany.
Dr Frank Abamu
The gene banks are hold 20,000 rice varieties for up to five years. It can stay for up to five years without them dying because we have set a temperature to about ten degree Centigrade and relative humidity to about forty.

NARRATOR
When the recent conflict reached the doorstep of the gene bank, scientists decided to guard against future attacks with two identical stores set up in the US and Philippines.

The different strains of Nerica rice from WARDAR are distributed to farmers across the country. Each seed is selected to meet local conditions.

These women’s groups are now the country’s most successful dry land rice farmers. They have been planting Nerica rice in their fields for two years.

Elise Ori Digbeu, Union Awane
Initially when I was using our usual rice I was only earning about 10,000 central African Francs. The first year we planted Nerica rice I was earning 80,000 Francs but this year I’m sure I can earn about a hundred thousand Francs from Nerica.

NARRATOR
So what exactly are the key benefits of Nerica?

The pluses don’t stop there. In Africa pounding rice is traditionally women’s work, so with its softer husk Nerica rice is a winner.

Local Woman
With our local strains of rice you have to mill it three times whereas with Nerica rice you only have to mill it twice.

NARRATOR
Last but not least is its taste and texture. Sticky or dry there’s always a Nerica.

Dr Frank Abamu
It’s like our treasure. It’s a collection of all that we have and all that we have doesn’t belong to us today. It belongs to the children that are coming behind us and generations thereafter.

NARRATOR
Bangladesh is self sufficient in rice growing 38 million tons a year.

Rice husks is a by-product that can be compacted into briquettes to replace firewood as a cleaner and more efficient cooking fuel but there is still room for improvement meaning cleaner more efficient briquette industry.

NARRATOR
Before being de-husked the rice is heated in furnaces powered by burning dried rice husk. This is often an inefficient and smoky process. Step forward the Bangladesh Rice Research Institute.
Dr Mohammad Bacqui, Bangladesh Research Institute
The main objectives of this project funded by DFID are to improve the efficiency of the furnaces.
Mohammed Ahi Duzzaman, Bangladesh Rice Research Institute

The efficiency of this boiler is very low, 15 to 20%.

NARRATOR
Improving the efficiency of the furnaces means more left-over husks for briquettes. At the Bangladesh Rice Research Institute, they developed a prototype of an energy-saving furnace for installation in a working mill.

One of the main requirements was insulating the furnace to stop heat loss.

Mohammed Ahi Duzzaman
I can really stand here because there is no heat loss by radiation because there is proper insulation.

NARRATOR
A pressure gauge and safety valve were also added to prevent the boiler from exploding and causing serious injury.

Volana Nonja
Because there is a safety valve there is no possibility for the pressure to build up in the boiler.

NARRATOR
But the process of producing briquette fuel from the remaining husk would also be improved. This screw, the key component of the briquetting machine, wears out after just eight hours. Once again the Institute stepped in. They found by changing the metal from steel to tungsten the life of the screw was doubled.

Mohammed Ahi Duzzaman
Tungsten carbide is more hard and this is for last for sixteen hours.

NARRATOR
In Bangladesh little is wasted. Apart from using rice husk as fuel Bangladesh has utilised by-products of rice for chicken food, feeding fish and even to clean their teeth.

The research institute is now working on a way to use the rice husk ash to make cement.

NARRATOR
The city market at Nueva Ecija in the Philippines and the rice stalls are open for business. With nearly three million hectares of paddy fields, new ways are being found to profit from the industry’s waste products.

NARRATOR
It’s seven a.m. and personnel officer Fe Frialde is on the way to work but she doesn’t just have a day job. For eighteen years she has led a double life.
Fe Frialde
This is my workshop, we made the paper out of rice straw and other indigenous materials.

NARRATOR
Fe’s workshop is near her home and she employs eight other part-time workers.

FRIALDE:
The process is very easy, only it’s labour intensive and you have to make more patience develop your skill.

NARRATOR
The rice straw, the leafy part of rice left after the grains have been taken out, is usually seen as worthless waste.

But Fe has perfected a process to turn it into something a lot more valuable.

Fe Frialde
I come to experiment with that fibres because some buyers ask me to make different textures of paper. Picture frames, CD case, magazine bags, wine bags.

NARRATOR
There are endless creative possibilities for Fe’s paper products.

Fe started her business in 1986 with a government loan as part of the programme to encourage alternative uses for rice. Things took off in 1992 when she started getting orders by the container load.

Fe Frialde
But during 1997 we, we don’t engage any more in the export because of the global crisis. All of the orders are cancelled so we had to stop exporting.

NARRATOR
Right now orders are increasing and the business is building up again. She’s even been invited to Kuwait for a year to teach how she does it. When she gets back she’s decided to leave her safe job and go it alone.

The Philippine government is keen to find new ways for people to boost their incomes from rice.

Riza Abilgos-Ramos, Phil Rice
At Phil Rice, what we do is to develop rice-based products and then once we have standardised or developed these products we train several groups of women and private individuals to venture and making rice-based products as their source of income.

NARRATOR
Here at Phil Rice they have taken ancient tribal practices of rice fermentation and adapted them for the modern market.

The method is straight-forward. Boiled rice is mixed with yeast and stored at room temperature for two or three days. The wine is now about ten percent alcohol, it’s drained and pasteurised and left to age for one month. The flavour is now fully developed and the
alcohol content is increased to about 14%. A final filtration through activated charcoal removes impurities and the rice wine is ready for sale.

Under these laboratory conditions they believe they’ve produced the perfect cup. Rice wine looks like being a hit in the Philippine market. Other brands are already on sale and big private manufacturers are looking at large-scale production.

But Phil Rice is working to make sure licensing will also give families sized operations a chance to make some extra cash from their crops.

Amongst Phil Rice’s display of alternative rice products is another potential hit, rice coffee. Last year Letty Basubas turned her back yard into a rice coffee factory.

**Letty Basubas**

When I was small my grandmother gave me rice coffee when I wasn’t feeling well. She gave rice coffee as a sort of therapeutic drink and it was good.

**NARRATOR**

It tastes similar to coffee but contains no caffeine and is said to have health benefits and it’s proving to be very popular. With very little marketing Letty is now selling her coffee in twenty local shops and supermarkets and employing ten part-time staff. It’s giving a real boost to her income from farming. All over Asia rice farmers face an increasingly competitive market, but with relatively simple methods and a dash of entrepreneurial flair, it’s possible to create the extra wealth and new jobs from this ubiquitous staple crop. The challenge now is for others to follow suit.