

## Supporting Information for:

### Appendix A – R function for estimation the equivalent index of stability and performance (EISP)

#### Example of function application

##### Getting started

This supplementary material included R function for [estimation the equivalent index of stability and performance \(EISP\)](#) ([Appendix A](#)), [supplementary tables](#) ([Appendix B](#)) [supplementary figures](#) ([Appendix C](#)).

```
> library(utils)
> data <- read.csv (file="D:/testR/inData.csv",sep = ",", header = T
RUE)
> # Y: Grain yield and S: one of the stability indices (in this case
, ASV)
> head(data,3)
  GEN     Y     S
1  G1 4607 26.3
2  G2 4699 63.1
3  G3 4418 11.8
> tail(data,3)
  GEN     Y     S
16 G16 3908 19.2
17 G17 3883 19.6
18 G18 4504 27.8
>
> # function body
> EISP <- function(data , rY= NULL, rS=NULL)
+ {
+   #data
+   if( is.null( rY ))
+     rY = 0.5
+   if( is.null( rS ))
+     rS = 0.5
+
+   EIASP <- c()
+   RanKEISP <- c()
+   j <- 1
+   maxY = max(data[, "Y"])
+   minY = min(data[, "Y"])
+   maxS = max(data[, "S"])
+   minS = min(data[, "S"])
+   k <- 2
+   for(i in data[, "Y" ])
+   {
+
+     EIASP[j] <- ( ((data[j, "Y"] - minY ) / ( maxY - minY )) * rY
) + ( ( 1- ((data[j, "S"] - minS)/(maxS - minS)) ) * rS )
+     j <- j+1
+   }
+
+   data$EIASP <- EIASP
+   data$RanKEISP <- rank(-EIASP)
+   print( data )
+ }
> # Save the function
> dump ("EISP","EISP.R")
> source ("EISP.R")
>
> #Example of function application
> EISP(data) # for blanced weight of mean performance and stability
  GEN     Y     S     EIASP RanKEISP
1  G1 4607 26.3 0.73547385         4
2  G2 4699 63.1 0.64499475        12
```

```

3  G3 4418 11.8 0.73972039 3
4  G4 4227 36.6 0.62673054 13
5  G5 5684 26.6 0.95600476 1
6  G6 4237 12.4 0.70072463 7
7  G7 4904 74.3 0.65384743 11
8  G8 4466 110.0 0.45767443 16
9  G9 4323 12.4 0.71840555 5
10 G10 4240 14.9 0.69390978 8
11 G11 4157 17.3 0.66971127 9
12 G12 5470 49.8 0.84304253 2
13 G13 4148 19.2 0.66221290 10
14 G14 3353 161.0 0.07724518 17
15 G15 3252 180.0 0.00000000 18
16 G16 3908 19.2 0.61287080 14
17 G17 3883 19.6 0.60654194 15
18 G18 4504 27.8 0.70983889 6
> EISP(data, rY=0.9,rs=0.1) # for higher weight (0.9) of mean performance
  GEN  Y  S  EIASP  RankeEIASP
1  G1 4607 26.3 0.59281846 5
2  G2 4699 63.1 0.60498579 4
3  G3 4418 11.8 0.53149671 7
4  G4 4227 36.6 0.44606979 12
5  G5 5684 26.6 0.99120095 1
6  G6 4237 12.4 0.46415808 10
7  G7 4904 74.3 0.67419054 3
8  G8 4466 110.0 0.49087699 9
9  G9 4323 12.4 0.49598374 8
10 G10 4240 14.9 0.46378196 11
11 G11 4157 17.3 0.43163962 13
12 G12 5470 49.8 0.89821377 2
13 G13 4148 19.2 0.42717942 14
14 G14 3353 161.0 0.04867272 17
15 G15 3252 180.0 0.00000000 18
16 G16 3908 19.2 0.33836363 15
17 G17 3883 19.6 0.32887418 16
18 G18 4504 27.8 0.55380988 6

```

## Appendix B

**Supplementary Table S1.** Eigenvalues and explained variance obtained in the factor analysis

PC	Eigenvalues	Variance (%)	Cum. variance (%)
PC1	4.61	57.6	57.6
PC2	1.11	13.9	71.5
PC3	0.997	12.5	84
PC4	0.636	7.95	91.9
PC5	0.343	4.29	96.2
PC6	0.22	2.75	99
PC7	0.073	0.913	99.9
PC8	0.00898	0.112	100

**Supplementary Table S2.** Factorial loadings after varimax rotation, and communalities obtained in the factor analysis

VAR	FA1	FA2	Communality	Uniquenesses
PH	-0.908	0.133	0.841	0.159
TN	-0.152	-0.872	0.784	0.216
PL	-0.0767	-0.67	0.455	0.545
FG	-0.57	-0.33	0.434	0.566
UNFG	-0.717	-0.623	0.902	0.0981
FP	-0.713	-0.639	0.917	0.0829
HGW	-0.728	-0.229	0.582	0.418
GY	-0.653	-0.617	0.807	0.193

