

REPUBLIC OF KENYA



MINISTRY OF AGRICULTURE

NATIONAL RICE DEVELOPMENT STRATEGY (2008 – 2018)





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Abbreviations

| | |
|----------|---|
| ASARECA | Association for Strengthening Agricultural Research in Eastern and Central Africa |
| ASDS | Agriculture Sector Development Strategy |
| ASK | Agricultural Show of Kenya |
| AU | African Union |
| ATIRI | Agricultural Technology and Information Response Initiative |
| CAADP | Comprehensive African Agricultural Development Program |
| CARD | Coalition for African Rice Development |
| CBOs | Community Based Organizations |
| CIGs | Common Interest Groups |
| DRSF | District Rice Stakeholders Forum |
| EAC | East African Community |
| ECARRN | Eastern and Central Africa Rice Research Network |
| ERS | Economic Recovery Strategy |
| FAO | Food and Agriculture Organization |
| FARA | Forum for Agricultural Research in Africa |
| GDP | Gross Domestic Product |
| HIV/AIDS | Human Immuno Deficiency Virus/Acquired Immune Deficiency Syndrome |
| IWUAs | Irrigation Water Users Association |
| ICT | Information Communication Technology |
| IRRI | International Rice Research Institute |
| JIRCAS | Japan International Research Centre for For Agricultural Sciences |
| KARI | Kenya Agricultural Research Institute |
| KEBs | Kenya Bureau of Standards |
| KEPHIS | Kenya Plant Health Inspectorate Service |
| KIRDI | Kenya Industrial Research and Development Institute |
| LBDA | Lake Basin Development Authority |
| MDG | Millennium Development Goals |
| M&E | Monitoring and Evaluation |
| MTEF | Medium Term Expenditure Framework |
| NARS | National Agricultural Research System |

| | |
|-------|---|
| NCPB | National Cereals and Produce Board |
| NEPAD | New Partnership for Agriculture Development |
| NFNSP | National Food and Nutrition Security Policy |
| NGOs | Non-Governmental Organization |
| NIB | National Irrigation Board |
| NRDS | National Rice Development Strategy |
| NRDSF | National Rice Development Stakeholders Forum |
| NVRC | National Variety Release Committee |
| PRSF | Provincial Rice Stakeholders Forum |
| PRSP | Poverty Reduction Strategy Paper |
| SRA | Strategy for Revitalization of Agriculture |
| SWOT | Strengths Weaknesses Opportunities Threats |
| WARDA | West Africa Rice Development Association (Now Africa Rice Centre) |

Preface

The Ministry of Agriculture, conscious of the importance of the agriculture sector to the national economy and the livelihoods of the Kenyan people, has embarked on making the sector vibrant. Despite the enormous potential of the rice sub-sector in enhancing food security and livelihoods for the majority of urban and rural poor in Kenya, it has not received adequate attention with regard to policy and institutional support. Consequently, there has been little growth of the sub-sector in spite of the huge potential that exists in the country. In this regard, the Ministry has developed a comprehensive, practical and all inclusive National Rice Development Strategy (NRDS) for the period 2008 – 2018. The strategy focuses on what the Ministry plans to accomplish by directing resources towards realizing the desired goals within the given time frame. Through timely implementation of the NRDS, the Ministry of Agriculture will realise its rice production targets, objectives and mission.

The strategy sets the vision, mission, objectives and strategies that Ministry will pursue in ten years with the aim of facilitating growth and development of the rice sub-sector. It will form the basis of which work plans will be formulated at national functional units and individual levels. The NRDS will also be an instrument of bidding for resources at the national, international and from private sector investors.

The NRDS sets out the contribution of the Ministry to the implementation of the Strategy for enhancing rice production, processing and marketing. In this regard cognizance has been taken of the new organizational structure that has been agreed upon and designed to meet the challenges of expanding rice production for food security and wealth creation.

The process of preparing the plan has been one of the participatory consultations between the Ministry of Agriculture and other stakeholder institutions on rice development. Account has been taken of the past policies on rice and various government strategies aimed at the development of the agricultural sector and the economy and food security as a whole.

From efforts to strengthen commercialization of rice farming this strategy envisages a structure that will be able to focus on core functions as we move rice production,

processing and marketing into private-public sector partnerships with support from development partners.

I wish to recognize the support of the Minister for Agriculture, Hon. William S. Ruto, not only in the process of developing this NRDS but also to all reforms and restructuring in rice production sub-sector that the Ministry is undertaking and plans to undertake. I also wish to recognise the technical support and guidance given to the taskforce by Dr. Wilson Songa, Agriculture Secretary and Dr. Johnson Irungu, Director Crop management. I wish to thank the technical and support team lead by Bibiana Walela, Head Food Crop sub-division and the able officers from the partner institutions for their hard work and endurance during the period of the preparation of this Strategy. I specifically want to acknowledge other members of the team that included: Prof. J.C. Onyango, Mr. W.O. Kouko, Mr. R.K. Wanjogu, Mr. R.G. Ngigi, Mr. R.M. Mahungu , Mrs. A.W. Kimani and Mr. E. Nyamwaya and finally Florence Omolo for valuable secretarial services.

It is my sincere hope that this strategy will meet the expectations of the Government, Development Partners, Private sector but more importantly, the needs of the farming community and producers who wholeheartedly participated in National Rice Stakeholders meeting.



Rc.....,

PERMANENT SECRETARY, MINISTRY OF AGRICULTURE



1.0 Introduction

Rice cultivation was introduced in Kenya in 1907 from Asia. It is currently the third most important cereal crop after maize and wheat. It is grown mainly by small-scale farmers as a commercial and food crop. About 80% of the rice grown in Kenya is from irrigation schemes established by Government while the remaining 20% is produced under rain-fed conditions.

Globally rice is one of the most important food crops in the fight against hunger. The total annual world production of milled rice currently stands at 400 million metric tons which compares favourably well with maize and wheat. The area under rice is forecast to rise by 1.5% (from 153 million hectares to 158.6 million hectares) and yields by close to 1%. In addition, unlike maize and wheat that are consumed as human and livestock feed, rice remains the most favoured grain globally for human consumption (Ito, 2002). Development of rice therefore presents an opportunity to reduce the number of gravely food insecure people in the world that stand at 816 million by half by 2015 according to the World Food Summit 1996 - Millennium Development Goals (MDG).

