Reveal quality and price determinants of an orphan crop in India and Nepal

Doreen Buergelt*, Matthias von Oppen*

Christian-Albrechts-Universität zu Kiel

Ricebean - an orphan crop

The ricebean (*Vigna umbellata*) is a traditional but 'orphan' pulse in India and Nepal. 'Orphan' crops are i) locally plentiful but globally rare, ii) there is little scientific information about them available and iii) their current use is limited, relative to their economic potential (GRUERE ET AL. 2007). Many orphans have a high potential to be improved by breeding as a mean of generating food and sustainable income for the local producers but until today, there are no enhanced ricebean varieties.

Fig. 1. Several variations in colour, form and size of ricebean (*Vigna umbellata*)

Objectives

The ricebean should be improved by breeding in two ways. First, by increasing the yield and, second, by introducing new varieties which would satisfy consumer preferences. Therefore, desired characteristics of the ricebean were identified.

METHODS

Hedonic price analysis - The central idea is that goods are valued by consumers for their utility deriving characteristics (LANCASTER 1966). Thus, the demand for a special characteristic is revealed through the demand for a product that contains that characteristic. Therefore, product prices change if the quantity of the characteristics changes (BROCKMEIER 1993).

Fig. 2. Market places of ricebean

Consumer preferences were obtained in 3 steps:

1) January-March 2008: 167 ricebean samples + prices were collected in markets in Nepal and India.
2) Samples were analysed in laboratories to determine parameters shown in Fig.4. & Fig.5.
3) Regression analysis was used to estimate the influence of characteristics on prices.

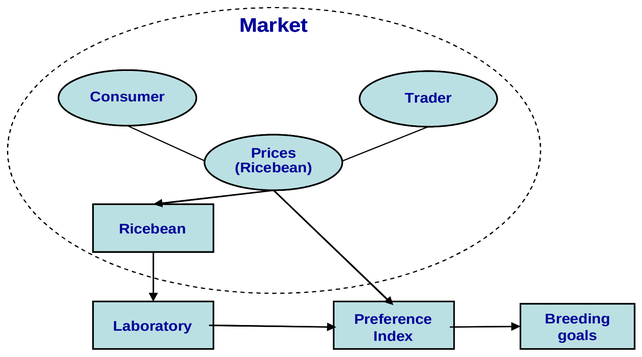

Fig. 3. Proceeding to identify preferred characteristics

RESULTS

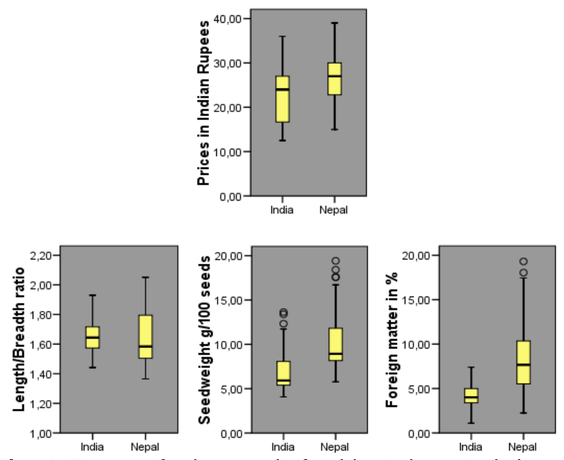

Fig. 4. Range of prices and of evident characteristics of samples collected in India and Nepal, January-March 2008

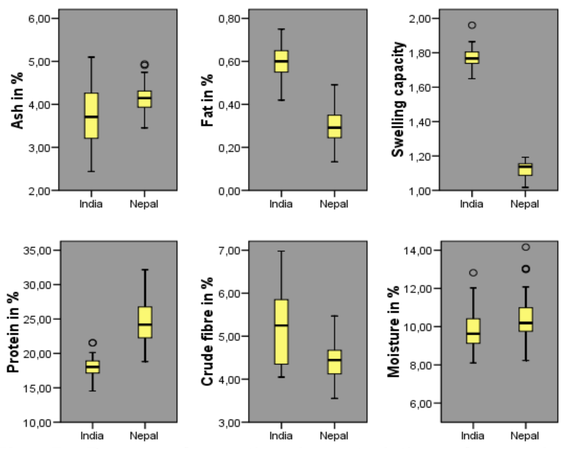

Fig. 5. Range of cryptic characteristics of samples collected in India and Nepal, January-March 2008

The laboratories in India and Nepal respectively were entered as *country-dummy* to prevent distortion.

Market locations were grouped by their population density (persons/km²) into three categories, *rural, semi-urban and urban*.

