**1.0 RICE - THE LIFE OF ASIA**

Ancient Asian civilizations have long valued the importance of rice in sustaining human health and nutrition. Rice is believed to nourish kidneys and reproductive organs having co-evolved with humans for millennia. The compact structure of the grain, with no seam or line dividing the grain into half, is believed to stimulate digestion, respiration and unified thinking.

The ancient ideogram for *chi* (Chinese for 'life energy') depicts steam rising from cooked rice while the symbol for peace (wa) combines rice and a stylized mouth, indicating that eating rice can contribute to the development of a calm and peaceful mind. Royal Chinese physicians, since 2,800 BC have used rice to restore tranquility and peace to those easily upset.

The Medical Book of Malayan Medicine describes many uses for rice. Pounded raw rice, fine rice flour and the water in which the rice was soaked were recorded in this old medical text as eye treatments. The ancient Indian Ayurvedic treatises on medicine mention the ability of rice to subdue the three humors (wind, bile and phlegm), an imbalance among which can cause disease. In addition, Ayurvedic medicine recognizes the ability of rice to enrich body elements, eliminate toxic metabolites, revitalize the body, regulate blood pressure, prevent skin disease, and stem premature ageing.

Rice is consumed by almost 50% of the global population, with the majority living in Asia. It is an important source of energy and protein and accounts for 21% of the global human per capita energy needs and 15% of per capita protein requirements. Rice is the main item in the diet of most Asians, constituting 50-60% of the total calorie intake and 30% of the total protein intake.

**2.0 RICE DIVERSITY FOR HEALTH AND NUTRITION**

### 2.1 Medicinal Value of Rice

Indigenous and local communities keep particular rice varieties for their medicinal properties. In Tamil Nadu, West Bengal and Orissa in India, village doctors feed convalescing patients with a rice variety called *kabiraj-sal* for quick recovery. *Bhat moori* rice is believed to cure anemia and enhance blood circulation in women after childbirth; *parmai sal* is used to restore strength, and *daudkhani* rice is used in sub-acute cases of enlarged liver and spleen and to treat piles.

In Sri Lanka, farmers cultivate different rice varieties such as *beth heenati* to treat diabetes and snake bites; *hetada sahal* to prevent constipation; and *kalu henati* to reduce toxins in the body, revitalize body strength, and treat hepatitis. *Kuru wee* and...
Amylase is an enzyme/protein that catalyzes/initiates the breakdown of starch to sugars. Rice tastes slightly sweet as it is chewed as amylase converts starch to sugar in the mouth. Starch is broken down into glucose during digestion, which is absorbed into the bloodstream and body cells with the help of the hormone, insulin. Some of the glucose will be used by the body for energy while excess glucose will be stored in the liver, muscles and other cells to be used later or converted to fat. Proponents of low-carb diets believe that decreasing carbohydrates will result in lower insulin levels which cause the body to have slow starch digestion (with low glycemic index), attributed to a high proportion of amylase and the size and structure of the starch granules. Basmati rice from India is another variety reported to have a low glycemic index.

Rice eaters who are Type II diabetics would be better off eating slowly digestible rice varieties than white rice. Brown rice, for instance, has a slow starch digestibility too and some starch is never turned into sugar at all and reaches the large intestine intact. One study in 2010 showed that the replacement of white rice by brown rice or other whole grains was associated with a lower risk of diabetes while another found that stabilized rice bran significantly reduced hyperglycemia and hyperlipidemia in both Type I and Type II diabetics. In any event, Type II diabetics should still avoid having too much carbohydrate in their diet.

Carbohydrate digestion and utilization rates vary with each individual, depending on his/her energy needs. Humans need carbohydrates for energy. As such, rice, which is predominantly a carbohydrate-rich food, is needed in our diets. Carbohydrate foods are important vehicles carrying proteins, micronutrients and other food components. Rice should be fairly valued, and not completely eliminated from the diet because of its high carbohydrate content. It should be valued for its nutritional and medicinal properties and ought to be consumed with other food such as vegetables, fish, meat and fruits to ensure a diverse diet, nutrition and good health.

Rice is an important source of protein. It has a high proportion of lysine and high protein digestibility. In fact, protein from rice-based oral rehydration solutions (ORS) have also been shown by several scientific studies to have certain advantages over the standard glucose-based ORS in certain situations and have been endorsed by the World Health Organization (WHO) in the treatment of diarrhea. As a least allergenic food, rice is often recommended for people afflicted with irritable bowel syndrome.