Food and Agriculture Organisation's (FAO's) forecast of global rice trade in 2008 has been raised to 31 million tons, after several exporting countries eased restrictions on

exports they had earlier imposed in the year. However, the exports were lower than in 2007 when 32.3 million tones were traded. Preliminary global rice export forecast by FAO in 2009 stands at 30.4 million tones. Importation of rice is globally under the control of the private sector which is more exposed to the risks of a global financial meltdown. Many African countries are expected to cut down imports and focus on local production of rice. Due to its importance, international partners and Pan-African initiatives such as FAO, NEPAD, CAADP, FARA, ECARRN, ASARECA and EAC have shown interest in research and development for the benefit of the livelihoods of communities living particularly in sub Saharan Africa.

Most Kenyans living in the rural areas consume limited quantities of rice, but it forms an important diet for the majority of urban dwellers. The annual consumption is increasing at a rate of 12% as compared to 4% for wheat and 1% maize, which is the main staple food. This is attributed to progressive change in eating habits. The national rice consumption is estimated at 300,000 metric tones compared to an annual production range of 45,000 to 80,000 metric tones. Table 1 shows the national and global rice production and consumption trends from 2001-2007. The deficit is met through imports which are valued at KES 7 billion in 2008. Promotion of rice production will therefore improve food security, increase smallholder farmers' income contribute to employment creation in rural areas and reduce the rice import bill.



Table 1: Rice Production, 2001-2007

| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Area (ha) | 13,200 | 13,000 | 10,781 | 13,322 | 15,940 | 23,106 | 16,457 |
| Production (Tones) | 44,996 | 44,996 | 40,498 | 49,290 | 57,941 | 64,840 | 47,256 |
| Unit price (per ton) | 26,250 | 16,060 | 58,000 | 65,000 | 68,000 | 70,000 | 53,000 |
| Average yield (tons/ha) | 3.4 | 3.4 | 3.7 | 3.6 | 3.6 | 2.8 | 2.8 |
| Consumption (tons) | 238,600 | 247,560 | 258,600 | 270,200 | 279,800 | 286,000 | 293,722 |
| Import (tons) | 201,402 | 208,944 | 213,342 | 223,190 | 228,206 | NA | NA |
| Total Value (Billion KES) | 1.2 | 0.7 | 0.7 | 1.3 | 0.9 | 3.3 | 2.7 |
| World Production (million tons) | NA | 378 | 391 | 401 | 416 | 415 | 421 |
| World Consumption million tons | NA | 107 | 86 | 78 | 81 | 78 | 72 |

Source: NCPB and Department of Land, Crops Development and Management, USDA – WASDE 2008



2.0 Review of the National Rice Sector

2.1 Status of Rice in National Policies

The Ministry of Agriculture and the Agriculture Sector as a whole has been involved and affected by the various reforms and plans of the Government over the years. These reforms such as PRSP, ERS, ASDS and now Vision 2030 are mainly geared to ensuring food security, food self sufficiency and poverty reduction the people of Kenya. Following these reforms the Ministry developed a strategic plan (2006–2010) which committed it to improved service delivery and interventions that have started yielding fruits.

In cognizance of Vision 2030, ASDS, the draft National Food and Nutrition Security Policy (NFNS) and the Ministry's current Strategic Plan 2008–2012, this National Rice Development Strategic Plan has been developed. The strategic plan will chart the course of rice production and development for the next twenty (20) years in five year phases. The Plan will also guide present and future efforts of the Ministry and its development partners, in providing technologies for improving the livelihoods of the millions of poor rice farmers and consumers in terms of food and income.

2.2 Consumer Preferences and Demand Projections

In Kenya, rice consumers prefer the aromatic basmati rice which also has superior cooking qualities compared to the other local and imported varieties.

2.3 Typology and number of Rice Farmers, Processors and Traders

In Kenya rice is mainly produced by small-scale farmers in Central (Mwea), Western (Bunyala), Coast (Tana delta, Msambweni) and Nyanza provinces (Ahero, West Kano, Migori and Kuria). About 300,000 rice farmers provide labour and also earn their livelihood out of the crop's production. There are four major rice mills spread across the country with varying capacities. LBDA has a milling capacity of 3.5 metric tons, Mwea NIB 24 metric tons, Western Kenya Rice mills 3 metric tons and Tana Delta with 3 metric tons per hour. Additionally there are several small privately owned one pass mills especially in Mwea. There are several rice traders in the country. The major traders include the government owned National Cereals and Produce Board (NCPB), National Irrigation Board (NIB) and Lake Basin Development Authority (LBDA) through their rice mills in Ahero, Mwea and Kibos process and supply milled rice to supermarkets and local retailers; Mwea Farmers' Multipurpose Cooperative Society, Supermarkets in major urban centers, Dominion Farms and Capwell Industries among others. In addition, there are also numerous small traders mostly women who sell rice in the local markets.

2.4 Gender Dimensions of Rice Production, Processing and Trading

Men, women and children are involved in rice production at various levels. Men are mainly involved in land preparation (Ploughing, Rotavation and levelling) and transportation whereas women and children do planting, weeding, bird scaring, harvesting, threshing and drying. Rice marketing is done by both men and women though women dominate the local retail rice businesses.

Low adoption of agricultural technologies has been associated with gender related issues. Women hardly attend seminars or training workshops yet they are the central players in rice production. This is likely to have adverse effects on adoption and up scaling of rice technologies. Deliberate targeting of women and children for capacity building and technology transfer will enhance production and productivity.

2.5 Comparative Advantage of Domestic Rice Production

The locally produced rice is of high quality compared to imported rice and is preferred by consumers as mentioned earlier. There have been incidences of importation of cheap poor quality rice which is fraudulently repackaged presenting unfair competition to locally produced rice. Kenya Bureau of Standards (KEBS) should enforce compliance of rice standards on imported and local rice. There exist unfair trade demands by rice exporting countries who insist on dumping poor quality rice in Kenya in exchange of high quality locally produced crop commodities.

Increased production of rice will ensure food security and saving of the much needed foreign exchange. Local rice production, processing and marketing will improve livelihoods of rural and urban populations by creating employment, opportunities for private investment and income for small-scale farmers.





3.0 Challenges and Opportunities Facing National Rice Sector Development

Constraints and challenges vary with production, cropping and farming systems across the country. Like the rest of the world, the trend of rice cultivation is going towards upland rice production where water use efficiency and conservation is emphasized. The infrastructure for paddy rice production is expensive to most small holder farmers. Some of the challenges identified in rice production are discussed below.