The *share of each colour* was determined and a *colour-diversity- index* (Herfindahl-Index) was calculated. $HI = \sum_{i=1}^{n} s_i^2$

For the regression analysis a double-log form was chosen. The estimated coefficients can be interpreted as *elasticity of characteristics*. The equation is shown in F 1.

F 1: $\ln P_i = \ln \alpha + \beta_1 \ln q_{1i} + \beta_2 \ln q_{2i} + \sum_j \beta_j \ln q_{ji} + \mu_i$

P_i: price of ricebean sample i
α: constant
j: characteristic
i: sample
β_j: coefficient of characteristic j
q_{ji}: quantity of characteristic j in sample i
μ_i: random error

Tab. 1. Results for Nepal and India

Dependent variable: ln price

Variable	Coefficient	t-value
Constant	**1.756** ***	(2.88)
Country	**0.024**	(0.16)
Rural	**-0.439** ***	(-10.25)
Urban	**-0.014**	(-0.35)
Moisture	**-0.183**	(-1.39)
Protein	**0.286** ***	(2.52)
Fat	**0.173** ***	(3.20)
CrudeFibre	**0.231** *	(1.86)
Ash	**-0.010**	(-0.09)
Seedweight	**0.360** ***	(6.48)
Foreign matter	**-0.033**	(-1.04)
Length/Breadth ratio	**0.289** *	(1.73)
Swelling capacity	**0.040**	(0.92)
Black	**0.008**	(1.38)
Brown	**-0.003**	(-0.66)
Gray	**-0.012** **	(-2.35)
Olive	**-0.007** *	(-1.77)
Red	**-0.006**	(-1.15)
Yellow	**0.010**	(-1.42)
Colour diversity	**-0.147** ***	(-2.53)
N:153, adj.R^2	0.70	

***/**/* significant at 1; 5 or 10% significance level, t-values in brackets

CONCLUSIONS

The results show that there are characteristics which should be considered when breeders choose the parents for further breeding.

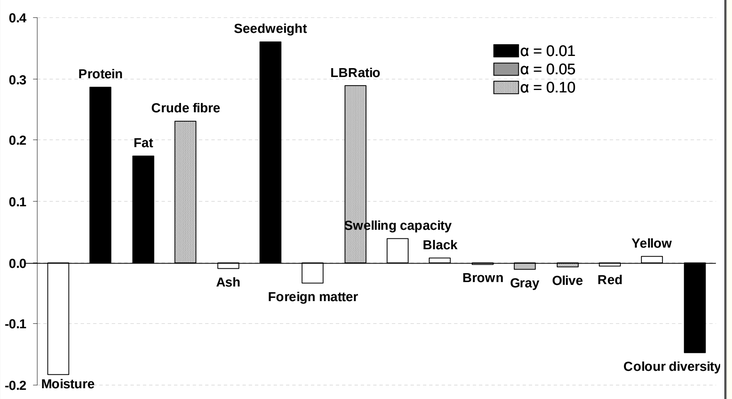

Fig. 6. Coefficients for India and Nepal, N: 153, adj. R^2: 0.70

Tab.2. Evaluation of ricebean varieties

#	ID		Protein %	Fat %	Seedweight	∑bj qji	Rank
1	100	high protein	32.16	0.26	13.03	13.93	**3**
2	85		31.21	0.21	8.26	11.94	**8**
3	112		31.16	0.32	5.78	11.05	**10**
4	4		31.00	0.39	7.84	11.76	**9**
5	51		30.99	0.15	10.93	12.82	**5**
6	150	high fat	18.20	0.75	6.33	7.61	**12**
7	140		17.15	0.75	8.31	8.03	**11**
8	159		14.56	0.72	4.63	5.96	**15**
9	162		18.03	0.71	5.29	7.18	**13**
10	165		18.20	0.69	4.69	7.01	**14**
11	87	high seed-weight	26.39	0.35	19.42	14.60	**2**
12	72		28.13	0.27	18.41	14.72	**1**
13	67		23.44	0.27	17.61	13.09	**4**
14	69		20.47	0.32	17.55	12.23	**7**
15	48		22.37	0.20	16.70	12.44	**6**
Coefficients			**0.286**	**0.173**	**0.360**		

The ranking in Tab.2. was calculated with the coefficients from the regression analysis. It shows that *seed size and protein content are more important than fat content.*

The final evaluation of the ricebean does not only depend on the set of significant characteristics. Due to the costs of breeding breeders should only focus on some characteristics.

According to the results a new ricebean variety should have:

a high protein content & bold seeds.

LITERATURE CITED

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*Department of Agricultural Economics
Innovation & Information
Christian-Albrechts-University at Kiel
Phone: +49 431 880-4408
E-mail: dbuerge@ae.uni-kiel.de
www.agric-econ.uni-kiel.de/Abteilungen/II/