2.2 Nutritional Composition of Rice

In 2006, micronutrient malnutrition resulting from diets deficient in minerals (e.g. iron, zinc, iodine), vitamins and essential amino acids, was estimated to affect more than two billion people, especially women and children. In particular, iron deficiency anemia, the most common nutritional disorder, is reported to affect two billion people.

The nutritional value of rice has been extensively researched. Different rice varieties have different nutritional composition. Current findings point to the importance of landraces\(^2\) and traditional rice varieties for their high mineral, protein and anti-oxidant contents. Studies have demonstrated beneficial qualities such as the high biological value of amino acids in rice, high content of essential fatty acids and selenium, and anti-hypertension effects. However, such knowledge remains unknown to most consumers who are conditioned to equating good quality rice with white polished rice, depriving them of the potential health benefits provided by rice diversity.

2.2.1 Rice for energy

In cereal grains, carbohydrates, proteins and fats are the three major sources of energy and nutrition. Comprising 90% carbohydrate, milled rice is a starchy staple food. Although milled white rice has high starch digestibility, there are rice varieties reported to have slower digestibility rates. Farmers in Bohol, Philippines, report feeling “full” long after eating red rice varieties. Certain traditional rice varieties in Aklan, Philippines, were also found to have slow starch digestion (with low glycemic index), attributed to a high proportion of amylase and the size and structure of the starch granules. Basmati rice from India is another variety reported to have a low glycemic index.

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2.2.2 Rice for protein

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risk ranks highly in nutritional quality among cereals, even though the protein content is modest. Different rice varieties have been found to have different protein content. The protein content of unmilled rice of the 17,587 cultivated varieties at the International Rice Research Institute (IRRI) ranged from 4.3-18.2%, averaging 9.5%. Some traditional rice varieties from the Philippines have a protein content of 14%. In addition to genetics and heritability, farm practices and environmental factors affect rice protein content. Thus, plant breeders generally find it difficult to breed for high protein.

2.2.3 Fatty acids and anti-oxidants

Rice lipids, which include fatty acids, are predominantly located in rice bran which is removed during milling. Depending on the variety, rice bran oil can have up to 80% unsaturated fatty acids. Oleic acid and linoleic acid constitute the unsaturated fatty acids in rice oil. These essential fatty acids, which cannot be synthesized by humans, are important in maintaining the function of cell membranes and the nervous system. Different rice varieties have different lipid and fatty acid contents. A study on Philippine traditional rice varieties found that traditional brown rice varieties had an average lipid content of 2.3% in contrast to high-yielding varieties with lipid contents ranging from 2.0 to 2.1%.

Rice bran also contains beneficial anti-oxidants like tocopherols and tocotrienols of the Vitamin E family and oryzanol. Researchers have investigated the anti-cancer activities of tocopherols and tocotrienols and the ability of oryzanol to reduce cholesterol absorption. Researchers have also found that tocotrienol present in rice bran can prevent or reverse blood clots and lesions that may lead to strokes or thrombosis.

In addition, the bran of red and purple rice is rich in anthocyanins and tannins which possess antioxidant and anti-inflammatory properties. Tannins have been investigated for their anti-bacterial effects and potential to prevent cancer and cardiovascular diseases.

Researchers have also found that purple rice bran extract can be utilized as a natural (and healthier) meat preservative.

2.2.4 Minerals, vitamins and fiber

Different rice varieties have different minerals, vitamin and fiber content (Table 1). Red and black rice have been found to be rich in iron (Fe), zinc (Zn) and minerals. Zinc and iron are needed by the human body for enzymatic processes and hemoglobin production, respectively. If zinc is deficient, symptoms such as diarrhea, weight loss and infection appear. If left untreated, zinc deficiency can be fatal. Similarly, iron deficiency can be detrimental to health, leading to anemia with symptoms of brittle hair, brittle fingernails and fatigue.

A study showed a wide variation of zinc (2.1 - 39.4 ug/g) and iron (5.1 - 441.5 ug/g) content among 220 rice varieties. The variation was attributed to plant mechanisms that regulate metal (including zinc and iron) absorption, movement and redistribution in plant tissue.

An analysis comparing traditional and IRRI rice varieties showed that the former had iron content up to 2.5 times higher than IRRI's high-yielding rice varieties. The zinc content was also found to be generally higher in traditional rice varieties than in high-yielding varieties. In general, aromatic and red and black colored rice varieties have higher iron and zinc content than white and high-yielding varieties.