3.1 Challenges

3.1.1 Land tenure

Land tenure system in the rice growing schemes is not favourable to farmers as they do not own land titles making it impossible to access credit. On the other hand women are key players in rice production, but yet they also do not own land. For sustainable rice production the land tenure system need to be addressed to provide for ownership and to allow women access to land.

3.1.2 Labour scarcity due to urban migration

The migration of young energetic people to the urban centers has rendered labour unavailable and expensive. Traditionally most farm families depend on family labour to carry out various farm activities partly to reduce on production costs and partly because it is available when labour demand peaks. Mechanization and provision of appropriate technologies suitable for farmers would promote rice production. Investment in processing, branding and marketing activities in the rural rice growing areas would create employment opportunities to curb the rural to urban migration by the youth.

3.1.3 Social issues

In the irrigation schemes high preference of waterborne diseases such as malaria and bilharzia affects the productive ability of farmers. In addition HIV/AIDS has greatly affected the productive work force of the rural farming communities. There is need to provide social amenities and improved health care services.

1.1.4. Unfavorable trans-boundary trade practice

Kenya is a member of both the East African Community (EAC) and COMESA regional trading blocks. It is therefore bound by the common tariffs that apply to the member states of these trading blocks. However, there is a lot of informal cross-border trade with Uganda and Tanzania. There is also movement of uncertified rice seed across the borders that could be detrimental to rice sub-sector development. However, the trading blocks presents major trading opportunities and sharing of germplasm. There is therefore need to speed up the on-going harmonization process of trade tariffs and seed industry rules and regulations by the partner states.

3.1.5 Liberalization of rice irrigation schemes resulting in poor rice management practices

Research and extension services were affected by the liberalization of the rice irrigation schemes resulting in loss of genetic purity, poor agronomic practices, low production and inadequate credit services due to limited Public-Private Sector partnerships.

3.1.6 High costs of farm inputs and machinery

The high cost of farm inputs and machinery is a disincentive in increase of rice productivity.

3.1.7 Infrastructure

In the lowland rain fed rice ecologies poor infrastructure and uneven distribution of rice mills has led to a decline in rice production. Infrastructure development such as roads, dams, irrigation and drainage, electricity, communication and viable public-private sector partnerships will improve the farming systems for small scale farmers hence unlock this potential resulting into poverty alleviation and economic growth.

3.1.8 Poor access to credit

Poor access to credit by farmers in the irrigation schemes due to lack of land ownership.

3.1.9 Uncoordinated marketing

Poor market organization has led to market dominance by cartels and adulteration of rice.

3.1.10 Low skills/knowledge on rice crop management

There is low technical harmonization on rice production technology among extension staff, farmers and processors.

3.2 Opportunities

3.2.1 Potential for expansion of Irrigated and rain-fed rice

Kenya has a potential of about 540,000 ha irrigable and 1.0 m ha rain fed for rice production. With improved water harvesting, storage, underground water resource utilization and innovative management technologies, the current irrigation potential can be increased by a further 800,000 ha to 1.3 m ha.

3.2.2 Strong Research and Extension systems

Kenya Agricultural Research Institute (KARI) has focused on rice research while the Ministry of Agriculture is providing extension. KARI and its partners have the capacity to conduct rice adaptability trials. The scientists based at research institutions have experience in rice breeding, agronomy, crop protection and socio-economics.

There also exists a strong national extension system. The current extension efforts have given rise to Common Interest Groups (CIGs) to entrench their bargaining power for a better deal in development along the commodity value chain. There is a need for strong farmers cooperative societies to complement the CIGs in accessing technology, credit, bulk purchases of farm inputs and marketing of farm produce at reasonable prices thereby eliminating exploitative tendencies of the middlemen. However, there is still need for capacity building for researchers, extension staff and farmers in rice production, post harvest and agro-processing technologies.

3.3.3. Established seed production and certification system

The seed producers under the supervision of the Kenya Plant Health Inspectorate Service (KEPHIS) produce certified seed.



4.0 Priority Areas and Approaches

4.1 Priority Ecologies

In order to double rice production in the next 10 years, emphasis will be put on irrigated and rain fed lowland ecologies in Central, Nyanza, Western, Coast and Rift valley Provinces where suitable climatic conditions and increased productivity potential exist.

4.2 The Challenges and Opportunities in the Prioritized Ecologies

In irrigated ecologies the main challenge is supply of adequate water, development and rehabilitation of irrigation infrastructure. Provision of health care services and land ownership rights and environmental concerns need to be addressed.

In rain-fed lowland ecologies the main challenge is erratic rainfall, inadequate skills for both farmers and extension staff and, infrastructure development including processing mills and road networks. In both ecologies provision of high quality seed, technologies development and transfer, strengthening of farmer organizations and management structures will need to be addressed. Low soil fertility, diseases (especially blast) and pests (Quelea birds and rodents) are a problem.

There are opportunities for harnessing the available water resources and expanding rice area. The government is committed to increasing food production as stipulated in its current policies and has embraced the Private-Public-Partnerships to encourage private sector participation and investment in business development services.

4.3 Policies and Institutional Challenges and Opportunities

In the past rice was not considered a strategic crop for food security. However, its production has been supported through the existing Government policies documents on food security, such as ASDS, NFNSP and vision 2030. Currently, consumption has outstripped production so there has been need to focus on policies that enhance production in order to achieve self sufficiency and import substitution. In line with the existing government policies on food self sufficiency, NRDS will address the following:

4.3.1 Technical issues

- Training of researchers, extension officers and farmers on modern rice production techniques and utilization
- Revitalise the existing training institutions to undertake capacity building in rice specific courses
- Support and strengthen rice institutions
- Posting of extension officers in rice growing areas and avoid high turnover of staff
- Strengthen rice quality inspection and its enforcement.

4.3.2 Farm inputs and equipment

- Facilitate accessibility and affordability of farm inputs and equipment
- Develop appropriate farm tools and equipment to reduce drudgery
- The Government through the NRDS will play a key role in rice variety development, maintenance and seed production in partnerships with other stakeholders.

4.3.3 Credit support

Farmers will be facilitated to form CIGs and cooperatives to enhance affordable credit.

4.3.4 Infrastructural development

- Improve roads and transport facilities in rice growing areas
- Construct and maintain major irrigation infrastructures
- Provide and strengthen health services in rice growing areas to curb waterborne diseases
- Encourage private sector partnerships in rice processing
- The cess collected from rice will be ploughed back to rice growing areas for infrastructural development
- Farmers will be represented in cess committees
- Undertake environmental impact assessment and audit for large scale rice investments.