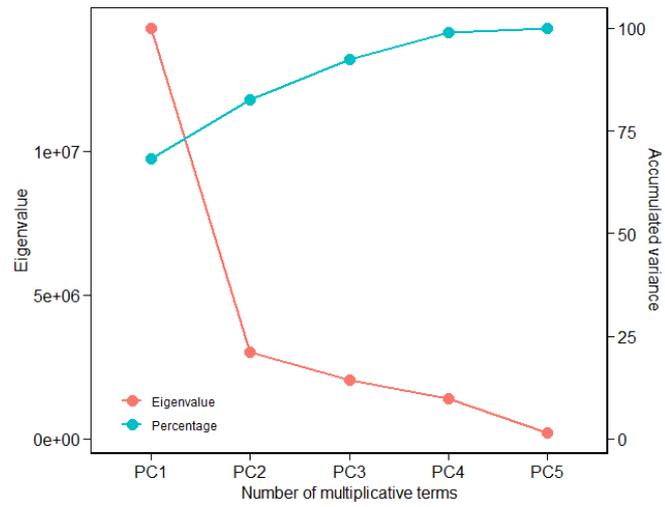
**Supplementary Table S3.** The related traits and genotypes for each of factors

Factor	Related traits to FA	Related Genotypes to FA
FA1	PH, FG, UNFG, FP, HGW, GY	G18, G2, G4, G5, G6, G1, G10, G14, G15
FA2	TN, PL	G7, G8, G9, G11, G12, G13, G17, G3

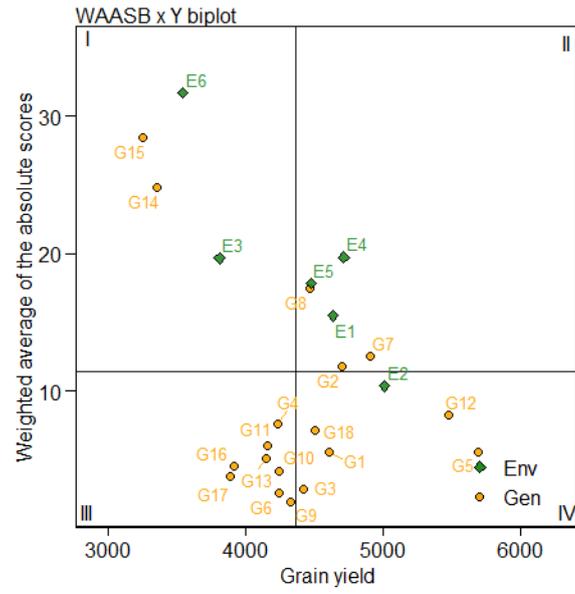
**Supplementary Table S4.** The origin/pedigree of rice genotypes used in this experiment

Genotype code	Genotype	Pedigree
G1	TM6-230-VE-7-5-1	Parent: Tarom
G2	TM6-230-VE-8-4-1	
G3	TM6-250-10-7-1	
G4	TM6-B-2-1-E	
G5	TM6-B-7-1	
G6	TM6-B-19-2	
G7	HM5-250-E-1-1	Parent: Hashemi
G8	HM5-250-E-3-2	
G9	HM5-250-6-6	
G10	HM5-250-7-6	
G11	HM5-300-12-1	
G12	HM5-300-3-1	
G13	HM5-300-5-1	Parent: Khazar
G14	KM5-200-4-2-E	
G15	Khazar	IR36/TNAU4756
G16	Hashemi	Iranian landrace
G17	Tarom	Iranian landrace
G18	Gilaneh	Saleh×Abjibuji

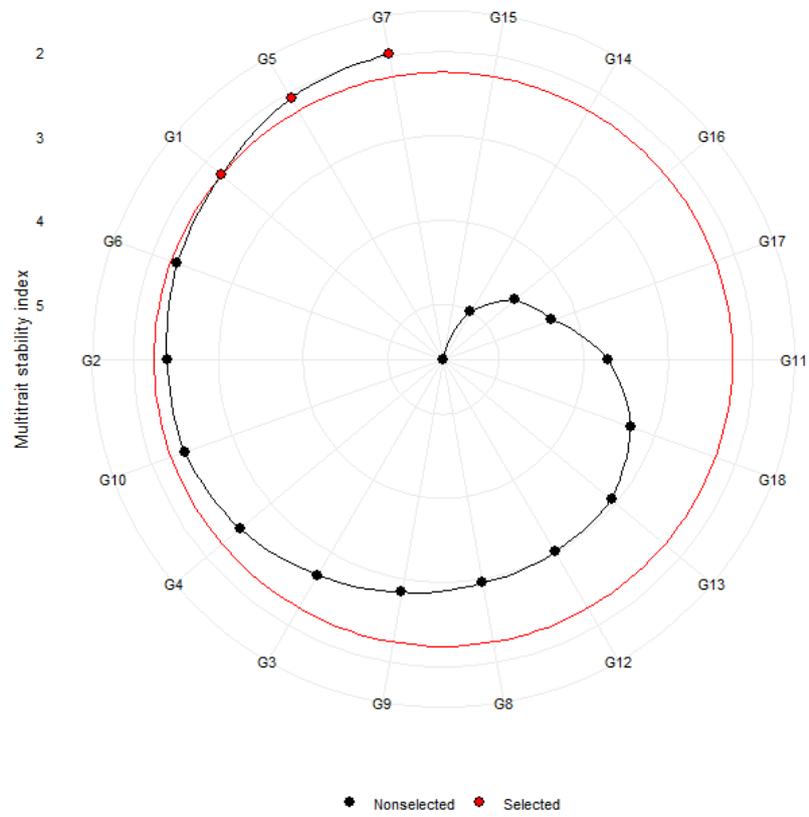
## Appendix C



**Supplementary Fig. S1.** Eigenvalues of the BLUP\_GEI matrix for grain yield of 18 rice genotypes across six environments



**Supplementary Fig. S2.** Biplot of grain yield vs WAASB of 18 rice genotypes evaluated over six environments (combinations of three cultivation years in three locations)



**Supplementary Fig. S3.** Genotype ranking and selected genotypes for MTSI.