Rice is also a source of potassium (K), an important mineral needed for enzyme production, cell, tissue and organ function, muscle growth, and normal activity of the heart. Rice also contains manganese (Mn) and copper (Cu) in trace amounts. Manganese is needed for normal functioning of the brain and nerves while copper is needed for enzyme production for normal body function. A study by Chinese researchers found that the average potassium, manganese and copper levels in indica rice (rice mostly grown in tropical climates) were significantly lower than those in japonica rice (rounded rice grains grown in temperate climates). The average content of copper in non-glutinous rice genotypes was higher than those in glutinous (sticky) ones whereas the average potassium and manganese levels in non-glutinous rice genotypes were lower.

2.3 Processing Nutritious Rice

Aside from differences in nutritional values of different rice varieties, processing also affects the nutrient quality of rice. White (milled) rice predominates in the market and Asian diets. Unfortunately, milling and polishing destroy 67% of Vitamin B3, 80% of Vitamin B1, 90% of Vitamin B6, 50% of manganese, 50% of phosphorus, 60% of iron, and all the dietary fiber and essential fatty acids. In contrast, brown unpolished rice has four times more dietary fiber which increases beneficial bacteria in the large intestine, aiding digestion and protecting against heart disease and high blood pressure.

Research also shows that mineral elements in brown rice are significantly higher than those in milled rice. Despite the known nutritional value of brown rice, it remains unpopular because it tends to turn hard when cooked. It also takes longer to cook and has a short storage life as it turns rancid over time due to the presence of rice oil.

<table>
<thead>
<tr>
<th>Type of rice</th>
<th>Protein (g/100g)</th>
<th>Iron (mg/100g)</th>
<th>Zinc (mg/100g)</th>
<th>Fiber (g/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White - polished</td>
<td>6.8</td>
<td>1.2</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Brown</td>
<td>7.9</td>
<td>2.2</td>
<td>0.5</td>
<td>2.8</td>
</tr>
<tr>
<td>Red</td>
<td>7.0</td>
<td>5.5</td>
<td>3.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Purple</td>
<td>8.3</td>
<td>3.9</td>
<td>2.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Black</td>
<td>8.5</td>
<td>3.5</td>
<td>-</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Japanese researchers are rediscovering that germinated brown rice is better than ungerminated brown rice for people with high blood pressure and diabetes and for those suffering from obesity. Germinated brown rice is prepared by pouring 30°C water over a pan of brown rice. Once the water has turned murky, after about six hours, the water is removed, the rice strained, and new water added. This process is repeated over 24 hours. This causes the rice to germinate, and be ready to be washed and cooked. Germination activates all the dormant enzymes in rice, frees bound minerals to supply the sprout with the best nutrition and makes these absorbable in our bodies.53

A team of Japanese researchers found that germinated brown rice had higher lysine content, food fiber and anti-oxidants than white rice. Germinated brown rice, with rich gamma amino butyric acid (GABA), appears to be effective in normalizing blood pressure, and controlling glycerina and cholesterol in the blood. It has the potential to activate brain cell metabolism, prevent cancer and Alzheimer’s disease, and eliminate anxiety disorders.54

Processed germinated brown rice is now being sold in Japanese and North American markets to cater to the health conscious.

3.0 THE LOSS OF RICE WISDOM

Rice is life to Asia. To Asians, rice is more than just food and is embodied in the culture, spirituality, community wisdom, local ecology and biodiversity, health and nutrition, and food sovereignty of rice-growing and rice-consuming communities all over the region.55

This holistic ‘rice wisdom’ and rice culture have been seriously eroded since the advent of the ‘Green Revolution’ in the 1960s.

3.1 The ‘Green Revolution’ – The Poisoning of Our Food and Our World

In the mid-1960s, the International Rice Research Institute (IRRI) was established in the Philippines and launched the ‘Green Revolution’ in Asia. Among its first initiatives was the release of a so-called ‘high yielding varieties’ (HYVs). These new ‘modern’ varieties and their associated farming technologies (chemical pesticides and synthetic fertilizers, mechanization, and mechanized irrigation systems) were widely adopted. The new seeds seemed to revolutionize rice production due to their ability to be planted twice a year and their responsiveness to chemical fertilizers. Consequently, farmers abandoned the cultivation of traditional rice varieties, especially in prime irrigated areas in favor of modern varieties. As a result, there was a pronounced loss of on-farm rice diversity. In the Philippines and Pakistan almost 50% and 99% of the total rice area, respectively, is planted with only 4 HYVs of similar parentage while in Cambodia, IR66 accounts for around 90% of the total rice area.56 This loss of rice diversity also led to the loss in nutrition from rice as almost all the released modern rice varieties were also sold as white, polished rice.