4.3.5 Marketing structure improvement

- The government will encourage increased private sector participation in the marketing of rice through public-private sector partnership.
- The Government should include and buy rice to form part of its strategic food reserves.
- Strengthen farmer organizations and common interest groups in rice marketing to offer services to its members.
- Encourage warehouse receipt system for rice farmers.
- Create fair competition from imported rice by enforcing rice standards through KEBS.
- Advocate for ICT market/price oriented technologies for speedy and timely market information.
- Identify and exploit value addition opportunities.

4.3.6 Lessons learnt from previous rice research and development

With the restructuring of NIB to provide operation and maintenance services, farmers are left with the responsibilities of paying for operation and maintenance, managing their own crops, and marketing. The government in collaboration with public-private sector partnership and the support of development partners has embarked on revival of the irrigation schemes and enhancement of upland rice production.



5.0 Vision and Scope of National Rice Development Strategy

5.1 Overall Goal

Improve food security and income of Kenyans through sustainable rice production, marketing and utilization.

5.2 Vision

A vibrant rice sector contributing significantly to improved livelihoods, food security and economic growth.

5.3 Mission

To increase rice production, productivity, value addition and competitiveness through generation, promotion and application of client driven knowledge, information and technologies in a sustainable environment.



5.4 Strategic Objectives

The overall objective is to double rice production in both rain-fed and irrigated conditions by 2018 through:

- Increased productivity in all rice growing ecosystems
- Increased rice production through expansion of area
- Reduced field and storage losses of rice
- Increased farmers' access to affordable credit and high quality inputs
- Increased farmers' access to certified rice seed timely
- Enhanced provision of extension, advisory support services and technology application
- Develop markets and marketing channels
- Mainstream rice stakeholder fora at all levels
- Strengthened human resource development
- Develop participatory monitoring and evaluation (PM&E).



Table 2: Current rice production and projections based on area, yield and consumption in 2008 by agro-ecological condition

| Year | Rain fed Upland | | | Rain fed Lowland | | | Irrigated | | | Total | | |
|-------------|-----------------|-----------------|-------------|------------------|-----------------|-------------|-----------|----------------|-------------|-----------|-----------------|-------------|
| | Area (ha) | Yield (tons/ha) | Prod (tons) | Area (ha) | Yield (tons/ha) | Prod (tons) | Area (ha) | Yield (ton/ha) | Prod (tons) | Area (ha) | Yield (tons/ha) | Prod (tons) |
| 2008 | 2,150 | 2.72 | 5,851 | 3,180 | 2.76 | 8,777 | 12,500 | 4.7 | 58,513 | 17,830 | 4.1 | 73,141 |
| 2013 | 3,000 | 3.11 | 9,330 | 4,000 | 3.20 | 12,800 | 18,216 | 5.1 | 92,902 | 25,216 | 4.6 | 115,032 |
| 2018 | 4,100 | 3.70 | 14,800 | 5,050 | 3.76 | 18,180 | 26,000 | 5.6 | 145,600 | 35,150 | 5.1 | 178,580 |

Agricultural Economic Review 2008; National Irrigation Board Strategic Plan 2008–2013 and Vision 2030

The figures presented in Table 2 are based on the actual rice production and cultivated area figures for 2008 from four rice producing regions in Central, Coast, Nyanza and Western provinces. The projections are based on rehabilitating and planned expansion of the National Irrigation Schemes which already have infrastructure developed to increase rice production under irrigation. This will also include the use of none aromatic high yielding varieties. The rain fed rice production will be increased through expansion of acreage and utilization of NERICA seeds besides other high quality seed. These interventions are manageable and increase in overall production can be achieved during the planned period.

