

# Table 1: 3 Catch Model

Table 1. Model selection tests of time-dependency and linearity for the  $S_t$  model using F-tests of nested models fit to log landings data.  $S_t$  is the catch during Qtr 3 (Jul-Sep) of season  $t$ .  $N_{t-1}$  is the catch in the prior sardine season during the post-monsoon period (Oct-Jun, of the previous sardine season).  $N_{t-2}$  is the same for two seasons prior.  $s()$  is a non-linear function of the response variable.

Model	Residual df	MAPE	XAPE	Adj. R2	F	p value	AIC
Naive Model 1982-2014 data							
$\ln(S_t) = \ln(S_{t-1}) + \epsilon$	33	3	48.4				96.23
AR-1 Model							
$\ln(S_t) = \alpha + \beta \ln(S_{t-1}) + \epsilon$	31	3.1	56.2				93.54
Time dependency test							
1. $\ln(S_t) = \alpha + \ln(N_{t-1}) + \epsilon$	32	2.9	48.1	27.7			98.23
2. $\ln(S_t) = \alpha + \beta \ln(N_{t-1}) + \epsilon$	31	3.1	56.2	39.1	6.84	0.014	93.54
3. $\ln(S_t) = \alpha + \beta_1 \ln(N_{t-1}) + \beta_2 \ln(N_{t-2}) + \epsilon$	30	3.5	56.2	38	0.46	0.503	95.03
Linearity test							
1. $\ln(S_t) = \alpha + \beta \ln(N_{t-1}) + \epsilon$	31	3.1	56.2	39.1			93.54
2. $\ln(S_t) = \alpha + s(\ln(N_{t-1})) + \epsilon$	29.5	2.9	50.8	47.1	4.25	0.036	89.79
3. $\ln(S_t) = \alpha + s(\ln(N_{t-1})) + s(\ln(N_{t-2})) + \epsilon$	27.2	2.4	47.9	51.1	1.87	0.169	88.81