The objective of the Green Revolution was not to improve human health and nutrition, rather it was to quell peasant unrest in Asia, control Asia’s food production, and open up markets for US agrochemicals and future products.57 As early as 1974, farmers began expressing their dissatisfaction with IRRI’s HYVs. They claimed the new seeds were more susceptible to pests and disease, and that seeds needed to be bought after three seasons.58 In addition, farmers complained about increasing production costs because the new seeds needed a lot of chemical pesticides and fertilizers. This led to farmer debt and bankruptcy. In addition, there were increasing reports of pesticide poisoning and the negative effects of the chemical inputs on the environment. Extensive fertilizer use led to soils turning acidic and nitrates from fertilizer leaked into and poisoned waterways. Rice yields subsequently declined with the poisoning of the soil, water and environment.6

With the advent of the Green Revolution, rice seeds became a commodity to be traded as opposed to the long-held tradition of free exchange of seeds amongst farmers. From HYVs, the past 20 years have seen an increasing interest in hybrid rice from public and corporate research institutions. The promotion and use of hybrid rice also received state support/subsidies. The compelling advantage to agribusiness corporations is that hybrid seeds need to be bought afresh every season as they only breed true (deliver expected yields) in the first generation. New rice technologies continue to strengthen corporate control over seeds, such as BASF’s herbicide-tolerant rice as part of its Clearfield Production System (CPS).6 There is also the aggressive move to introduce genetically engineered rice for stronger corporate proprietary rights (exclusive monopoly control) over rice seeds. These trends point to the growing encroachment of agribusiness into local food production with the advent of the Green Revolution, entrapping smallholder farmers in never-ending cycle of dependency and debt, while exposing consumers to unhealthy food and environment.

3.2 Genetically-engineered ‘Bio-Fortified’ Rice

Following the argument that the most micronutrient malnourished sectors are those who consume cereals as staples, scientists began experimenting with increasing micronutrient levels in cereals like rice in the mistaken...
belief that this would address the problem.\textsuperscript{57} In some ways, this is an implicit recognition that the ‘modern’ rice seeds contributed to the current problem of micronutrient malnutrition. Most of the commercially cultivated rice varieties, predominantly ‘modern’ varieties, are deficient in iron and zinc.\textsuperscript{58} Rice plant breeders, during the Green Revolution and afterwards, did not select for micronutrient-rich rice when they were developing new high-yielding varieties.

With the advent of genetic engineering, scientists have sought to introduce nutrient-enhancing genes into rice. For example, genes from maize and a common soil micro-organism that produces beta carotene were incorporated into rice to produce ‘Golden Rice’ (also known as Vitamin A rice or beta carotene rice). Golden Rice was developed by Professors Beyer and Portykus along with Syngenta, one of the world’s largest agrochemical and seed companies. IRRI, along with private sector partners, is aggressively pushing Golden Rice and it has been field tested in Bangladesh and the Philippines. By 2013, IRRI researchers plan to submit safety information about Golden Rice to regulators in the Philippines for subsequent human feeding trials to Vitamin-A deficient women.\textsuperscript{59}

There is also ongoing research to fortify rice with iron through genetic engineering. This is accomplished by inserting two plant genes into existing rice varieties, resulting in grains with six times more iron than typical milled rice.\textsuperscript{60} Iron in rice is mostly found in the bran, which is lost in milling. Researchers have recently succeeded in folate (Vitamin B9) bio-fortification of rice\textsuperscript{61} and research is underway on rice bio-fortified with zinc.