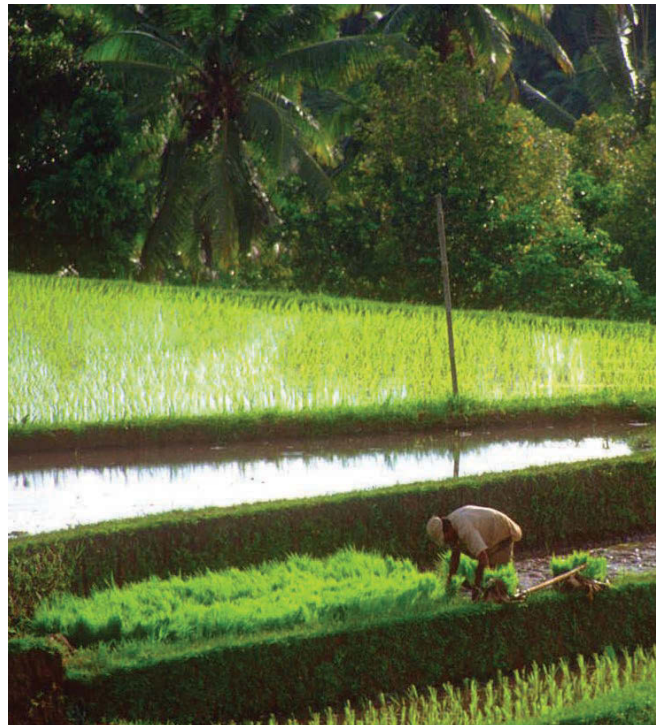


Table 3: Projections on Production and consumption

| Year | Year difference after 2008 | Population at 2.7% Annual growth rate | Estimated Annual National need = Pop.x 8 (kg/person/yr) | Actual Production (kg) | Deficit/Imports (kg) = Need - Actual prod. | Expected Annual Production (kg) to bridge the gap (9.31% increase) | Expected Annual Deficit after increasing Annual Production (kg) by 9.31% |
|------|----------------------------|---------------------------------------|---|------------------------|--|--|--|
| 2008 | 0 | 36,000,000 | 300,000,000 | 73,141,000 | 226,859,000 | 73,141,000 | 226,859,000 |
| 2009 | 1 | 36,972,000 | 295,776,000 | 73,141,000 | 222,635,000 | 79,950,427 | 215,825,573 |
| 2010 | 2 | 37,970,244 | 303,761,952 | 73,141,000 | 230,620,952 | 87,393,812 | 216,368,140 |
| 2011 | 3 | 38,995,441 | 311,963,525 | 73,141,000 | 238,822,525 | 95,530,176 | 216,433,349 |
| 2012 | 4 | 40,048,317 | 320,386,540 | 73,141,000 | 247,245,540 | 104,424,035 | 215,962,505 |
| 2013 | 5 | 41,129,622 | 329,036,976 | 73,141,000 | 255,895,976 | 114,145,913 | 214,891,064 |
| 2014 | 6 | 42,240,122 | 337,920,975 | 73,141,000 | 264,779,975 | 124,772,897 | 213,148,078 |
| 2015 | 7 | 43,380,605 | 347,044,841 | 73,141,000 | 273,903,841 | 136,389,254 | 210,655,587 |
| 2016 | 8 | 44,551,881 | 356,415,052 | 73,141,000 | 283,274,052 | 149,087,094 | 207,327,958 |
| 2017 | 9 | 45,754,782 | 366,038,258 | 73,141,000 | 292,897,258 | 162,967,102 | 203,071,156 |
| 2018 | 10 | 46,990,161 | 375,921,291 | 73,141,000 | 302,780,291 | 178,139,339 | 197,781,952 |
| 2019 | 11 | 48,258,896 | 386,071,166 | 73,141,000 | 312,930,166 | 194,724,112 | 191,347,054 |
| 2020 | 12 | 49,561,886 | 396,495,088 | 73,141,000 | 323,354,088 | 212,852,926 | 183,642,161 |
| 2021 | 13 | 50,900,057 | 407,200,455 | 73,141,001 | 334,059,454 | 232,669,534 | 174,530,921 |
| 2022 | 14 | 52,274,358 | 418,194,867 | 73,141,002 | 345,053,865 | 254,331,067 | 163,863,800 |
| 2023 | 15 | 53,685,766 | 429,486,129 | 73,141,003 | 356,345,126 | 278,009,290 | 151,476,839 |
| 2024 | 16 | 55,135,282 | 441,082,254 | 73,141,004 | 367,941,250 | 303,891,955 | 137,190,299 |
| 2025 | 17 | 56,623,934 | 452,991,475 | 73,141,005 | 379,850,470 | 332,184,296 | 120,807,179 |
| 2026 | 18 | 58,152,781 | 465,222,245 | 73,141,006 | 392,081,239 | 363,110,654 | 102,111,591 |
| 2027 | 19 | 59,722,906 | 477,783,245 | 73,141,007 | 404,642,238 | 396,916,255 | 80,866,990 |
| 2028 | 20 | 61,335,424 | 490,683,393 | 73,141,008 | 417,542,385 | 433,869,159 | 56,814,234 |
| 2029 | 21 | 62,991,481 | 503,931,845 | 73,141,009 | 430,790,836 | 474,262,378 | 29,669,467 |
| 2030 | 22 | 64,692,251 | 517,538,004 | 73,141,010 | 444,396,994 | 518,416,205 | (878,200) |

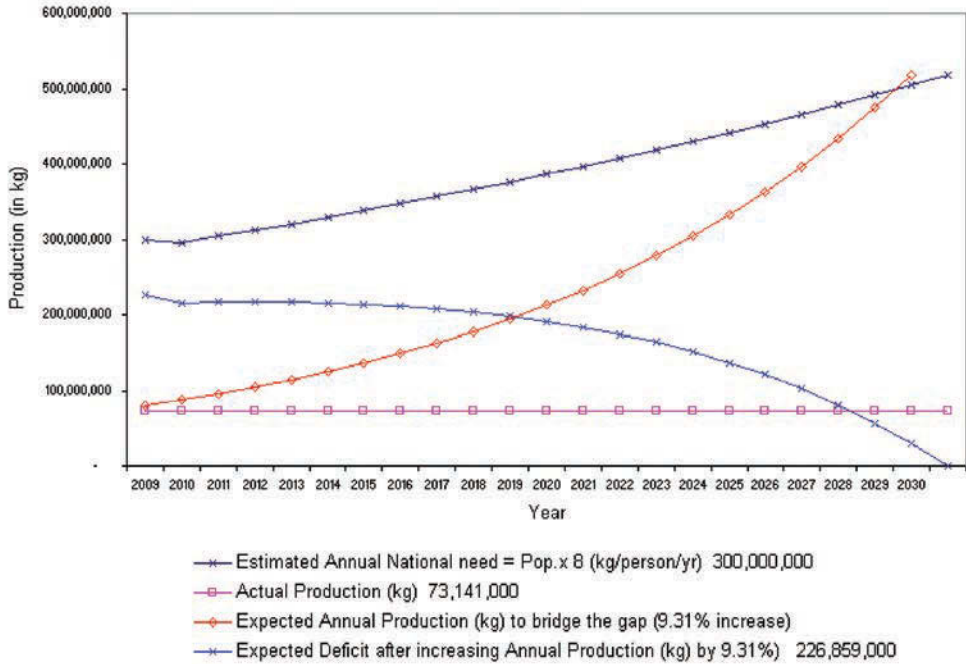


Fig 1: Projections on production and consumption of rice by 2030

Table 4: Long term (10 years) target market price of rice

| Items/ Activities | Year | | | | | | | | | | |
|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| Average Price per 50Kg bag (KES) | 3,500 | 3,500 | 3,600 | 3,600 | 3,800 | 3,900 | 4,000 | 4,100 | 4,200 | 4,350 | 4,500 |

As shown in Table 4 the local market prices are expected to progressively increase from KES 3,500 in 2008 to 4500 per 50 kg bag in 2018 if the current upward trend in price increases continues to prevail.

5.6 Governance Structure of National Rice Development Strategy (NRDS)

NRDS aims at providing adequate institutional framework to mobilise sufficient resources to achieve its objectives in rice production. Lessons learnt from other countries indicate that only those with well institutionalized NRDS have been effective in the rice industry development. At present, various stakeholders actively involved in rice production are not well coordinated. There is need to harness stakeholders together in a forum for more interaction and collaboration to enhance implementation of NRDS.

5.6.1 NRDS organizational structure

To enhance the proper functioning of NRDS there is need to have an organizational structure headed by the Permanent Secretary, Ministry of Agriculture who will be the lead implementer of the NRDS. National Rice Development Stakeholders Forum (NRDSF) members will be entrenched in the existing stakeholder forum.

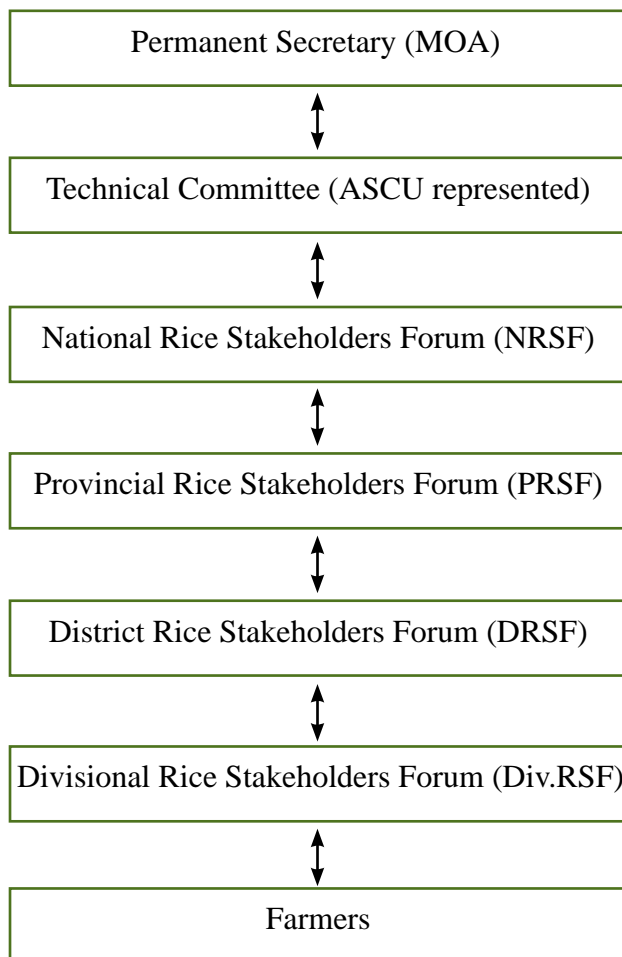


Fig 2: The organizational structure of NRDS stakeholders

Permanent Secretary (MoA)

The Permanent Secretary will appoint the NRSF members, drawn from stakeholders in research, extension, production, irrigation, processing, and marketing. The Permanent Secretary will also appoint members of the technical committee from MoA, KARI, NIB, ASCU, STAK, Universities and Private sector

5.6.2 Technical Committee

The Technical Committee (TC) and Secretariat members will be drawn from MOA, KARI, NIB, ASCU, STAK, Universities and Private sector. The Committee will meet on quarterly basis and will facilitate the implementation of NRSF recommendations by:

- Providing technical and administrative guidance
- Developing the implementation plan for NRDS
- Resource mobilization for the implementation of NRDS
- Provide technical back stopping and feedback
- Undertake Monitoring and Evaluation of NRDS activities.

National Rice Stakeholders' Forum (NRSF)

A national rice stakeholders' forum will be established. Members will elect the chairperson from the members of the Forum. The NRSF will normally hold its meetings twice a year. The forum will be instrumental in priority setting and implementation of interventions identified in NRDS. The NRSF will endeavour to collaborate with regional and international rice stakeholders and partners. It will also participate in regional and international rice development initiatives like the Regional Rice Centre of Excellence. The stakeholders' forum will be composed of but not limited to the following:

- MOA (to provide and house Secretariat)
- Researchers (KARI, NIB, Universities and others)
- Organizations dealing with rice e.g. Dominion Farms
- Relevant Agriculture sector ministries like Water and Irrigation, Regional Development Authorities, Local Government, Cooperatives and Marketing and Trade
- Farmer organizations
- Policy makers
- Regulatory bodies (KEBS, KEPHIS)
- Agro-processors

- Service providers- Stockists and seed producers
- Rice traders and merchants
- NGOs (e.g. SACRED AFRICA etc) and CBOs
- Credit providers (AFC, Banks and MFIs)
- Consumer organization (apex organization)

5.6.4 Terms of reference for the National Rice Stakeholders’ Forum

- Periodical review of NRDS within the frame work of Government policies.
- Set and periodically review extension, research and capacity building agenda.
- Prioritise programs and activities of NRDS.
- Form specialised committees as need arises
- Co-opt other members as need arises
- Monitor and evaluate implementation of NRDS.
- Perform any other related responsibilities.

PRSF and DRSF: They will oversee the implementation of NRDS at the provincial and district levels. They will also perform a monitoring function.

Divisional Rice Stakeholders Forum (RSF)

The Divisional Rice Stakeholders Forum will be the implementing organ for the NRDS. As NRDS implementation proceeds its revisions will be done by the Stakeholders Forum from time to time.

Agriculture Sector Coordination Unit (ASCU)

ASCU will provide linkages with the various stakeholders and development partners during the implementation of the NRDS. It will facilitate collaboration and building of public-private sector partnerships. It will be represented in the technical committee.

5.6.5 Financing

The Government will commit financial resources through its Medium Term Expenditure Framework (MTEF) process and development partners to meet the goals of NRDS. Budgetary allocations will give particular attention to Monitoring and Evaluation mechanisms to ensure efficient and effective implementation of NRDS.

5.6.6 Implementation strategy

Effective implementation of NRDS will depend on the active, integrated and holistic involvement of all the rice stake holders.

5.6.7 Monitoring and evaluation

There is need for a suitable monitoring and evaluation system/ mechanism to track the implementation of NRDS activities. This includes use of results/ logical frameworks, work plans, field visits, quarterly and annual reports, mid-term review and evaluation, end term evaluation and lay groundwork for the formation of the next strategic plan. The government will seek assistance on monitoring and evaluation from national and international partners to support efforts of promoting rice production in Kenya.

5.6.8 Resource mobilization

Considering that, increased production and productivity will be mainly achieved through irrigation development which requires high capital investment, the Government and development partners are called upon to prioritise investment in this area to ensure successful implementation of NRDS. Stakeholders will be encouraged to develop competitive proposals for soliciting support and grants.

5.6.9 Linkages, collaboration and partnerships

Regional and international linkages, collaboration and partnerships (such as ASARECA, WARDA, IRRI, and JIRCAS) will be encouraged to enhance achievements of NRDS goals and objectives.

5.7 Strategic Interventions

5.7.1 Rice productivity increased by developing:

- High yielding , superior quality, pest and disease resistant varieties
- Appropriate agronomic practices for different cropping systems
- Appropriate soil and water management techniques in irrigated rice
- Apply systems of rice intensification (SRI)
- Appropriate pest, disease and weed control technologies
- High quality seed and supply system
- Appropriate crop rotations in rice farming systems.