Research is now underway to turn rice into a pharmaceutical product (pharma rice). Rice porridge has been traditionally used in rural communities to address dehydration resulting from diarrhea and the World Health Organization has been using rice-based oral rehydration salts (ORS). Ventria Bioscience, a company based in the US, has undertaken trials to make similar ORS, but with GE rice containing recombinant milk proteins lactoferrin (with antifungal, antiviral, antimicrobial, anti-inflammatory properties) and lysozymes (enzymes that kill bacteria by breaking down their protective skin, classified as bactericidal). Ventria intends to market the proteins from the GE Rice as additives for a ‘miracle cure’ ORS for diarrhea. It also intends to market such products as food additives and supplements in infant foods,\textsuperscript{62} yoghurt, meal replacements, performance beverages, bars and nutritional supplement drinks\textsuperscript{63} as well as for wound repair.\textsuperscript{64}

3.3 Risks of GE ‘Bio-fortified’ Rice

There are many concerns about the health risks of GE rice including allergenicity, toxicity and potential damage to the gut, among others.\textsuperscript{55} GE rice may produce new allergens or intensify the production of existing allergens. There are cases where genes when transferred to a different background, change character and become immunogenic possibly leading to asthma and other allergic reactions.\textsuperscript{66}

In addition, since rice is widely eaten in Asia, it is possible that some people may over-consume GE bio-fortified rice leading to excessive intake of the fortified nutrients. Excessive amounts of Vitamin A can lead to toxicity, which in turn can lead to nausea, dizziness, vomiting and abdominal pain.\textsuperscript{67} Chronic toxicity which occurs if ingestion occurs over a period of time, can result in bone and joint pain, menstrual abnormalities, fatigue, edema, nervous abnormalities and other symptoms and discomfort.\textsuperscript{68}

Nutrition scientists admit that there is scant evidence of the beneficial effects of micronutrient supplements or fortification in healthy populations (with the exception of folic acid).\textsuperscript{69} Significant results have been achieved in nutrient-deficient populations however when natural foods containing deficient micronutrients are incorporated into the diet of such communities. Nutritionists also believe that unusual nutrient profiles in the diet through fortification or supplementation may displace other essential diet constituents or alter human metabolism.\textsuperscript{70}

The singular approach of fortifying rice with a deficient nutrient undermines existing traditional knowledge about the nutritious elements present in rice and the diversity of food that can be tapped to address malnutrition. For instance, the causes of Vitamin A deficiency are steeped in poverty and cannot be addressed by technological solutions such as Golden Rice. Vitamin A deficiency would be better addressed by alleviating poverty and ensuring a balanced diet with local greens and fruits that contain Vitamin A.\textsuperscript{9}

While research on GE rice is still being conducted and GE rice is not yet commercialized, there is a high possibility of “gene escape” from experimental GE rice leading to the contamination of rice in farmers’ fields. There is the possibility of GE bio-fortified and pharma rice getting into the supply chain and being eaten by healthy populations. Rice varieties in the US and rice stocks in over 30 countries in 2006-2007 were contaminated with Liberty Link Rice 601 (LLRice 601), a GE rice resistant to glufosinate, which had been only approved for field testing by Bayer. The contamination of non-GE rice varieties with GE rice poses a grave threat to biodiversity and human health.

4.0 SAFE AND NUTRITIOUS RICE FOR ALL

Our rights to health and to safe, adequate, and culturally appropriate food are inherent and inalienable rights. However, these rights are threatened and in many cases, violated, by public institutions and corporations through the promotion of technologies that are hazardous to human health and the environment (e.g. chemical pesticides and GE crops/food). Ancient wisdom has enshrined the

\textsuperscript{9} For more information on Golden Rice and GE rice, read the Rice Sheets “Who Needs Golden Rice?” and “GE Rice – the Genetic Engineering of the World’s Leading Staple Crop” at www.panap.net
intrinsic nutritional and medicinal value of rice. We must rediscover this wisdom and claim our basic right to safe and nutritious food.

4.1 A Daily Balanced Diet
A balanced diet is key to good health. Rice ought to be one of the many other food items in our daily food basket along with vegetables, fruits and other plant and animal protein sources. Relying solely on rice or any single food for that matter to deliver all our nutritional requirements is not realistic. To optimize the nutritional value of rice, consumers should not be limited to eating only white polished rice, but actively consume unpolished or germinated rice, black rice, red rice and all the other different rice varieties with varied colors, tastes and nutritional contents. Community initiatives to develop farming and food systems based on diversity ought to be promoted and supported. Ensuring diversity in food production and consumption ought to be part of initiatives to build healthy communities.

4.2 Saving Traditional Rice Varieties and Farmers’ Seed Systems
Traditional rice varieties must be saved from being lost as they are good sources of nutrients and many possess medicinal properties as well. Planting and consuming traditional rice varieties, and researching and promoting traditional knowledge on the value of local seeds to human health and nutrition will help arrest the continued loss of traditional rice varieties. Let us support farmer groups conserving and developing traditional rice varieties by patronizing their products and promoting the positive aspects of having diverse rice in our diets.