5.7.2 Area under rice cultivation expanded by:

- Improving and expanding irrigation infrastructure
- Increasing the area under irrigated and rain fed rice production
- Enhance rain water harvesting for rice production
- Improving appropriate mechanization techniques for all rice operations.
- Improve land tenure system

5.7.3 Field and post harvest losses reduced by:

- Appropriate utilization of post harvest technologies
- Apply improved cultural practices
- Improving harvesting, timing and post harvest handling techniques
- Developing and introducing appropriate harvesting and processing equipment.

5.7.4 Farmers access credit and high quality inputs by:

- Ensuring appropriate germplasm and variety maintenance
- Facilitating adequate production, distribution and marketing of good quality seeds
- Facilitating adequate supply and marketing of high quality inputs
- Ensuring affordable credits to farmers.

5.7.5 Extension, advisory support services and technology development and application improved by:

- Providing fully functional research and extension infrastructure
- Developing, packaging, disseminating and promoting appropriate technologies
- Develop Networks for information sharing among farmer organizations, extension and other stakeholders
- Strengthening and improving farmer- extension - research linkages
- Facilitating private sector participation in technology development and transfer
- Addressing human health against malaria and water borne diseases in irrigated system
- Managing environmental resilience through optimal fertilizer utilization.

5.7.6 Human resource development and productivity strengthened by:

- Building adequate human resource for rice research, production and agro-processing
- Creating enabling environment for motivation and retention of staff in research and extension
- Training for skills and technology development at farm level.

5.7.7 Develop markets and marketing channels

- Develop appropriate rice marketing policy
- Establish public private sector partnerships in marketing
- Develop value addition techniques
- Promote access for ICT to link farmers to markets
- Ensure quality of both locally produced and imported rice

5.7.8 Develop and strengthen stakeholder networks and partnerships

- Establish stakeholder forum at all levels and link them to networks
- Strengthen stakeholder networks and partnerships

5.7.9 Monitoring and evaluation (M&E) by:

- Monitoring and evaluating technology uptake
- Monitoring and establishing the status of rice in the country
- Monitoring and promoting production and value addition chains
- Establish feedback mechanisms and interactive platforms.





6.0 Strategies for the Sector

6.1 Value chain analysis

There is need to determine all stages of rice production, processing and marketing in order to address the gaps.

6.2 Variety development and maintenance

The research scientists will acquire germplasm from international rice research institutions for variety evaluation and release. These varieties together with germplasm currently available in the country will be used to develop new ones for different agro-ecological zones.

6.3 Variety Release Mechanism

Varieties will be developed for release after National Performance Trials (NPT) by the National Variety Release Committee (NVRC). The Minister for Agriculture will then release them officially for gazettment and commercial cultivation.

6.4 Seed production and distribution

Breeder's seed

- Variety development will be agro-ecological zone specific, but seed multiplication will be in areas with low biotic stresses.
- Breeder seed will be produced by researchers and maintained in the research institutions.
- Foundation seed will be produced and maintained in the research stations by breeders/scientists.
- Certified seed will be produced by seed merchants, and farmers under the supervision of KEPHIS and rice scientists.
- An integrated formal/informal community based and quality assured seed production system will be developed and strengthened.
- The certified seed will be sold to seed stockists in rice growing areas as per projected requirements for ease of accessibility to farmers.

Table 5: Seed Multiplication Procedure

| Seed type | Research centers | Quantity | Responsible |
|-----------------|--|---------------------------------|--|
| Breeder | KARI Kibos KARI Mwea MIAD Baobab Company in Coast | 1 to 10 kg | Researchers KEPHIS |
| Foundation seed | KARI Kibos KARI Mwea MIAD Baobab Company in Coast | 100 kg | Researchers KEPHIS |
| Registered seed | KARI Kibos KARI Mwea MIAD Baobab Company in Coast | 3000 kg | Researchers KEPHIS Seed merchants |
| Certified seed | KARI Kibos KARI Mwea MIAD Baobab Company in Coast Seed Merchants | As per market requirement | Seed merchants, farmers, seed growers, researchers & KEPHIS |

6.4 Requirements based on the Current Vision and Situation

6.4.1 Infrastructure

- Seed storage facilities
- Temperature regulated stores for bulk seeds
- Seed storage freezers for breeders seed
- Adequate area for seed multiplication in the research centers
- Adequate area for varieties evaluation
- Fully equipped laboratories for seed analysis
- Seed processing equipments
- Rice harvesting machines.

6.4.2 Human resource requirements

Table 6: Number of researchers, technicians and extension workers in 2008 and targets in future

| Year | Agricultural Researchers with MA or PhD. | | | Research Technicians | | | Extension Workers | | |
|------|--|------------------------------|------------------------------|----------------------|------------------------------|------------------------------|-------------------|------------------------------|------------------------------|
| | Total | Rice specialists (part time) | Rice specialists (full time) | Total | Rice specialists (part time) | Rice specialists (full time) | Total | Rice specialists (part time) | Rice specialists (full time) |
| 2008 | 20 | 12 | 8 | 48 | 20 | 28 | 817 | 685 | 132 |
| 2013 | 32 | 16 | 16 | 60 | 26 | 34 | 899 | 754 | 20 |
| 2018 | 56 | 22 | 34 | 84 | 32 | 52 | 989 | 829 | 160 |

6.4.3 Institutions

Table 7: Institutional Roles

| Activity | Institution |
|---------------------|--|
| Variety Development | KARI/NIB (in collaboration with International Research Institutions) |
| Variety evaluation | KARI&NIB, Universities with MOA and farmers as observers |
| Breeder seed | KARI/NIB /Public Private breeders, KEPHIS |
| Foundation seed | KARI/NIB/Public/Private breeders, KEPHIS |
| Registered seed | KARI & NIB, Public, Private Sector, KEPHIS |
| Certified seed | Seed merchants, NIB, MOA, KARI, KEPHIS |

6.4.4 Private seed sector development

Private seed merchants will be encouraged to participate as the rice industry develops.

6.5 Fertilizer Marketing and Distribution

Table 8: National Fertilizer Requirements

| Fertilizer type | Amount/ Ha (kg) | National requirements (tons) | | |
|---------------------|-----------------|------------------------------|-----------|-----------|
| | | Year 2008 | Year 2013 | Year 2018 |
| Production Area Ha) | - | 17839 | 35660 | 53490 |
| DAP | 185 | 3300 | 6597 | 9896 |
| SA | 309 | 5512 | 11019 | 16528 |
| CAN | 247 | 4406 | 8808 | 13212 |
| MOP | 185 | 3300 | 6597 | 9896 |

6.6 Post Harvest Requirements

Technologies for each step:

- Cutting - Sickles and small scale harvesters will be required
- Threshing - To develop small motorized threshers
- Winnowing - To develop small scale motorized winnowers
- Drying - To develop small scale driers
- Storage - To construct seed storage facilities
- To construct driers for paddy rice in the rice growing areas
- Milling - Private entrepreneurs will be encouraged to install improved rice mills
- Provide pass mills in the rice growing rural areas.
- There is need to introduce mobile mills
- Grading - Seed and paddy rice grading equipment will be required
- Packaging - Rice seed and milled rice will be packaged in appropriate materials.

Development of the above equipments will be done by National Rice Stakeholders Forum in collaboration with Agriculture Technology Development Centers (ATDCs), KIRDI and *Jua Kali* sector.

6.7 Marketing Vision

Development of competitive marketing channels will play a key role in stimulating rice production.

6.7.1 Targeting Market price and quality

- Prices will be determined by forces of demand and supply, variety and quality of milled rice. In the event of oversupply, NRSF will recommend that the Government buys excess for the National Strategic Food Reserves.
- The NRSF will liaise with government to address the marketing constraints that distort rice supply and demand.
- Private sector will be expected to play a key role in rice trade and marketing.
- Variety Development will be oriented towards consumer demand to enhance domestic market.
- Quality of locally milled and imported rice will be regulated in accordance with international and national food/rice standards and enacted by KEBS.

6.8 Irrigation and Investment in Water Control Technology

- Rehabilitation and modernization of infrastructure of the existing schemes and the newly expanded areas is required.
- In view of the high cost of pumping water, gravity irrigation systems need to be installed in all the existing and upcoming rice schemes.
- There will be need to increase water resources availability for irrigation and other uses by water harvesting and development of water storage infrastructure.
- There will be need to improve on various efficiencies by canal lining and adequate water management including operation and maintenance of all flow control and measurements structures.
- There will be need to build capacity in irrigation and drainage research and water management.
- Capacity build and train irrigation water users association (IWUAs) to effectively fulfill their mandate to sustainably fund, operate and maintain their irrigation infrastructure.

6.9 Access to and Maintenance of Agricultural Equipment

- Land preparation- Private entrepreneurship will be encouraged to participate in ploughing and rotavation.

- Farmers will be introduced to animal draft implements for puddling and ploughing.
- Research on land preparation equipment involving key stakeholders will be continuous.
- The private sector in collaboration with scientists will be encouraged to design, fabricate and repair land preparation, harvesting and post harvest equipment.

6.10 Research, Technology Dissemination and Capacity Building

Research, technology dissemination and capacity building will play a key role in realization of the NRDS strategic objectives.

6.10.1 Technology generation and access to knowledge

- Technology generation will be spearheaded by National Technology and Research institutions namely, Universities, Polytechnics, KIRDI, KARI and NIB.
- Participatory research will be encouraged where farmers and extension personnel will be involved.
- Annual research findings will be presented in joint research, extension and farmer conferences/committees and published documents availed to the stakeholders.
- It is recommended that growers manual be updated regularly as new technologies emerge.
- Field days and demonstrations will be held every season and whenever necessary.
- Participation in ASK shows will be of paramount importance
- Bulletins print, electronic media and ICT will be used to disseminate new technologies.

6.10.2 Genetic resources conservation and use

Research scientists will acquire germplasm from international rice research institutions for varietal evaluation and release. New varieties will also be developed from the locally available germplasm and land races through plant selection and hybridization.

6.10.3 Soil health/fertility management

- Soil health/fertility trials will be carried out in all rice growing areas to determine fertility amendment methods/rates.

- Similarly, soil water relationship research will be conducted in all the rice growing areas.
- Appropriate crop rotations will be applied to improve soil fertility.
- Plant water requirement research will be done for water use efficiency.
- Disseminations of appropriate soil and water technologies will be taken to farmers.
- Demonstrations to be undertaken with the farmers on Soil and water management.

6.10.4 Advisory Services – extension/NGOs/Agribusiness

- Advisory services will be provided through extension service providers.
- Training on rice production, processing and marketing will be done to farmers, common interest groups and farmer field schools.
- Pamphlets, brochures and video messages will be developed for informing rural communities on new developments in the rice industry.
- Encourage farmer to farmer extension.
- Strengthening of Agriculture extension desks to provide information to farmers.
- Strengthening of Agricultural Training Centres to provide training in rice production, processing and marketing to stakeholders.

6.10.5 Producer Organizations

Farmers will be facilitated to form producer organizations to achieve economies of scale, ease access to services such as extension, market information and markets.

6.10.6 Access to credit/agricultural finance

Farmers will be facilitated to access affordable credit through their associations.

6.10.7 Capacity building

- There will be capacity building of human resource for research and extension workers.
- There will be capacity building of stakeholders along the value chain in all techniques related to rice production, processing and marketing.
- In addition there will be capacity building for input stockists and agro-processors for value addition chains.



7.0 Conclusions and Recommendations

- It is important to note that rice will continue to play a vital role in food security in Kenya.
- There is need to undertake value chain analysis in order to determine the gaps and develop interventions to address them.
- Efforts therefore need to be made to address challenges facing rice by increasing investments in research and development.
- The importance of seed as a key input in production cannot be overemphasized; hence deliberate efforts have to be made towards production and distribution of clean certified seed to farmers.
- A system for production and distribution of seed needs to be established so as to acquire the necessary quantities to farmers.
- Extension activities on technical guidance, seed production and distribution, and awareness creation to be increased.
- Establishment of harvesters, threshers and rice mills among others, need urgent attention for increased rice production.

- Expansion and improvement of existing schemes together with development of upland and wetland areas will go a long way in increasing the area under production.
- Farmers and farmer organizations together need to be empowered to undertake production, processing and marketing of rice.
- It is important to address the issue of post harvest management to reduce losses and improve quality of rice.
- There is need for financial support for technology development and dissemination/ extension services, capacity building and provision of mobile mills.
- In order to support farmer capacity to acquire seed and other inputs there is need to establish a revolving fund for sustainability.
- In order to attract the youth into rice farming and also increase productivity of the aged there is need to reduce drudgery by introducing small-scale mechanization equipment and machinery.
- The proposed NRDS requires capital investment for its successful implementation, in this respect, the public-private sector partnership and development partners' collaboration in resource mobilization with target of at least US\$25 million will be imperative for the first five years.



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REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE

P.O Box 30028, Nairobi, Kenya

Tel: +254 20 2718870