Intellectual property rights (IPRs), which provide monopolistic private rights over seeds, should be replaced with a system that upholds farmers’ rights to save, use, develop and exchange seeds freely. Farmers have already provided all their seeds to the world for free. The new varieties they continue to develop are also provided for free. We must take action to ensure that seeds are not subject to IPRs. Corporate control over seeds is among the biggest threats to the very biodiversity that ensures the safety, health, nutrition and sustainability of the planet and its people. Farmers’ traditional seed exchange systems and local innovation processes were the reasons we could enjoy diversity in our food, thus we must ensure that these systems and pathways continue.

4.3 Opting for Biodiversity-based Ecological Agriculture
More farmers should eliminate the use of hazardous agrochemicals and convert to biodiversity-based ecological agriculture (BEA) to reduce the cost of production while safeguarding their own health and that of their communities and the environment. Studies show that organically grown seeds have better seed viability and vigor, resulting in better grains and longer storage life, contributing to better production.

Locally-adapted, diverse, non-hybrid, and non-genetically engineered seeds that perform well with low external inputs secure local seed systems, eliminating farmer dependency on corporations for seeds and assuring farmers of lower production costs. At the same time, strong and diverse seeds give rise to healthier plants which in turn contribute to healthy, resilient and adaptive biodiverse ecological production systems. Therefore as consumers, we should purchase rice (and other food) grown under BEA or organic systems as part of our personal commitment to food safety, sustainable farmer livelihoods, environmental conservation, and combating global warming. The IAASTD report clearly states that small-scale farmers and agro-ecological methods are the way forward for sustainable food production.

4.4 Supporting Local Farmers’ Markets
By directly purchasing from farmers, consumers support farmers in taking control over the price of their products and buffering local production from market volatility. Only 6% of the total rice produced is traded globally, but in recent years, we have experienced rice price volatility, resulting in sharp price hikes as well as artificial shortages (for example, through hoarding, which further pushed up the price of rice). Rice-exporting countries also refused to supply food-insecure countries in order to protect domestic food security. While there were numerous reasons cited for price hikes such as drought and changes in food consumption patterns, it was essentially the unregulated financial market and financial speculation that triggered the 2008 rice price crisis. Governments need to disengage from speculative trading by securing domestic supplies and facilitating/supporting local markets where farmers and consumers can deal directly. We need to ‘re-occupy’ the markets!

4.5 Rejecting GE Rice
Rice is an important source of food and nutrition. Supporting organically-produced and BEA rice means rejecting GE rice. There is no scientific consensus on the benefits of genetically engineered rice while there is compelling scientific evidence that GE crops pose serious health and environmental risks. We must exercise the Precautionary Principle in the development of GE Rice and we should reject GE rice in our fields and plates. As it is, we are already dealing with the negative effects of the Green Revolution technologies in rice, we must be cautious of the proposed GE solutions coming from the same proponents now pushing the so-called ‘Second Green Revolution’ or the ‘Gene Revolution’.

4.6 Reframing Rice Research
The current paradigm of rice research as driven by IRRI should be dismantled and replaced by a farmer-centered one developed along the principles of food sovereignty and biodiversity-based rice ecosystems. This will
provide more diverse and nutritious sources of food complementary to rice. Research on exploring the nutritional value of traditional rice varieties should be encouraged and supported.

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Pesticide Action Network Asia and the Pacific (PAN AP) is one of five regional centres of PAN, a global network which aims to eliminate the harm caused by pesticides and promote biodiversity-based ecological agriculture. It is committed to the empowerment of people especially women, agricultural workers, peasants and indigenous farmers. PAN AP launched its Save Our Rice Campaign in 2003 in response to the powerful threats arising against rice, the staple food of half the world’s population. The foundation of the Campaign is the “Five Pillars of Rice Wisdom”: (1) Rice Culture, (2) Community Wisdom, (3) Biodiversity-based Ecological Agriculture, (4) Safe Food and (5) Food Sovereignty. The Campaign is dedicated to saving traditional local rice, small rice farmers, rice lands and the rice heritage of Asia. PAN AP Rice Sheets provide relevant information on the threats to rice and are written from the people’s perspective. Enquiries may be sent to: panap@panap.net.

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**Publisher:** Pesticide Action Network Asia and the Pacific (PAN AP). P.O. Box: 1170, 10850 Penang, Malaysia.

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